CHINO AIRPORT

SAN BERNARDINO COUNTY

AIRPORT LAYOUT PLAN AND NARRATIVE REPORT

AIRPORT LAYOUT PLAN & NARRATIVE REPORT

For
CHINO AIRPORT

Prepared for
San Bernardino County, California

By

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Airport Consultants

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SAN BERNARDINO COUNTY

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INTRODUCTION

SAN BERNARDINO
COUNTY

INTRODUCTION

EXECUTIVE SUMMARY

The Chino Airport (CNO) is a na. onal general aviation reliever facility as classified by FAA. Airports in this classification are some of the most complex airports in the nation as they accommodate every manner of general aviation activity from the largest business jets to the small single engine piston aircraft. The airport is owned and operated by the San Bernardino County Department of Airports, and it is one of six airports in the County owned airport system.

The Department of Airports pursues a continuous planning methodology for their airports to be positioned to address any necessary capital projects in a timely manner. In some instances, the Department of Airports will utilize FAA grant funding for various capital projects. A requirement to be eligible for FAA funding is that the Airport Layout Plan (ALP) be current. This project endeavors to update CNO ALP to account for changes (increases) in aeronautical activity and to address the most recent FAA design standards, which have a significant impact on the airfield geometry at CNO.

During the study process of this ALP Update project, and at the request of the FAA, an additional Airfield Geometry Study was undertaken. That study, included as an appendix to this ALP Update, helped inform and guide the alternatives development process and ultimately the recommended development concept (**Exhibit 5A**) of this ALP Update. In relation to the airside facilities, numerous taxiway geometry changes are recommended for the purpose of meeting the most recent design standards contained in FAA AC 150/5300-13B, *Airport Design*. The recommended changes are intended to address each of the four existing hot spots on the airfield. In addition, the proposed taxiway geometry changes are intended to make the airport more intuitive for pilots so that the potential for runway events such as a runway incursion, is reduced or eliminated.

The proposed taxiway changes are extensive and will take many years to complete. The ALP Update includes a detailed 20-year capital improvement program in which safety related projects, such as the taxiway geometry changes, are considered the highest priority. As one of the busiest general aviation airports it is imperative that the airfield geometry aid pilots in their situational awareness. To this end, the taxiways are proposed to be reconstructed at a uniform width of 35 feet. The list of capital projects is available on **Exhibit 6A**, and the phasing of the projects is graphically presented on **Exhibit 6C**.

The ALP Update includes a new 20-year forecast of aviation demand in which projections of based aircraft and operations are presented. An analysis of the current and future critical aircraft was also undertaken. The current critical aircraft is C-II-2A and the future critical aircraft is D-III-2B.

This ALP Update provides a roadmap of potential capital projects that the Department of Airports may pursue. The projects listed are nearly all eligible for FAA grant funding. The highest priority projects directly related to safety, which are also the highest priority projects for FAA grant funding.

The Chino Airport (CNO) – Airport Layout Plan & Narrative Report (ALP Update) provides an evaluation of the airport's aviation demand and an overview of the systematic development that will best meet those demands. The Federal Aviation Administration (FAA) recommends that airports update their primary local planning documents periodically, or as necessary to address local changes. The ALP Update establishes development objectives and provides a 20-year planning period that details specific study elements, including airfield configuration, facility development, on-airport land use development recommendations, and support facilities. It also serves as a tool for evaluating airport improvement priorities, as well as justifying the need for federal and state funding assistance. The previous master plan for Chino Airport was originally prepared in November 2011 and was "accepted" by the County of San Bernardino Board of Supervisors on December 6, 2011; however, the master plan was not finalized or fully adopted by the Board of Supervisors. Therefore, the current active airport planning document is the master plan that was approved in 2006. The ALP technical drawing has been modestly updated several times since then, with the most recent revision occurring in 2015.

Since that time, existing conditions have changed as have FAA guidelines and regulations, aviation forecasts need to be revised, and airport development priorities need to be re-evaluated. As a result, the local CNO planning document must be updated, and then presented to the Board of Supervisors for formal adoption. As such, this ALP Update is a necessary and timely re-evaluation of the airport's existing conditions, capabilities and role, potential improvement needs, impact on the local economy, and value related to the national air transportation system.

The County of San Bernardino recognizes the importance of air transportation to the community, as well as the associated challenges inherent in maintaining a safe and efficient airport environment. The cost of maintaining an airport is an investment which yields impressive benefits to the community. With a sound and realistic ALP Update, Chino Airport can maintain its role as an important link to the national air transportation system for the region, while maintaining the existing public and private investments in its facilities.

An important outcome of the ALP Update process is a recommended development plan that reserves sufficient space for future facility needs. Such planning will protect development areas and ensure they will be readily available when required. The intended outcome of this study is a detailed on-airport land use concept which outlines specific uses for all areas of airport property, including strategies for revenue enhancement.

STUDY OVERVIEW

The County of San Bernardino, as the airport sponsor, is responsible for funding capital improvements at the airport, as well as obtaining Federal Aviation Administration (FAA) and California Department of Transportation's Division of Aeronautics (CALTRANS) development grants. Additionally, the county oversees private entities' facility enhancements and infrastructure development on airport property to ensure compliance with federal, state, and local regulations. The ALP Update provides guidance for future development and justification for funding airport projects by the FAA and CALTRANS through an updated capital improvement program (CIP).

The ALP Update process will follow a systematic approach outlined by the FAA to identify existing and future airport needs in advance of actual need for improvements. This is done to ensure that county officials and airport staff can coordinate environmental reviews, project approvals, design, financing, and construction to minimize the negative effects of maintaining and operating inadequate or insufficient facilities. The intended result is a recommended development concept which outlines the proposed uses for separate areas of the airport.

The County of San Bernardino has contracted with Coffman Associates, Inc. (a national airport planning firm) to undertake the development of the ALP update. The study is prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, and (AC) 150/5300-13A, *Airport Design*.

ALP UPDATE GOALS AND OBJECTIVES

The primary objective of the CNO ALP Update is to develop and maintain a financially feasible, long-term development program which will satisfy aviation demand and be compatible with community development, other transportation modes, and the environment. The accomplishment of this objective requires the evaluation of the existing airport, and a determination of which actions should be taken to maintain an adequate, safe, and reliable airport facility meeting the air transportation needs of the area. The completed ALP Update provides an outline of the necessary development and gives responsible officials notice of future needs to aid in planning, scheduling, and budgeting.

This ALP Update will provide guidance, through an updated CIP, to outline for the airport sponsor (County of San Bernardino) what investments may be required for the future development and maintenance of the airport facilities. The plan will consider and be coordinated with other planning studies in the area and with aviation plans developed by the FAA and CALTRANS. This study will also take into consideration historical planning documents, including the *Chino Airport Draft Final Master Plan* (January 2012), as well as the most recently updated Airport Layout Plan (ALP) (Draft dated January 2015).

Some specific goals of this ALP Update are outlined below:

- Justify proposed development through the technical, economic, and environmental investigation of concepts and alternatives;
- Provide an effective graphic presentation of the development of the airport and anticipated land uses in the vicinity of the airport;

- Establish a realistic schedule for the implementation of the development proposed in the plan, particularly the short-term CIP;
- Propose an achievable financial plan to support the implementation schedule;
- Provide sufficient project definition and detail for subsequent environmental evaluations that may be required before a development project is approved;
- Present a plan that adequately addresses the issues and satisfies local, state, and federal regulations;
- Research and evaluate socioeconomic factors likely to affect the air transportation demand in the region;
- Determine the projected facility needs of airport users through the year 2039, by which to support airport development alternatives;
- Recommend improvements that will enhance the airport's safety capabilities to the maximum extent possible;
- Recommend improvements that will enhance airport capacity to the maximum extent;
- Produce current and accurate airport base maps and ALP drawings;
- Establish a schedule of development priorities and a program for the improvements; and
- Prioritize the airport capital improvement program and develop a detailed financial plan.

This ALP Update will provide recommendations from which the County of San Bernardino may take action to improve the airport and all associated services important to public needs, convenience, and economic growth. The plan will benefit all residents of the area by providing a single comprehensive plan which intends to support and balance continued growth of aviation activities and the environmental preservation of the surrounding areas.

ALP UPDATE TASKS

The ALP Update for the airport specifically addresses the following tasks:

- Assist the County of San Bernardino in determining a vision for the airport;
- Conduct outreach to allow the general public an opportunity to be informed on the airport and provide input related to the study process;
- Analyze strengths, weaknesses, realistic markets, goals, resources, and strategies to move forward. This analysis will factor in the strengths and weaknesses of the airport to include physical and operational features.
- Establish goals and priorities for the airport to meet the vision based on the realistic evaluation of the facility in terms of configuration, condition, amenities, location, competition, and forecasted aviation demand;
- Identify airfield alternatives based on goals and opportunities as well as applicable airport design standards. The analysis will include an evaluation of the airfield geometry to address potential runway incursion hot spots and nonstandard conditions, in addition to providing recommendations for conformance and improvement;

- Provide a landside development plan that identifies areas for accommodating the forecasted growth of aviation, aviation-related businesses and, if appropriate, areas for non-aviation revenue-producing opportunities. Consideration will be given to the potential new or expanded aviation facilities, including, but not limited to, aircraft storage hangar capacity, aircraft parking apron space, and support facilities;
- Access compatible land uses near the airport; and
- Prioritize pavement/facility preservation and rehabilitation recommendations in order of greatest overall positive impact.

BASELINE EXPECTATIONS

This type of study typically outlines some baseline expectations that will be used throughout the analysis. The baseline expectations for this study include:

- Chino Airport will continue to operate as a publicly owned regional general aviation reliever airport through the 20-year period, as identified by the FAA *National Plan of Integrated Airport Systems* (NPIAS) Report 2021-2025;
- The airport will continue to serve general aviation tenants and itinerant and/or local aircraft operations by general aviation and air taxi operators;
- The aviation industry will grow through the planning period as projected by the FAA. Specifics of projected growth in the national commercial and general aviation industry are contained in Chapter Two - Forecasts of the ALP Update; and
- A federal and state airport improvement program will be in place through the planning period to assist in funding capital development needs.

ALP UPDATE ELEMENTS AND PROCESS

The CNO ALP Update is being prepared in a fashion pursuant to the scope of services that has been coordinated with the County of San Bernardino. The study has 11 specific elements that are intended to assist in the identification of future facility needs and provide supporting rationale for their implementation. This ALP Update will cover most elements that are ordinarily contained in a master plan study with the intent of extending the usable life of the study beyond the typical five-to-seven years for an ALP Update. **Exhibit iA** provides a graphical depiction of the elements and process involved with the study.

Element 1 – Inventory summarizes facilities and operational data, area airspace, weather conditions, population and economic data, vicinity land uses, and environmental conditions of the airport and surrounding area.

Element 2 – Forecasts examines the potential aviation demand for general aviation, air taxi, and military activity at the airport over a 20-year period. Specific indicators for based aircraft, aircraft operations, and peaking characteristics will be required to meet the projected aviation demand at the airport through the planning period.

PROJECT WORK ELEMENTS

PHASE ONE

INVENTORY
- Airport facilities
- Airspace and air traffic control
- Area socioeconomic data
- Local planning and land use
- Airport access and parking, utilities, and aerial photography

FORECASTS
- Based aircraft and fleet mix
- Annual instrument approaches
- Peaking Characteristics

FACILITY REQUIREMENTS
- Taxiways
- Airfield capacity
- Hangar facilities
- Design categories
- Runway length and strength
- Support facilities
- Terminal building
- Aprons
- Navigational aids

PHASE TWO

AIRPORT ALTERNATIVES
- Evaluate development scenarios (airside, landside, support)

PHASE THREE

RECOMMENDED CONCEPT/ ENVIRONMENTAL REVIEW
- Detailed master plan facility and land use plans
- Review evaluation of NEPA environmental categories
- Noise exposure

FINANCIAL PLAN/ CAPITAL IMPROVEMENTS
- Airport development schedule (CIP)
- Cost estimates
- Funding sources

AIRPORT LAYOUT PLANS/ LAND USE COMPATIBILITY
- Airport layout plan
- Landside drawing
- Airspace/approach drawings
- On-airport land use plan
- Property map
- Land use plan

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)
- Initial Study Documentation
- Evaluate Environmental Impacts
- Determine Need for Environmental Impact Report (EIR) or Negative Declaration (Neg Dec)

FINAL DOCUMENTATION/ DELIVERABLES
- Draft Report
- ALP Approvals
- Final Report
- Electronic Documentation

Element 3 – Facility Requirements determines the available capacities of various facilities at the airport, whether they conform with FAA standards, and what facility updates or new facilities will be needed to comply with FAA requirements and/or projected 20-year demand.

Element 4 – Airport Alternatives considers a variety of solutions to accommodate projected airside and landside facility needs through the long-term planning period. An analysis is completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development.

Element 5 – Recommended Concept provides both a graphic and narrative description of the recommended plan for the use, development, and operation of the airport.

Element 6 – Capital Improvement Program entails a detailed CIP that defines the schedule and costs for the recommended development projects through the 20-year planning period.

Element 7 – Airport Layout Plan (ALP) Drawing Set is developed to depict existing and proposed facilities and provide the official ALP drawings that are produced as a result of the recommended development plan. These drawings are used by the FAA and CALTRANS in determining grant eligibility and funding.

Element 8 – Environmental Evaluation provides the county with proper guidance regarding, and compliance with, the *National Environmental Policy Act* (NEPA). Throughout the study process, environmental factors are evaluated that assess existing and future conditions on and adjacent to the airport. This preliminary environmental evaluation follows FAA guidelines in implementing NEPA.

Element 9 – Public Coordination and Communication provides opportunities to inform the public on the ALP Update process. Working papers are prepared at various milestones in the planning process. A series of coordination meetings are planned during the process to discuss study findings. Also included in this element is the development of a study summary brochure and a project website.

Element 10 – Final Reports and Approvals provides documents which depict the findings of the study effort and present the study and its recommendations to appropriate local organizations. The final document incorporates the revisions to previous working papers prepared under earlier elements into a usable ALP Update & Narrative Report document.

Element 11 – *California Environmental Quality Act* CEQA Documentation for ALP Update Approval provides the County of San Bernardino with proper guidance regarding environmental documentation for the future development of the airport as outlined in the ALP Update. This element includes the preparation of an Initial Study as the basis for the determination whether the ALP Update qualifies for a Negative Declaration, a Mitigated Negative Declaration, or will require the preparation of an Environmental Impact Report (EIR).

CHAPTER ONE

INVENTORY

SAN BERNARDINO COUNTY

CHAPTER ONE

INVENTORY

The inventory chapter for the CNO ALP Update is intended to give a summary of the existing facilities and conditions at the airport. Serving as a baseline for the preparation of the ALP Update, the inventory will outline the airport's current role in the national, regional, and local aviation systems, and provide an overview of the airport's physical and operational features. Specific, detailed information related to airport facilities, users, air traffic activity, land use, community socioeconomic data, and environmental conditions helps to provide an understanding of the future development potential for the facility.

The information outlined in this chapter provides a foundation for all subsequent chapters. Some of the information was obtained through on-site inspections of the airport and interviews with airport staff and tenants, as well as aerial and ground photography and project record drawings. Also, pertinent online data has been collected as it relates to the airport and areas served by the airport. Other useful sources of information include documents prepared by the Federal Aviation Administration (FAA), California Department of Transportation – Division of Aeronautics (CALTRANS), San Bernardino County, and the City of Chino.

AIRPORT SYSTEM PLANNING ROLES

Airport planning exists on many levels: national, regional, state, and local. Each level has a different emphasis and purpose. On a national level, Chino Airport (CNO) is included in the *National Plan of Integrated Airport Systems* (NPIAS). At the regional level, Chino Airport is included in the *Southern California Association of Governments* (SCAG) *Aviation Program*. At the state level, the airport is included in the *California Aviation System Plan* (CASP). Locally, the primary planning document is the ALP Update or the more comprehensive airport master plan. The previous Chino Airport Master Plan was "accepted" by the County of San Bernardino Board of Supervisors in 2011 but was never finalized or officially adopted/approved. Prior to that study, the last master plan update for the airport was completed in 2006.

NATIONAL AIRPORT PLANNING

The nationwide system of airports which exists today is a direct result of federal policy that promotes the development of civil aviation. Most of the nation's network of existing airports were initially constructed by the federal government. Also, in most cases, their maintenance and developments are still primarily funded through various federal grant programs that aid communities in the care of their prospective airfields. As part of the continuing effort to maintain a thriving national airport system in the United States, representatives in Congress maintain a plan for development and maintenance of airports called the NPIAS.

CNO is classified in the current NPIAS (2023-2027) as a national general aviation reliever airport. The national grouping includes 107 airports nationwide (out of a total of 3,287 NPIAS airports). National general aviation airports are located in metropolitan areas near major business centers and support flying throughout the Nation and world. National airports have very high levels of activity with many based jets and turboprops. The average 224 based aircraft including 38 jets. These airports provide pilots with attractive alternatives to the busy primary airports. In fact, the FAA has designated 245 airports as relievers for primary airports. Chino Airport is recognized as one of these designated regional relievers. Regional airports have very high levels of activity with some jets and multiengine propeller aircraft. These airports are also heavily used by general aviation aircraft, which is the case for Chino Airport. **Table 1A** outlines and describes the different categories of general aviation airports.

TABLE 1A | NPIAS General Aviation Airport Roles

Role	Description
National	**Supports the national and state systems by providing communities with access to national and international markets in multiple states and throughout the United States.**
Regional	Supports regional economies by connecting communities to statewide and interstate markets.
Local	Supplements communities by providing access to primarily intrastate and some interstate markets.
Basic	Links the community with the national airport system and supports general aviation activities (e.g., emergency services, charter or critical passenger service, cargo operations, flight training and personal flying).
Unclassified	Provides access to the aviation system.

Source: 2023-2027 National Plan of Integrated Airport Systems

REGIONAL AIRPORT PLANNING

At the regional level, CNO is included in the SCAG's aviation program. The SCAG is the nation's largest metropolitan planning organization, representing six counties which include Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura County. The SCAG participates in numerous planning and policy initiatives to encourage a more sustainable Southern California now and in the future. The SCAG's aviation program is responsible for developing long-term regional aviation plans, as well as passenger demand, cargo, and operation forecasting for all airports that lie within the SCAG region. In April 2016, the SCAG adopted *Connect SoCal (2016-2040 Regional Transportation Plan/Sustainable Communities Strategy)*. Connect SoCal is a long-range visional plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. It should be noted that the SCAG has since adopted the *2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* as of September 2020.

According to the Aviation and Airport Ground Access Technical Report, adopted in the Connect SoCal plan, the SCAG region has seven commercial airports with scheduled passenger service, seven government/military airfields, and over 30 reliever and general aviation airports. Within the Technical Report, Chino Airport is classified as a reliever airport, identifying it as a facility that serves a high volume of general aviation operations and aircraft ranging from small single engine piston aircraft up to corporate jet aircraft.

STATE AIRPORT PLANNING

At the state level, CNO is included in the *California Aviation System Plan* (CASP) and falls under the jurisdiction of CALTRANS. The CASP has been created by the Division of Aeronautics, which includes every California airport designated in the NPIAS and any other existing or proposed public use airports, as designated by the division. According to the *Aviation in California Fact Sheet (February 2019)*, there are 215 general aviation airports, 27 commercial service airports, 68 special-use airports, 365 permitted heliports, 22 federal air bases, and 1 joint use facility in the State of California. The purpose of CASP is to provide a framework for the integrated planning, operation, and development of California's aviation assets. The CASP provides policy guidelines that promote and maintain a safe aviation system in the state, assess the state's airport capital improvement needs, and identify resources and strategies to implement the plan. The CASP provides important insight into how California's airports can remain highly advanced, safe, and responsive to the public's needs today and throughout the 20-year planning horizon. The CASP identifies Chino Airport as a Regional General Aviation Airport; however, the CASP goes on to state that CNO meets all the CASP requirements of a Nonprimary Commercial Service Airport. **Table 1B** outlines the CASP requirements for Regional General Aviation Airports.

AIRPORT HISTORY

Prior to the United States entering World War II, construction of the present-day Chino Airport had begun. Originally, the airport site, known as Cal Aero Field, consisted of 375 acres and was purchased by the United States Government from the University of California. The airport served primarily as a training facility. Cal Aero Academy operated from 1940 until the airport was closed in 1944. During this period, the Cal Aero Academy trained over 12,000 pilots. At the time of its closure, the airport site comprised 860 acres, more than doubling in size since its inception. After the war, there was no longer a need for the airport as a military installation. In 1948, the War Assets Administration transferred ownership of the entire airport site and existing facilities to the County of San Bernardino. Since that time, the airport has remained with the County. Between 1950 and 1960, the County leased the airport to a private company named Pacific Aeromotive Corporation, who

Airport Entrance

specialized in rebuilding airplane and helicopter projects. In 1960, the County of San Bernardino resumed operation of the airfield. The airport was officially opened for public use under the name Chino Airport in July 1960. Since that time, numerous improvements have been made to the airport and include additional runway pavement, taxiways, and building development. Today, CNO is home to over 600 based aircraft and experiences over 200,000 aircraft operations annually. Several aviation-related businesses are located on the field that provide an array of general aviation services.

TABLE 1B | CASP Minimum Standards for Regional GA Airports - Chino Airport

Facility Description	CASP Regional GA Airports	CNO
Runway Length	Sufficient to accommodate 100% of the aircraft fleet at 60% useful load	7,000’
Runway Width	75’	150’
Runway Pavement Strength	12,500 lbs S	75,000 lbs S
Runway Safety Area	Formula determined per AC 150/5300-13	Yes
Visual Aids	VASI/PAPI to lighted runway if no approach lights; REIL for IFR runway without approach lights	PAPI-4 to runway with MIRL, REILs (3-21)
Approach Procedures	GPS/VOR	ILS, VOR, RNAV (GPS)
Runway/Approach Lighting	None	None
24-Hour On-Field Automated Weather AWOS/ASOS	24 hour on-field weather observation	ASOS
Fuel Available	Jet A and Avgas	Jet A and Avgas
Airport Layout Plan	Approval date fewer than five years old	Yes (pending approval of this document)

ASOS: Automated Surface Observation System
AWOS: Automated Weather Observation System
GPS: Global Positioning System
IFR: Instrument Flight Rules
ILS: Instrument Landing System
lbs: Pounds
MIRL: Medium Intensity Runway Lights
PAPI: Precision Approach Path Indicator
REIL: Runway End Identifier Lights
S: Single Wheel Loading
VASI: Visual Approach Slope Indicator
VOR: Very High Frequency Omnidirectional Range

Source: California Aviation System Plan (CASP), General Aviation System Needs Assessment Element – 2010, General Aviation System Needs Assessment Update - 2013.

AIRPORT ADMINISTRATION

The County of San Bernardino owns and operates CNO as well as five other county-owned airports. The County of San Bernardino – Department of Airports provides for the management, maintenance, and operation of Chino Airport, Apple Valley Airport, Baker Airport, Barstow-Daggett Airport, Needles Airport, and Twentynine Palms Airport. The Department of Airports’ mission is to “plan, organize, and direct the County’s airport and aviation system to provide high quality aviation facilities and services in a safe and efficient manner, optimizing the benefit to the communities and citizens of the county.” The Director of Airports has responsibility for the overall management, maintenance, and operation of the six county airports. The Assistant Director of Airports and Administrative Supervisor also aids in the overall functioning of the airports. Daily management and operation of Chino Airport is the responsibility of the Airport Manager who reports directly to the Assistant Director of Airports. Additional airport staff at Chino Airport include an office assistant, airport maintenance supervisor, and maintenance and operations personnel. The San Bernardino County Airports Commission has been established by the San Bernardino County Board of Supervisors and consists of seven members: one member from each of the five supervisory districts, one member at-large from the Mountain-Desert area, and one member at-large from the San Bernardino Valley area.

The Airports Commission is tasked with:

- Making recommendations and observations concerning County airports and aviation-related issues to the Board of Supervisors.;
- Promoting airports and aviation in general in San Bernardino County;
- Reviewing and participating in County airport special events; and
- Reviewing and making recommendations for initial preparation of the annual airport budget.

Airport Commission members are appointed to terms that are not to exceed four years and expire on January 31st of the appropriate year, with staggered terms of office to ensure that no more than two-thirds of the terms expire in any one-year period. The commission meets on the 4th Thursday of every month.

CAPITAL IMPROVEMENTS

To assist in funding capital improvements, the FAA has provided funding assistance to Chino Airport through the Airport Improvement Program (AIP). The AIP is funded through the Aviation Trust Fund, which was established in 1970 to provide funding for aviation capital investment programs to include aviation development, facilities and equipment, and research and development. The Aviation Trust Fund also finances a portion of the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts. **Table 1C** summarizes FAA AIP grants for CNO since 2003. CALTRANS has a similar program that funds capital improvement projects at airports. For federally funded projects, non-commercial airports can receive a matching grant equal to five percent of the FAA AIP grant. Since 2003, approximately $11.6 million in AIP funds have been invested in the airport through various federal grants with matching funds from the state through CALTRANS. This has included funding for construction projects and airfield safety improvements.

Table 1C | Capital Improvement History - Chino Airport

Fiscal Year	Grant Number	Project Description	Grant Amount
AIP FEDERAL GRANTS			
2003	25	Improve Runway Safety Area (3-21); Rehabilitate Taxiway Lighting	550,000
2005	26	Safety Area Improvements (3-21 and 8L-26R)	2,330,255
2006	27	Construct Apron, Rehab Access Road (Ph II)	1,889,715
2007	28	Construct Taxiway E Extension	1,419,315
2009	29	Install Runway Lighting (3-21 and 8L-26R)	1,022,995
2009	30	Install Runway Lighting (3-21 and 8L-26R)	150,000
2014	31	Conduct Miscellaneous Study [(PMMP)]	58,860
2014	32	Install Airfield Guidance Signs, Rehabilitate Apron	256,076
2016	33	Rehabilitate Apron	3,914,100
2023	38	Conduct or Update Misc. Study	135,000
Subtotal Federal Grants			**11,726,316**

Source: Airport Improvement Program (AIP) Grant Histories (FAA.gov)

REGIONAL SETTING

The City of Chino is located in southern California, in the southwestern corner of San Bernardino County, at an elevation of approximately 735 feet. From a regional standpoint, the city is located approximately 30 miles east of Los Angeles, California, 100 miles north-northwest of San Diego, California, and 200 miles southwest of Las Vegas, Nevada.

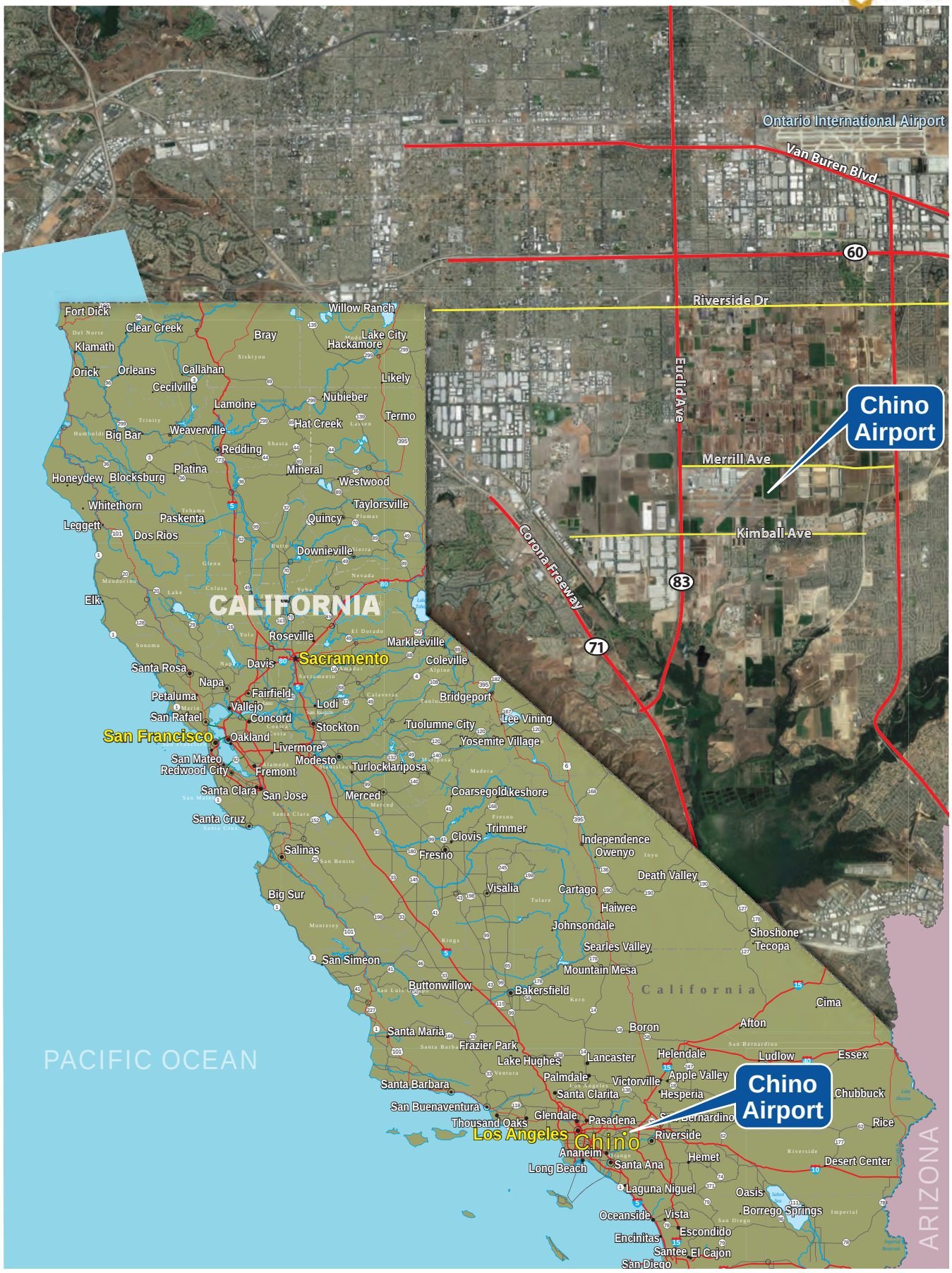
AIRPORT LOCATION

Exhibit 1A depicts the vicinity and location of Chino Airport, which is located on approximately 1,097 acres of property within the corporate limits of the City of Chino, in southwestern San Bernardino County. The airport is located approximately three miles to the southeast of the City of Chino's central business district and directly to the south of the City of Ontario. The City of Chino is part of the greater Los Angeles metropolitan area within San Bernardino County and is in close proximity to the counties of Los Angeles, Orange, and Riverside.

The City of Chino is surrounded by Chino Hills to the west, Ontario to the northeast, unincorporated San Bernardino County to the southeast, and unincorporated Riverside County to the south. The airport is bounded on the north by Merrill Avenue, to the east by industrial warehousing type buildings, to the south by Kimball Avenue, and to the west by Euclid Avenue. Several roadways extending south from Merrill Avenue provide access to aviation and non-aviation facilities on the north side of the airport. Among them, Cal Aero Drive, a divided two-lane access road, extends south from Merrill Avenue and provides access to the airport administration building, airport traffic control tower (ATCT), and other airport facilities. A large automobile parking area on the southeast side of the airport offers immediate access from Kimball Avenue that provides parking associated with aviation-related activities in this area. The City of Chino has excellent access to regional highway infrastructure linking it to the entire Los Angeles metropolitan area and points beyond. Euclid Avenue, located adjacent to the west side of the airport, provides direct access to U.S. Highway 60 to the north and U.S. Highways 71 and 91 to the south. Known as Pomona Freeway, U.S. Highway 60 runs in an east/west direction on the north side of Chino and provides access to U.S. Interstate 15 to the east and Los Angeles to the west. U.S. Interstate 15 links the area to cities such as San Diego to the south and Las Vegas to the northeast.

TRANSPORTATION NETWORK

Local transportation includes regional bus service provided by Omnitrans. This public transit agency serves the greater San Bernardino Valley, which includes the City of Chino. Omnitrans was established in 1976 through a joint powers agreement and carries approximately 11 million passengers each year throughout its 480-square mile service area. This area covers 15 cities and portions of the unincorporated areas of San Bernardino County. Some of the major destinations within this service area include transportation centers, medical centers, educational facilities, shopping malls, business parks, and community centers. Moreover, a second transportation service in the area is Metrolink, which provides commuter rail service to the greater Los Angeles metropolitan area. Metrolink was established in 1991 by the Southern California Regional Rail Authority and is the nation's third largest commuter rail system with 407 unduplicated route


Ontario International Airport
Van Buren Blvd
60
Riverside Dr
Euclid Ave
Chino Airport
Merrill Ave
Kimball Ave
Corona Freeway
83
71
CALIFORNIA
Sacramento
San Francisco
Los Angeles
Chino
Chino Airport
PACIFIC OCEAN
ARIZONA
Fort Dick
Willow Ranch
Clear Creek
Bray
Lake City
Hackamore
Klamath
Orick
Orleans
Callahan
Cecilville
Likely
Nubieber
Lamoine
Hat Creek
Termo
Big Bar
Weaverville
Redding
Honeydew
Blocksburg
Platina
Mineral
Westwood
Whitethorn
Taylorsville
Leggett
Paskenta
Quincy
Dos Rios
Downieville
Elk
Roseville
Markleeville
Davis
Coleville
Santa Rosa
Napa
Petaluma
Fairfield
Bridgeport
Vallejo
Lodi
San Rafael
Concord
Stockton
Tuolumne City
Lee Vining
Oakland
Yosemite Village
Livermore
San Mateo
Modesto
Redwood City
Fremont
Turlocklariposa
Santa Clara
San Jose
Merced
Coarsegoldkeshore
Santa Cruz
Trimmer
Clovis
Independence
Owenyo
Salinas
Fresno
Death Valley
Big Sur
Visalia
Cartago
Haiwee
Johnsondale
Shoshone
Tecopa
Searles Valley
San Simeon
Mountain Mesa
Buttonwillow
Bakersfield
California
Cima
Boron
Afton
Santa Maria
Frazier Park
Lancaster
Helendale
Ludlow
Essex
Lake Hughes
Palmdale
Victorville
Apple Valley
Santa Barbara
Santa Clarita
Hesperia
Chubbuck
San Buenaventura
Glendale
Pasadena
Thousand Oaks
Rice
Riverside
Anaheim
Hemet
Desert Center
Long Beach
Santa Ana
Laguna Niguel
Oasis
Oceanside
Vista
Borrego Springs
Escondido
Encinitas
Santee
El Cajon
San Diego

miles and 538 total route miles. Metrolink operates 2.9 million train miles per year and 432 million passenger miles per year. However, there are currently no rail spurs in the immediate vicinity of Chino Airport. Cargo rail service is located farther north, near Ontario International Airport.

CLIMATE

Local weather conditions must be considered in the planning and development of an airport. Temperature is a significant factor in determining runway length needs, while local wind patterns can affect the operation and capabilities of the runway system. The need for navigational aids and lighting can be determined by the visibility and cloud ceiling conditions.

Exhibit 1B lists climate data for CNO and the surrounding region. The National Oceanic Atmospheric Administration (NOAA) notes an average annual high temperature of 94.1 degrees Fahrenheit (F) in the month of August and an average annual low temperature of 37.7 degrees F in December. Average precipitation is 13.29 inches annually. Historical data shows January as the month in which the most precipitation occurs in the region. Wind patterns in the region range from the southwest in the spring and summer months to the northwest in the winter months, with peak average wind speeds occurring in the spring and summer months.

LAND USE AND ZONING

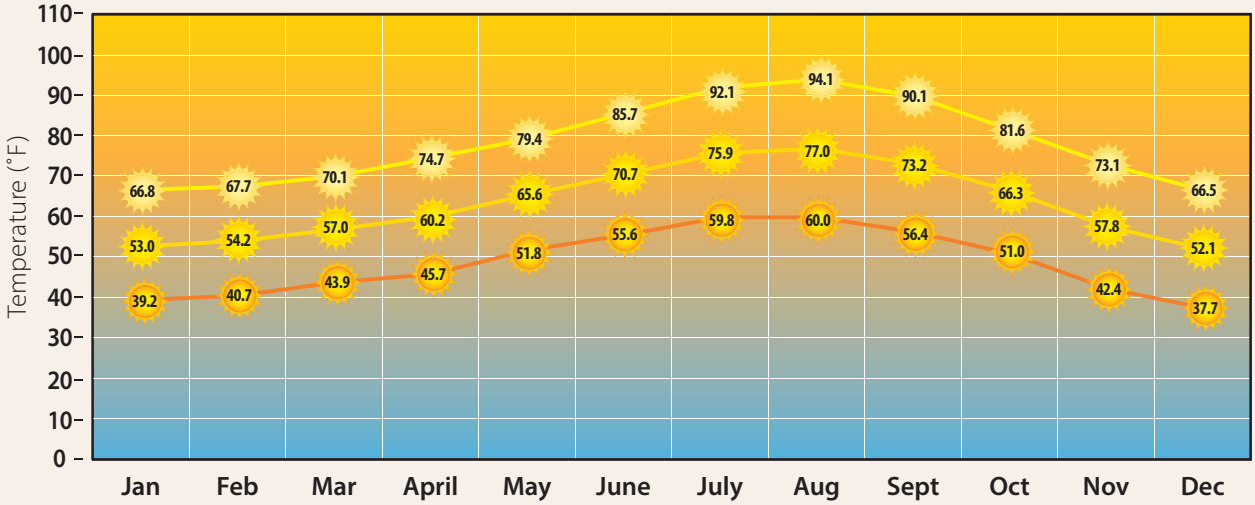
The area land use surrounding CNO can have a significant impact on airport operations and growth. The following sections identify baseline information related to both existing and future land uses in the vicinity of CNO. It is important to understand the land use issues surrounding the airport, in order to consider appropriate recommendations for the future of the airport.

Industrial Park Entrance

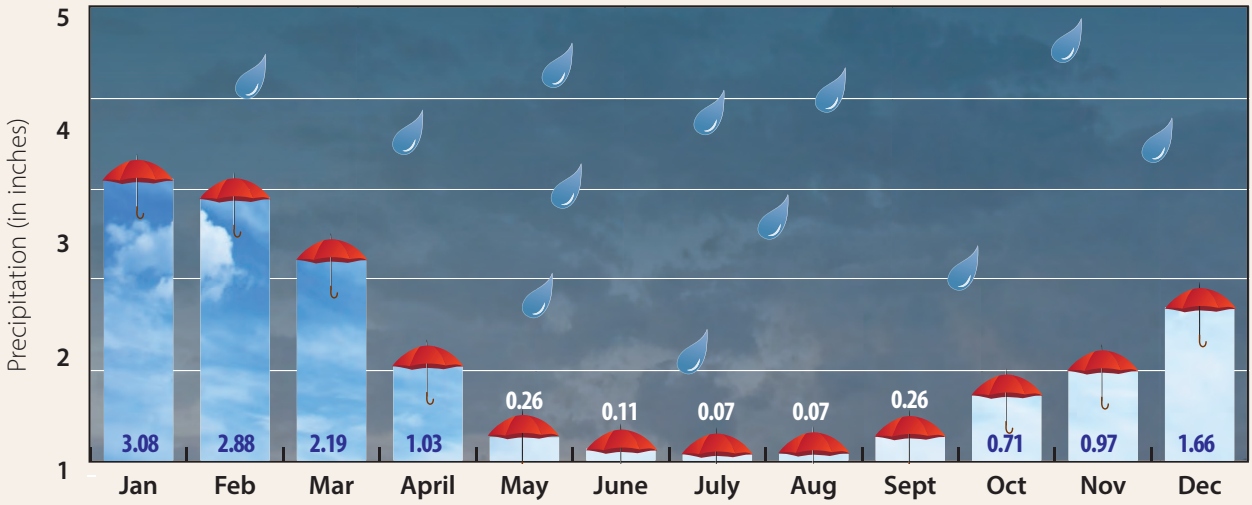
EXISTING LAND USES

Chino Airport is located within the corporate boundaries of the City of Chino. Land adjacent to the east, south, and west of the airport is under the jurisdiction of the city. Much of the existing land uses surrounding the airport were used for agricultural purposes; however, nearly all land surrounding the airport has been developed for industrial warehousing facilities. To the west of the airport, across from Euclid Avenue, is a former youth correctional facility that encompasses approximately 110 acres. South of the closed correctional facility, adjacent to Highway 83, are several distribution centers. Land adjacent to the south side of the airport is comprised of several types of activities to include agriculture, commercial, and residential development. In addition, an area adjacent to the south side of Kimball Avenue is dedicated as a development area known as The Preserve.

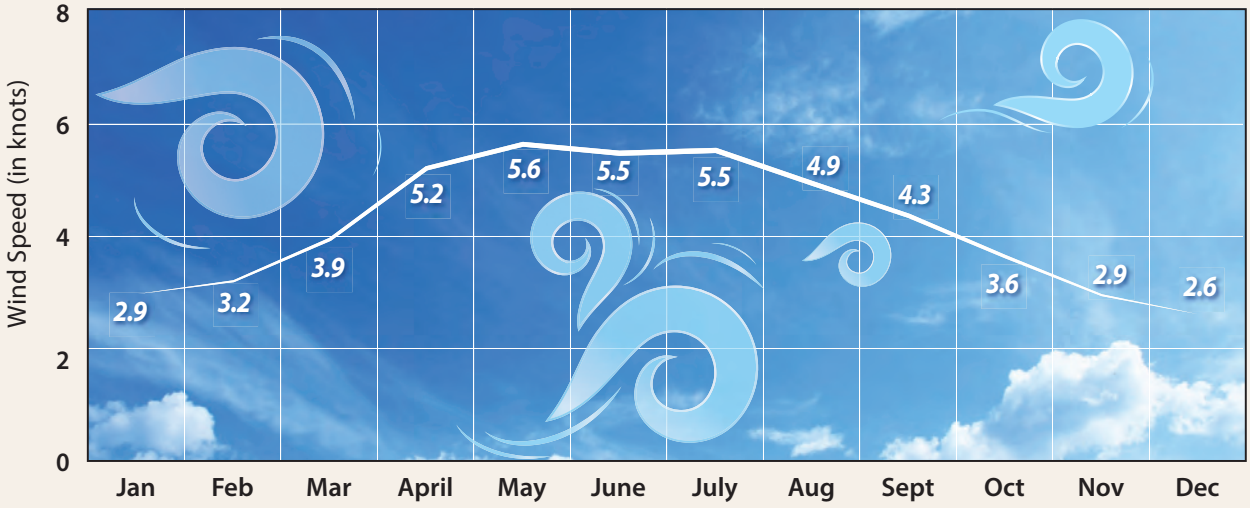
MONTHLY TEMPERATURES



MONTHLY PRECIPITATION



MONTHLY WIND DATA



Source: Station- CHINO AIRPORT, CA US USW0000317

The Preserve is an area of approximately 5,435 acres of former and existing farm and dairy property. The area was annexed to the City of Chino in July 2003. Approximately half the area will consist of residential, commercial, industrial, and airport-related development. The other half will remain as open space, for natural, recreational, and agricultural uses.

Land north of Merrill Avenue, located within the City of Ontario, has been developed for industrial purposes. **Exhibits 1C** and **1D** present the land use plans for the cities of Chino and Ontario, respectively.

FUTURE LAND USE

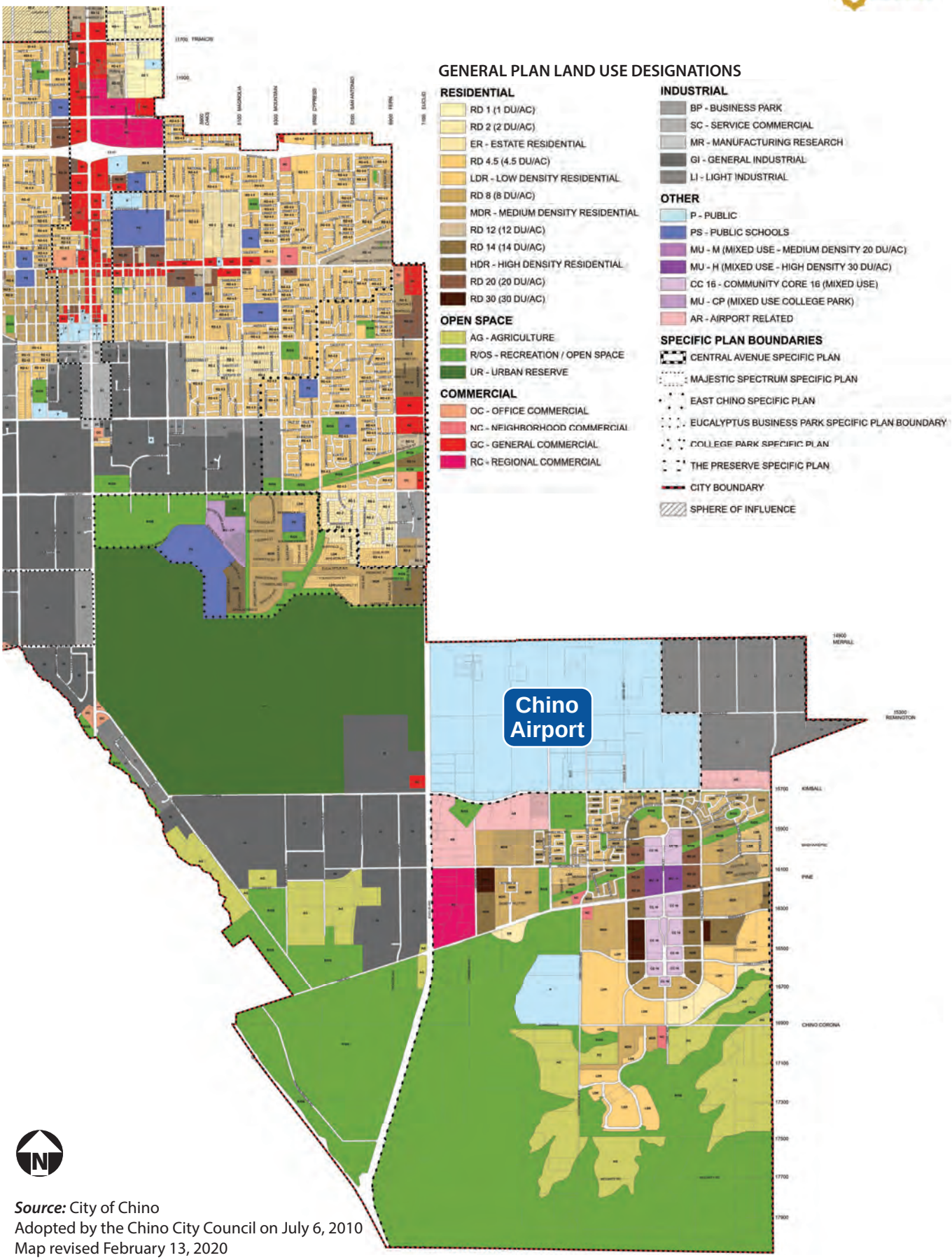
Under ideal conditions, the development immediately surrounding the airport can be controlled and limited to compatible uses. Compatible uses would include light and heavy industrial development, some commercial development, and agricultural activities. As identified on **Exhibit 1C**, the land use plan for the City of Chino calls for compatible land uses adjacent to the airport in the form of open space, agriculture, light industrial, and manufacturing. Property to the south of the airport is of concern, given the low- to medium-density residential and, in some cases, high-density residential development that is allowed in The Preserve area. A large parcel of land adjacent to the northeast side of the airport is planned for a future public institution. The City of Ontario land use plan, as depicted on **Exhibit 1D**, calls for industrial and business park development on property currently being utilized for agricultural purposes on the north side of the airport. Other land uses within this area call for commercial, residential, and office development. As of October 2023, the surrounding lands have been developed with compatible industrial uses.

There are a number of methods by which governmental entities can ensure that land uses in and around airports are developed in a compatible manner. The objective of enforcing land use restrictions is to protect designated areas for the maintenance of operationally safe and obstruction-free airport activity.

ZONING

Land use zoning is the most common land use control. Zoning is the exercise of jurisdictional powers granted to state and local governments to designate permitted land uses on parcels of land. Typically, zoning is developed through local ordinances and is often included in comprehensive plans. The primary advantage of zoning is that it can promote compatibility with the airport, while leaving the land in private ownership. Zoning is subject to change; therefore, any potential alterations to the zoning code near the airport should be monitored closely for compatibility. The City of Chino Zoning Code establishes the Airport Overlay District. The specific purpose of the airport overlay district is to:

- Implement the *Chino Airport Comprehensive Land Use Plan*;
- Identify areas of the city subject to high noise levels and crash impacts by the operation of the Chino Airport; and
- Encourage the orderly use and development of the area around Chino Airport, which is compatible with continued airport operations.



Source: City of Chino
Adopted by the Chino City Council on July 6, 2010
Map revised February 13, 2020

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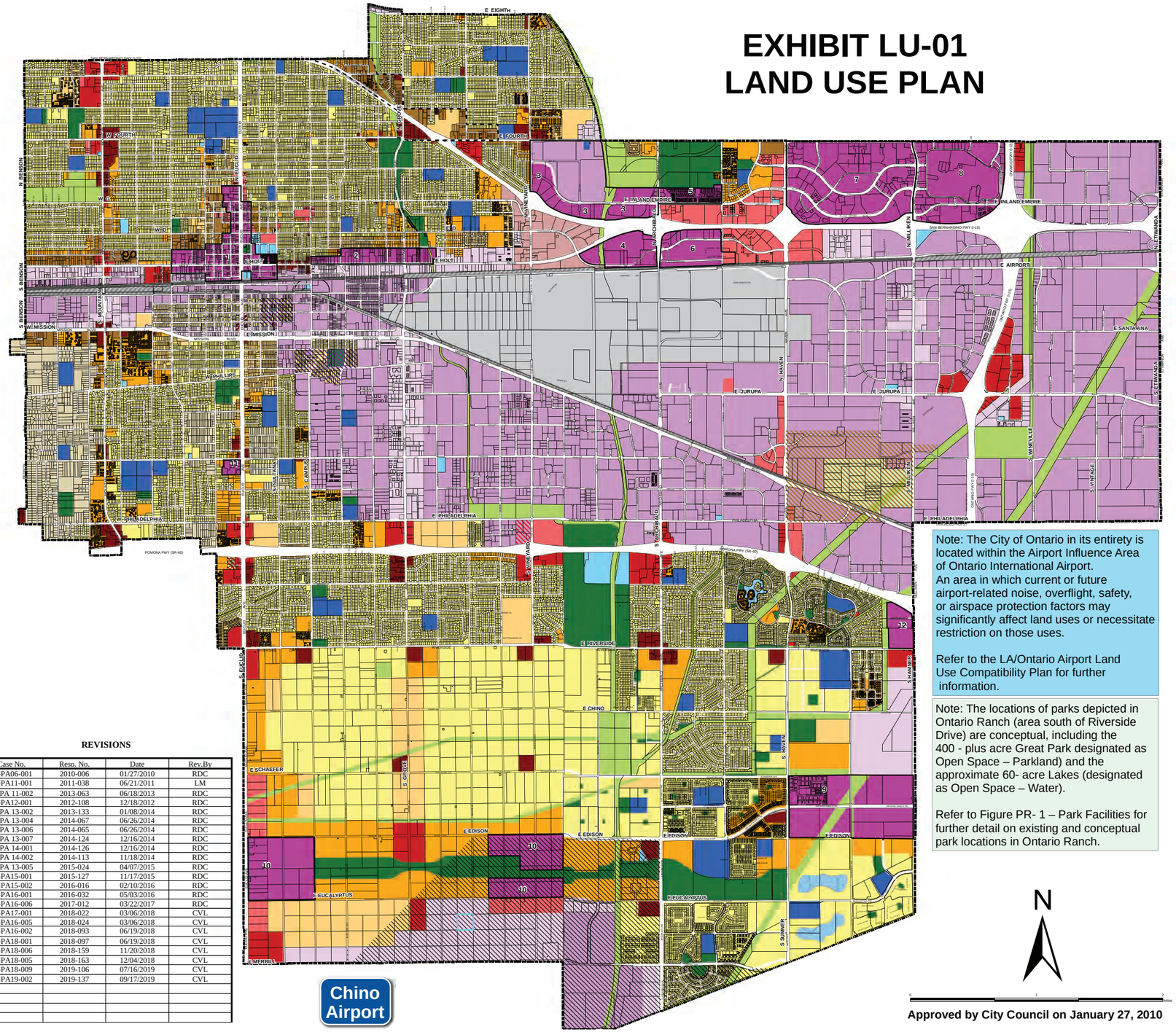
EXHIBIT LU-01
LAND USE PLAN



Note: The City of Ontario in its entirety is located within the Airport Influence Area of Ontario International Airport.
An area in which current or future airport-related noise, overflight, safety, or airspace protection factors may significantly affect land uses or necessitate restriction on those uses.

Refer to the LA/Ontario Airport Land Use Compatibility Plan for further information.

Note: The locations of parks depicted in Ontario Ranch (area south of Riverside Drive) are conceptual, including the 400 - plus acre Great Park designated as Open Space – Parkland) and the approximate 60- acre Lakes (designated as Open Space – Water).

Refer to Figure PR- 1 – Park Facilities for further detail on existing and conceptual park locations in Ontario Ranch.

N

0 1 2 Miles

Approved by City Council on January 27, 2010

REVISIONS

Case No.	Reso. No.	Date	Rev.By
PGPA06-001	2010-006	01/27/2010	RDC
PGPA11-001	2011-038	06/21/2011	LM
PGPA 11-002	2013-063	06/18/2013	RDC
PGPA12-001	2012-108	12/18/2012	RDC
PGPA 13-002	2013-133	01/08/2014	RDC
PGPA 13-004	2014-067	06/26/2014	RDC
PGPA 13-006	2014-065	06/26/2014	RDC
PGPA 13-007	2014-124	12/16/2014	RDC
PGPA 14-001	2014-126	12/16/2014	RDC
PGPA 14-002	2014-113	11/18/2014	RDC
PGPA 13-005	2015-024	04/07/2015	RDC
PGPA15-001	2015-127	11/17/2015	RDC
PGPA15-002	2016-016	02/10/2016	RDC
PGPA16-001	2016-032	05/03/2016	RDC
PGPA16-006	2017-012	03/22/2017	RDC
PGPA17-001	2018-022	03/06/2018	CVL
PGPA16-005	2018-024	03/06/2018	CVL
PGPA16-002	2018-093	06/19/2018	CVL
PGPA18-001	2018-097	06/19/2018	CVL
PGPA18-006	2018-159	11/20/2018	CVL
PGPA18-005	2018-163	12/04/2018	CVL
PGPA18-009	2019-106	07/16/2019	CVL
PGPA19-002	2019-137	09/17/2019	CVL

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LEGEND

Residential
- Rural (0 - 2 du/ac)
- Low Density (2.1 - 5 du / ac)
- Low-Medium Density (5.1 - 11 du / ac)
- Medium Density (11.1 - 25 du / ac)
- High Density (25.1 - 45 du / ac)

Mixed Use
- Mixed Use
  1. Downtown
  2. East Holt
  3. Meredith
  4. Multimodal Mixed Use
  5. Inland Empire Corridor
  6. Guasti
  7. Ontario Center
  8. Ontario Mills
  9. NMC East
  10. NMC West
  11. Euclid/Francis
  12. 60/Hamner

Retail/Service
- Neighborhood Commercial (0.4 FAR)
- General Commercial (0.4 FAR)
- Office Commercial (0.75 FAR)
- Hospitality (1.0 FAR)

Employment
- Business Park (0.6 FAR)
- Industrial (0.55 FAR)

Other
- Open Space - Non Recreation
- Open Space - Parkland
- Open Space - Water
- Public Facility
- Public School
- Airport
- Rail
- Landfill

Overlays
- Business Park
- Industrial
- Commercial
- I-10/Grove Interchange Area
- Landfill Impact Area
- Chino Airport Overlay

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In addition to the restriction of the Airport Overlay District, existing zoning surrounding the airport calls for agricultural, light industrial, manufacturing, and commercial except for certain areas on the north and south sides of the airport. Some of these areas are zoned residential, which are not typically compatible with airport activity. Future airport operations will need to be sensitive to these existing and planned residential developments. Height restrictions are necessary to ensure that objects will not impair flight safety or decrease the operational capability of the airport. Title 14 of the Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*, defines a series of imaginary surfaces surrounding airports. The imaginary surfaces consist of approach zones, conical zones, transitional zones, and horizontal zones. Objects, such as trees, towers, buildings, or roads, which penetrate any of these surfaces, are considered by the FAA to be an obstruction to air navigation.

Currently, the City of Chino ordinances adhere to and support the height restriction guidelines as set forth in 14 CFR Part 77. In addition, the *Chino Airport Comprehensive Land Use Plan* and *County of San Bernardino 2007 General Plan* (amended 2014) call for conformity with land use and zoning guidelines. Height restrictions can be accomplished through height and hazard zoning, avigation easements, or fee simple acquisition.

AIRPORT FACILITIES AND SERVICES

There are three broad categories of facilities and services at the airport: airside, landside, and support facilities.

- **Airside facilities** | Facilities directly associated with aircraft operations, including runways, taxiways, lighting, markings, navigational aids, and weather reporting.
- **Landside facilities** | Facilities necessary to provide a safe transition from surface to air transportation and support aircraft parking, servicing, storage, maintenance, and operational safety.
- **Support facilities** | Serve as a critical link to provide the necessary efficiency to aircraft ground operations, such as fuel storage, airport maintenance, firefighting, and fencing.

AIRSIDE FACILITIES

Existing airside facilities are identified on **Exhibit 1E** and in **Table 1D**. The table included within the exhibit also summarizes airside facility data for Chino Airport.

Runways

CNO is served by a parallel runway system (Runway 8R-26L and Runway 8L-26R), which is intersected by a single crosswind runway (Runway 3-21). The parallel runways are separated by 800 feet from centerline to centerline. All three runways are constructed of asphalt. Runway 8R-26L has a grooved surface, which improves water drainage from the pavement surface, thereby improving surface friction during wet conditions.

TABLE 1D | Airside Facility Data - Chino Airport

	Runway 8R-26L	Runway 8L-26R	Runway 3-21
RUNWAYS			
Length (feet)	7,000	4,858	4,919
Width (feet)	150	150	150
Surface Type	Asphalt	Asphalt	Asphalt
Surface Treatment	Grooved	None	None
Condition	Good	Good	Good
Runway Load Bearing Strength (pounds):			
Single Wheel Loading (S)	75,000	12,000	21,000
Dual Wheel Loading (D)	150,000	N/A	130,000
Dual Tandem Wheel Loading (2D)	215,000	N/A	N/A
Runway Lighting	MIRL	HIRL	MIRL
Runway Markings	Non-Precision	Basic/Precision	Non-Precision
TAXIWAYS			
Taxiway Lighting	MITL		
Taxiway Markings	Centerline		
VISUAL APPROACH AIDS			
Approach Slope Indicators	PAPI-4	PAPI-4	PAPI-4
Approach Lighting	N/A	N/A	REILs
Instrument Approach Aids	VOR (Circling)	ILS/LOC Rwy 26R GPS Rwy 26R VOR Rwy 26R	VOR (Circling)
Weather Navigational Aids	ASOS, ATCT, GPS, VOR, ILS		
Visual Aids	Segmented Circle, Lighted Wind Cones, Rotating Beacon		

ASOS: Automated Surface Observation System
ATCT: Airport Traffic Control Tower
GPS: Global Positioning System
HIRL: High Intensity Runway Lights
ILS: Instrument Landing System
HIRL/MIRL: High/Medium Intensity Runway Lights
PAPI: Precision Approach Path Indicator
REIL: Runway End Identifier Lights
VOR: Very High Frequency Omnidirectional Range

Source: Airport Master Record, Form 5010.

Primary Runway 8R-26L is the longest available runway at the airport. It is oriented in an east-west manner and is 7,000 feet long by 150 feet wide. Pavement strength is an indication of the runway's ability to withstand repeated use by aircraft on a regular basis. There are different aircraft landing gear configurations that displace aircraft wight differently, thereby affecting a runway's ability to handle the load. Single wheel loading (S) refers to having one wheel per landing gear strut. Dual wheel loading (D), dual tandem wheel loading (2D), and double dual tandem (2D/2D2) include the design of aircraft with additional wheels on each landing gear strut which help distribute the aircraft's weight on the runway surface. The Runway 8R-26L pavement has been strength-rated at 75,000 pounds single wheel loading (S), 150,000 pounds dual wheel loading (D), and 215,000 pounds dual tandem wheel loading (2D). The runway slopes from its low point of 619 feet mean sea level (MSL) on the west end, to a high point of 636 feet MSL on the east end. Thus, the runway gradient (elevation difference between runway high and low points divided by the length of the runway) is 0.2 percent.

Parallel Runway 8L-26R is 4,858 feet long by 150 feet wide. It provides a weightbearing capacity of 12,000 pounds S. The slope of the runway rises from the west end to the east end resulting in a gradient of 0.4 percent.

Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Hold Apron
Hold Apron
Drainage Canal
Blast Pad
REILs
ATCT Tower
PAPI-4
Runway 3-21 (4,919' x 150')
Hold Apron
Blast Pad
PAPI-4
Runway 8L-26R (4,858' x 150')
ASOS
Hold Apron
Localizer
Hold Apron
Segmented Circle/ Lighted Windcone
PAPI-4
Glideslope/ Antenna
PAPI-4
Runway 8R-26L (7,000' x 150')
Blast Pad
Euclid Av.
Blast Pad
PAPI 4
Holding Ponds
Perimeter Access Rd.
Hold Apron
PAPI-4
Perimeter Access Rd.
REILs
Blast Pad
Hold Apron
Kimball Av.
NORTH
0
800
SCALE IN FEET
LEGEND
Airport Property Line
A Taxiway Identifier
ASOS - Automated Surface Observation System
ATCT- Airport Traffic Control Tower
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
Aerial Photo: Google Earth 4-15-20

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Crosswind Runway 3-21 at CNO is 4,919 feet long by 150 feet wide. It is oriented in a northeast-southwest manner and has a strength rating of 21,000 pounds S and 130,000 pounds D. The slope of the runway rises from the northeast to the southwest, constituting an effective runway gradient of 0.8 percent.

Taxiways

The taxiway system at CNO includes three full-length parallel taxiways serving each runway. Taxiway A serves as the parallel taxiway for Runway 8L-26R and is located north of the runway with a runway centerline-to-taxiway centerline separation of 400 feet. Taxiway C serves as the parallel taxiway for Runway 8R-26L and is located south of the runway, with a runway centerline-to-taxiway centerline separation of 400 feet. Finally, Taxiway D provides parallel taxiway access for Runway 3-21, has a 400-foot runway separation to taxiway separation, and is located to the west of the runway.

The north side of Runway 8L-26R is served by five entrance/exit taxiways which are designated from west to east as A, H, K, D, and P. Taxiway D, which is the parallel taxiway serving Runway 3-21, provides an angled exit from the Runway 8L-26R and is located approximately 2,800 feet from the Runway 8L threshold. Angled taxiways allow aircraft to exit the runway at a slightly greater speed than if the taxiway were at a right angle. This configuration can add to the overall capacity of the airfield and increases aircraft movement efficiency.

Runway 8L-26R is served by four entrance/exit taxiways located on the south side of the runway and are designated as F, K, D, and P moving from west to east. Taxiway D provides an angled exit for aircraft landing on Runway 26R and is located approximately 2,200 feet from the runway threshold.

Taxiways F, D, L, P, and B provide entrance/exit points to the north side of Runway 8R-26L. Taxiways D and L allow an angled exit for aircraft utilizing Runway 8R and are located 2,100 and 3,200 feet from the runway end, respectively.

There are five entrance/exit taxiways located on the south side of Runway 8R-26L designated as C, D, E, P, and C from west to east. Taxiways E and D provide angled exit capabilities for aircraft landing on Runway 26L and are located approximately 4,000 feet and 5,000 feet, respectively, from the Runway 26L threshold.

Runway 3-21 is served by six entrance/exit taxiways on its west side labeled as Q, P, A, L, C, and H from north to south. On the runway's east side, Taxiways P, A, L, C, and E provide entrance/exit points from north to south.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows:

Airport Identification Lighting | The location of the airport at night is universally identified by a rotating beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. This indicates that the airport is a civilian lighted land airport. The beacon operates from sunset to sunrise and is located on top of the ATCT on the north side of the airfield.

Pavement Edge Lighting | Pavement edge lighting defines the lateral limits of the pavement to ensure safe operations during night and/or times of low visibility, which maintains safe and efficient access to and from the runway and aircraft parking areas. Runways 8R-26L and 3-21 at CNO are equipped with medium intensity runway lighting (MIRL). Runway 8L-26R is equipped with high intensity runway lighting (HIRL) because it supports a precision instrument approach to Runway 26R. All runways are equipped with threshold lights, which emit green light outward from the runway and emit red light toward the runway. Green lights indicate the landing threshold to arriving aircraft and red lights indicate the end of the runway for departing aircraft. Runway lighting operates continuously during nighttime hours when the ACTC is closed from 9:00 p.m. to 7:00 a.m.

Visual Approach Aids | Visual approach aids are installed at airports to assist pilots in determining the correct descent path to the runway end during landing. Each runway end at CNO is equipped with a four-box precision approach path indicator (PAPI-4) system. PAPIs have an effective visual range of three miles during the day and 20 miles at night. All runways are equipped with PAPIs and provide standard 3.00-degree glide paths.

Runways 3 and 21 are both equipped with runway end identifier lights (REILs). REILs help pilots identify the ends of the runway in areas having a large concentration of light. Runways 8R-26L and 8L-26R are not equipped with REILs.

Taxiway Lighting | All active airfield taxiways serving the runway system at CNO are equipped with blue medium intensity taxiway lights (MITL), except for Taxiway G.

Airfield Signage

The airport has a runway/taxiway signage system that assists pilots in identifying their location on the airfield and directing them to their desired location. The presence of runway/taxiway signage is an essential component of a surface movement guidance control system necessary for the safe and efficient operation of the airport. The signage system installed at CNO includes lighted runway and taxiway designations, routing/directional, and runway exits. Distance remaining signs are installed on Runway 8R-26L. Distance remaining signs are located at 1,000-foot intervals from the end of the runway and give pilots an indication of the remaining runway length available when landing or departing.

Runway 8R-26L Signage

Taxiway Signage

Airport Markings

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. At present, Runway 26R has precision markings which identify the runway designation, edges, centerline, threshold, touchdown zone, and aiming point. Runways 8R-26L and 3-21 have non-precision markings which identify the runway designation, edges, centerline, threshold, and aiming point. Runway 8L has basic runway markings which include the runway designation, edges, centerline, and aiming points.

Taxiway and taxilane centerline markings are provided to assist pilots in maintaining proper clearance from the pavement edges and objects near the taxiway and taxilane edges. Additional taxiway markings include continuous-edge markings along paved shoulders and dashed-edge markings along portions of Taxiways A and D, which are contiguous to aircraft parking aprons. Taxiway markings also include aircraft hold positions located on the connecting taxiways. At CNO, all hold lines are marked 250 feet from the runway centerlines. Aircraft movement areas on the parking aprons are also identified with centerline markings.

Navigational Aids

Navigational aids are electronic devices that transmit radio frequencies that pilots in properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to/from CNO include the very-high frequency omnidirectional range (VOR), non-directional beacon (NDB), and global positioning system (GPS).

Supplemental Windcone and PAPI-4

A VOR provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. CNO and the greater East Los Angeles area are served by three VORTACs (Paradise – 6.3 miles east of CNO; Pomona – 9.7 miles northwest of CNO; and Seal Beach – 23.8 miles southwest of CNO) and three VORs (Riverside – 9.4 miles; El Toro – 18.5 miles south of CNO; and Homeland – 25.4 miles southeast of CNO).

A non-directional beacon (NDB) is a radio transmitter that acts as a navigational aid. In contrast to other navigational aids like the VHF omnidirectional range (VOR) and TACAN, the signal transmitted from the NDB does not include inherent directional information. The NBD signal can be received at much greater distances at lower altitudes and follow the curvature of the Earth to assist pilots. The nearest NDB is the El Toro VOR/DME located 18.5 miles south of CNO.

The U.S. Department of Defense initially developed the global positioning system (GPS) for military navigation around the world. Now, GPS is used extensively for a wide variety of civilian uses, including civil aircraft navigation. GPS uses satellites placed in orbit around the globe to transmit electronic signals, which pilots of properly equipped aircraft use to determine altitude, speed, and navigational information. This provides more freedom in flight planning and allows for more direct routing to the destination. GPS provides for enroute navigation, a non-precision localizer performance with vertical guidance (LPV) instrument approach, and a non-precision localizer navigation (LNAV) instrument approach to Runway 26R.

Weather and Communication

When the ATCT is active, pilots can receive ATIS, which is a weather report generated hourly and recorded by air traffic controllers. When the ATCT is closed, CNO is served by an automated surface observation station (ASOS). The system updates weather observations every minute and is continuously reporting changes. The ASOS can be reached via radio using frequency 125.85 mHz or by calling (909) 393-5823. The ASOS reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), and density altitude (airfield elevation corrected for temperature). The ASOS is located approximately 700 feet north of the Runway 26L threshold.

Chino Airport Traffic Control Tower

Automated Surface Observation System (ASOS)

CNO also has a lighted wind cone and segmented circle located at midfield between parallel Runways 8R-26L and 8L-26R and west of Runway 3-21. The wind cone informs pilots of the wind direction and speed, while the segmented circle indicates aircraft traffic pattern information.

LANDSIDE FACILITIES

At a general aviation airport, such as Chino Airport, landside facilities support the aircraft and pilot/passenger handling functions, as well as other non-aviation facilities typically providing a revenue stream to the airport. These facilities can often include a terminal building, general aviation facilities,

and support facilities, such as fuel storage, vehicle parking, roadway access, and aircraft rescue and firefighting (ARFF). Non-aviation related facilities, such as restaurants and industrial parks, may also constitute landside development. The primary landside facilities at Chino Airport are identified on **Exhibits 1F** and **1G.**

Terminal Area Facilities

At CNO, there is no dedicated general aviation terminal building. However, terminal services on the airport are comprised of several separate facilities that serve specific aviation functions. FBO and other specialty aviation facilities on the north and south sides of the airport provide pilot and passenger accommodations to include public lobby areas, restrooms, pilots' lounge areas, and administrative offices. Chino Airport administrative offices are located in a 2,500-square-foot facility adjacent to the west side of Cal Aero Drive. This facility includes a lobby area, conference room, restrooms, and offices.

Airport Traffic Control Tower and Flying Tigers Aviation FBO

Aircraft Parking Aprons

There are several designated aircraft parking apron areas at CNO, which total approximately 201,000 square yards, and 250 aircraft tiedown spaces. These areas include space for marked aircraft tiedowns and larger aircraft parking.

Aircraft Apron Area

Approximately 81,100 square yards of apron area are located on the northwest side of the airport between Yanks Air Museum and the Port-a-Port storage hangars, as well as a longer and narrower tiedown area directly to the south. This area contains approximately 150 aircraft tiedown spaces. Additional aircraft parking aprons are located near the ATCT in the midfield area of the airport. The midfield parking aprons combine for a total of approximately 84,000 square yards of pavement and include 100 aircraft tiedown spaces.

On the south side of the airport, near the threshold of Runway 26L, there is an additional 15,600 square yards of apron space serving the Encore Jet Center and Threshold Aviation Group. There are no designated tiedowns in this location as this area has been designed for large aircraft movement and parking, primarily serving business jets.

Smaller aircraft apron areas are located throughout the airport near the conventional, executive, T-hangar, and Port-a-Port hangar facilities. These apron areas account for approximately 20,300 square yards of apron area. All aircraft parking aprons are depicted on **Exhibits 1F** and **1G.**

Aircraft Hangar Facilities

Hangar facilities at Chino Airport are comprised of conventional hangars, executive box hangars, T-hangars, and Port-a-Port hangars. Conventional hangars are large hangars, 10,000 square feet or more, and are used to accommodate multiple large aircraft for storage, maintenance activities, or various services. Executive box hangars are smaller than conventional hangars and range from 1,500 to 10,000 square feet. Executive box hangars are often able to hold multiple smaller aircraft or larger multi-engine or turbine aircraft. Executive box hangars provide the same type of aircraft storage as conventional hangars in that the structure is free from roof supports but are typically smaller than 10,000 square feet. These hangars are normally utilized by individual owners to store several aircraft or by smaller airport businesses. This type of hangar is becoming much more popular at general aviation airports and often is included in a larger contiguous facility that contains several separate hangar areas. T-hangars provide a single unit for aircraft storage within a larger hangar complex. Port-a-Port hangars are similar to T-hangars, in that they are enclosed hangars for individual aircraft storage. However, each Port-a-Port hangar can be disconnected and transported to a different location. The hangar facilities inventory table on **Exhibits 1F** and **1G** outlines the hangar storage facilities at Chino Airport.

Conventional Hangar

Executive Box Hangar

T-Hangars

There are nearly 90 individual enclosed buildings of various types and sizes at Chino Airport totaling approximately 2,049,100 square feet. Many of these structures are for aviation-related purposes and provide aircraft storage. However, there are several buildings that serve as support facilities, a museum, or non-aviation purposes. Buildings that do not accommodate aircraft storage total approximately 333,800 square feet and, thus, approximately 1,715,300 square feet are designated for aircraft hangar storage and other aircraft support functions. There are 22 conventional hangars at the airport that total approximately 607,700 square feet. Executive box hangar space consists of 25 units totaling approximately 695,600 square feet. T-hangars and Port-a-Port hangars on the airport consist of 16 nested units totaling approximately 412,000 square feet.

Port-A-Port Hangars

KEY

A-230 – San Bernardino County Aviation (east end)
Vacant (west end)
A-240 – Jim Irwin, A240 Partners
A-245 – Yanks Air Museum
A-270 – Yanks Air Museum
A-275 - Yanks Air Museum
A-280 – Yanks Air Museum
A-285 – Yanks Air Museum
A-290 – Southern California Edison
A-310 – R&R Properties, American Auto Truck, So. Co. Dairy
A-315 – Flo's Cafe
A-320 – Pleasant Feed Supplements, So. Ca. Dairy Equip.
A-325 – Pleasant Feed Supplements
A-330 – Vacant
A-335 – Affordable Avionics dba Araina Avionics
A-340 – Chino Aviation
A-385 – Santiago Communities
A-390 – Santiago Communities
A-436 – Agricultural-related business
A-437 – Chino Airport Maintenance Facility
A-440 – Century Aircraft Painting
A-445 – Port-a-Port Hangars (Private Aircraft Storage)
A-460 – T-Hangars (Private Aircraft Storage)
A-465 – T-Hangars (Private Aircraft Storage)
A-470 – T-Hangars (Private Aircraft Storage)
A-475 – T-Hangars (Private Aircraft Storage)
A-480 – Yancey Enterprises
A-485 – Yancey Enterprises
A-490 – Hangar (Vacant)
A-495 – Aero Traders
A-497 – Aero Traders
A-503 – Chino Airport Maintenance Facility
A-505 – Chino Airport Maintenance Facility
A-510 – Planes of Fame Air Museum
A-515 – Planes of Fame Air Museum /Fighter Rebuilders
A-520 – Planes of Fame Air Museum
A-530 – Planes of Fame Air Museum
A-532 – Planes of Fame Air Museum
A-540 – The Hangars at Chino (Private Aircraft Storage)
A-542 – The Hangars at Chino(Private Aircraft Storage)
A-544 – The Hangars at Chino
A-546 – Hangars (Private Aircraft Storage)
A-548 – Hangars (Private Aircraft Storage)
A-550 – Chino Airport Administration
A-552 – The Hangars (Private Aircraft Storage)
A-555 – Hangar (Commercial Arcraft Storage)
A-560 – Hangar (Commercial Arcraft Storage)
B-110 – Hangars / DuBois Aviation/ Creative Rotocraft
B-120 – Hangars / KAA / Chino Aircraft Interiors
B-130 – Hangars (Private Aircraft Storage)
B-140 – Hangars (Private Aircraft Storage)
B-150 – Hangars (Private Aircraft Storage)
B-160 – Hangars (Private Aircraft Storage)
B-170 – Hangars (Private Aircraft Storage)
B-180 – Hangars (Private Aircraft Storage)
B-181 – Hangar (Private Aircraft Storage)
B-182 – Hangar (Private Aircraft Storage)
B-183 – Hangar (Private Aircraft Storage)
B-184 – Hangar (Private Aircraft Storage)
B-185 – Hangar (Private Aircraft Storage)
B-186 – Hangar (Private Aircraft Storage)
B-187 – Hangar (Private Aircraft Storage)
B-188 – Hangar (Private Aircraft Storage)
B-195 – Airport Traffic Control Tower
B-197 – Electrical Vault
B-199 – SBC Aviation - Flying Tigers Fuel Service
B-210 – Hangars/Offices
B-220 – T-Hangars (Private Aircraft Storage)
B-230 – T-Hangars (Private Aircraft Storage)
B-240 – T-Hangars (Private Aircraft Storage)
B-250 – T-Hangars (Private Aircraft Storage)
B-260 – T-Hangars (Private Aircraft Storage)
B-270 – T-Hangars (Private Aircraft Storage)
B-280 – T-Hangars (Private Aircraft Storage)
B-290 – T-Hangars (Private Aircraft Storage)
B-295 – SBC Aviation
B-297 – B297 Partners
B-310 – Hangar / Offices / Chino Fuel Service
B-320 – Hangars (Private Aircraft Storage)
B-330 – Hangars (Private Aircraft Storage)
B-340 – Hangars (Private Aircraft Storage)
B-350 – Navion Custom Aircraft

Aerial Photo: Google Earth 4-23-20

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F-330 - Threshold Aviation Group
F-340 - Threshold Aviation Group
F-350 - Threshold Aviation Group
F-360 - Threshold Aviation Group
F-365 - Hangar (Private Aircraft Storage)

LEGEND
Airport Property Line

NORTH

Exhibit 1G
EXISTING SOUTH LANDSIDE FACILITIES

Aviation Services

Fixed base operators (FBO) are providers of various aviation-related services. Some of the services that FBOs provide include aircraft fueling, flight training, aircraft maintenance, aircraft rental, hangars, aircraft parking and storage, and flight planning, as well as pilot lounge areas, pilot supplies, courtesy vehicles, catering, and charter services.

Currently, there are four FBOs on the airfield that provide aviation fueling services: Threshold Aviation Group, Encore Jet Center, Chino Fuel Services, and Flying Tigers Aviation. In addition, there are a full range of specialty aviation businesses located throughout the airport that provide aviation services. The County of San Bernardino also provides airport management and operations oversight, land lease rental, aircraft hangar rental, and tiedown rental at the airport. **Table 1E** provides a list of the primary businesses operating at Chino Airport. The businesses and organizations listed below play an important role in the overall activity and vitality of the airport. As airport tenants, they support the overall airport operation financially and draw aviation activity to the area.

TABLE 1E | Aviation Businesses - Chino Airport

Business Name	Service Provided/Additional Information
Fixed Base Operator and Specialized Aviation Service Operators	
Threshold Aviation Group	A full service FBO, fuel, maintenance, hangar sales & leasing
Chino Fuel Services	A full service FBO, fuel, maintenance
Chino Fuel Services	A full service FBO, fuel, maintenance, hangar sales & leasing
Flying Tigers Aviation	A full service FBO, fuel, aircraft tiedowns
Mach One	Jet charters, aircraft management, aircraft sales
DeBritton Aviation	Aircraft sales, management, maintenance, hangar leasing
Aircraft Maintenance	
Cabe's Aviation	Aviation electronics
Chino Aviation	Aircraft maintenance
Fighter Rebuilders	Aircraft restoration
Inland Valley Aviation	Aircraft maintenance and repair
Navion Customs	Navion aircraft restoration and maintenance
Aircraft Painting/Detailing/Interiors/Sales	
Century Aircraft Painting	Aircraft painting
Vinny's	Aircraft detailing
Chino Aircraft Interiors	Custom aircraft interiors and paint
Aero Trader	Aircraft and aircraft parts sales
Flight Training School/Banner Towing	
Alliance International Aviation	Flight training and air charter
DuBois Aviation	Flight training and aircraft rental
K-M Air	Flight training
Kazuaki Yanagida	Flight training
Tom King Aerial Enterprises	Banner towing
Museum	
Planes of Fame Air Museum	Historic aviation museum
Yanks Air Museum	Historic aviation museum
Hangar Sales & Leasing	
A-240 Partners	Aircraft hangar sales and leasing
Chino Airport	Aircraft hangar sales and leasing
Chino Airport B110 & B210	Aircraft hangar sales and leasing
Chino Development Group	Aircraft hangar sales and leasing
Chino Development League	Aircraft hangar sales and leasing
Lancair, Inc.	Aircraft hangar sales and leasing
Pioneer Airport, LLC	Aircraft hangar sales and leasing
Southwest Airport Development	Aircraft hangar sales and leasing

Source: subcounty.gov/airports, 2020.

Non-Aviation Services

Chino Airport is home to several non-aviation related businesses, which are primarily located in areas that are not provided with aircraft access. On the north side of the airport, several buildings are utilized for private businesses that specialize in agricultural services. On the south side of the airport, approximately 75 acres of land are leased to a tree nursery and sod farm. Multiple other areas on airport property are leased to private commercial farming entities.

Automobile Parking

Multiple automobile parking lots are available at Chino Airport. Approximately 680 parking spaces are available on the north side of the airport, of which approximately 20 are handicap accessible. On the south side of the airport, an additional 150 parking spaces are available for vehicles using the FBO facilities located directly south of the Runway 26L threshold. Total, there are approximately 830 automobile parking spaces located at CNO that serve both aviation and non-aviation-related businesses.

SUPPORT FACILITIES

Various other landside facilities that play a supporting role in overall airport operations have also been identified. These support functions include facilities related to fuel storage, aircraft rescue and firefighting (ARFF), maintenance, utilities, and security.

Aircraft Wash Rack

At present, there is a designated aircraft wash rack located on the southeast side of the airfield adjacent to the south side of Runway 26L. The aircraft wash rack allows aircraft owners to wash their aircraft and was constructed to ensure proper drainage of run-off water cleaners.

Fuel Facilities and Equipment

There are currently three fuel farms located on the airport, all of which are operated by FBOs. Threshold Aviation Group owns and operates a fuel farm that consists of two aboveground fuel storage tanks. These tanks consist of one 20,000-gallon tank dedicated to Jet A fuel, and one 20,000-gallon capacity tank that is split into two 10,000-gallon capacity compartments; one is designated for Jet A and the other is designated 100LL.

Fuel Farm

Chino Fuel Services leases a fuel farms on the north side of the airport that provide 100LL self-service fueling. One fuel farm is located on the northwest side of the airfield and the other on the northeast side. The fuel farm on the northeast side of the airport also contains Jet A fuel storage. All these storage tanks are underground fuel storage facilities; however, their capacities are unknown.

There is also a fuel farm located on the north side of hangar designation B-295, which is also contained underground, as well as a fuel farm located east of the ATCT on parcel designation B-199.

Aircraft Rescue and Fire Fighting (ARFF)

The Chino Valley Independent Fire District's Fire Station No. 3 is located on the south side of the airport and fronts Kimball Avenue. It is designated to provide emergency and rescue services to the surrounding area, as well as Chino Airport. Fire Station No. 3 has four personnel at the facility 24 hours per day, seven days per week. Although the station is not aircraft rescue and firefighting (ARFF) certified, it operates a variety of equipment that is capable of handling fire and rescue operations specific to aircraft emergencies. One fire engine and one quick-response unit capable of storing 100 gallons of aqueous film forming foam (AFFF) and 150 pounds of Purple K dry chemical are based at the fire station.

Chino Valley Independent Fire District Station No. 3

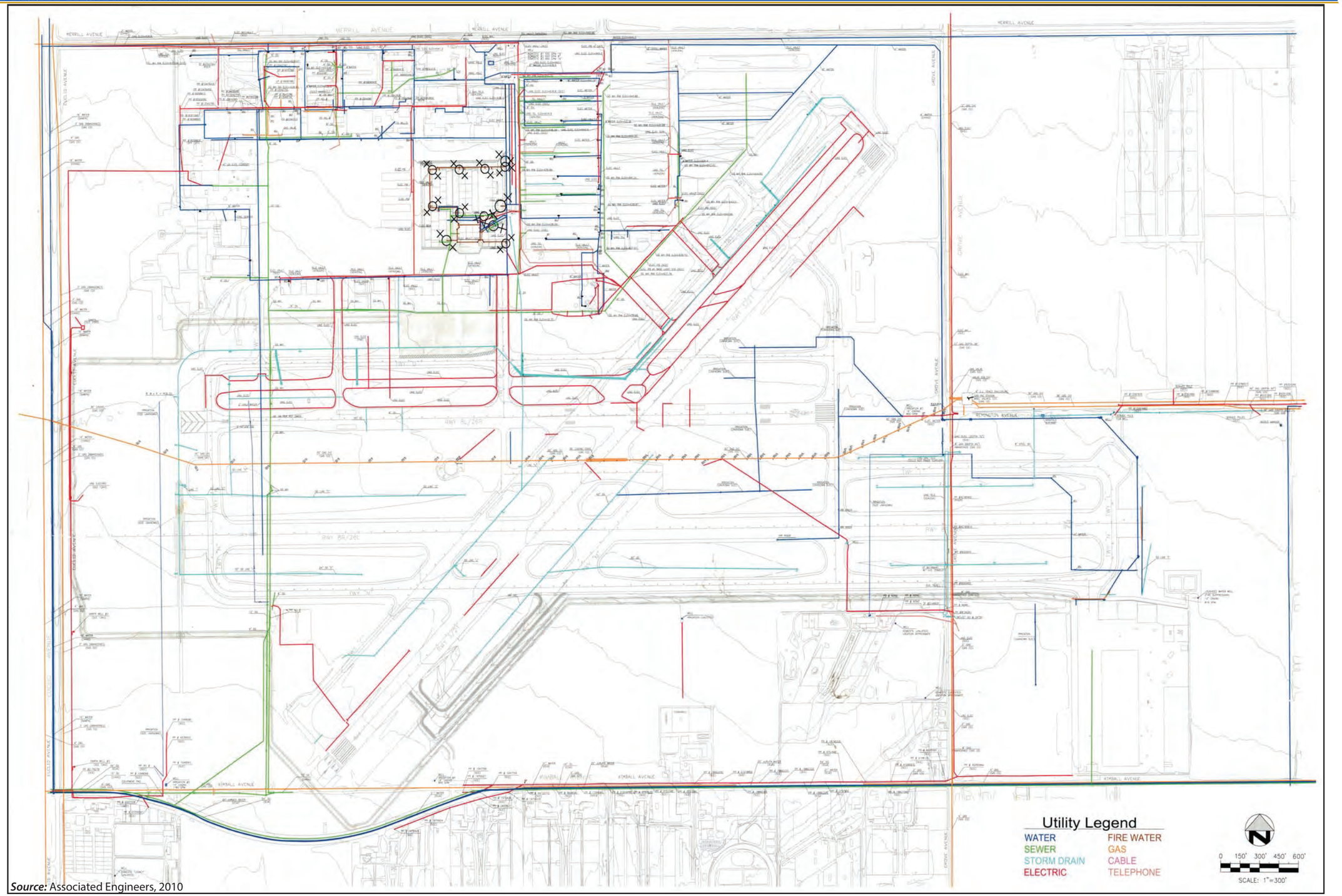
Fire Station No. 3 has a direct communication line with Chino Airport operations and ATCT personnel, allowing it to provide immediate emergency services when needed. An access road extending from the north side of the fire station provides personnel and equipment direct access to Taxiway E.

Security Fencing and Gates

The operations area at Chino Airport is completely enclosed by a six-foot chain-link fence topped by three-strand barbed-wire to prevent inadvertent access to the airport by vehicles and pedestrians.

Utilities

The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport, as well as the land immediately adjacent to the facility. Utility availability is a critical element when considering future expansion capabilities at the airport, both airside and landside components. The current utility map for the airport is presented on **Exhibit 1H**.



Source: Associated Engineers, 2010

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The airport is supplied by electricity, natural gas, water, and sanitary sewer. Electric service is provided by Edison International. Southern California Gas Company provides natural gas. Water and sanitary sewer services are provided by the City of Chino, while telephone and communication services are provided by Verizon.

AREA AIRSPACE

The FAA Act of 1958 established the FAA as the responsible agency for the control and use of navigable airspace within the U.S. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground, in addition to establishing a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

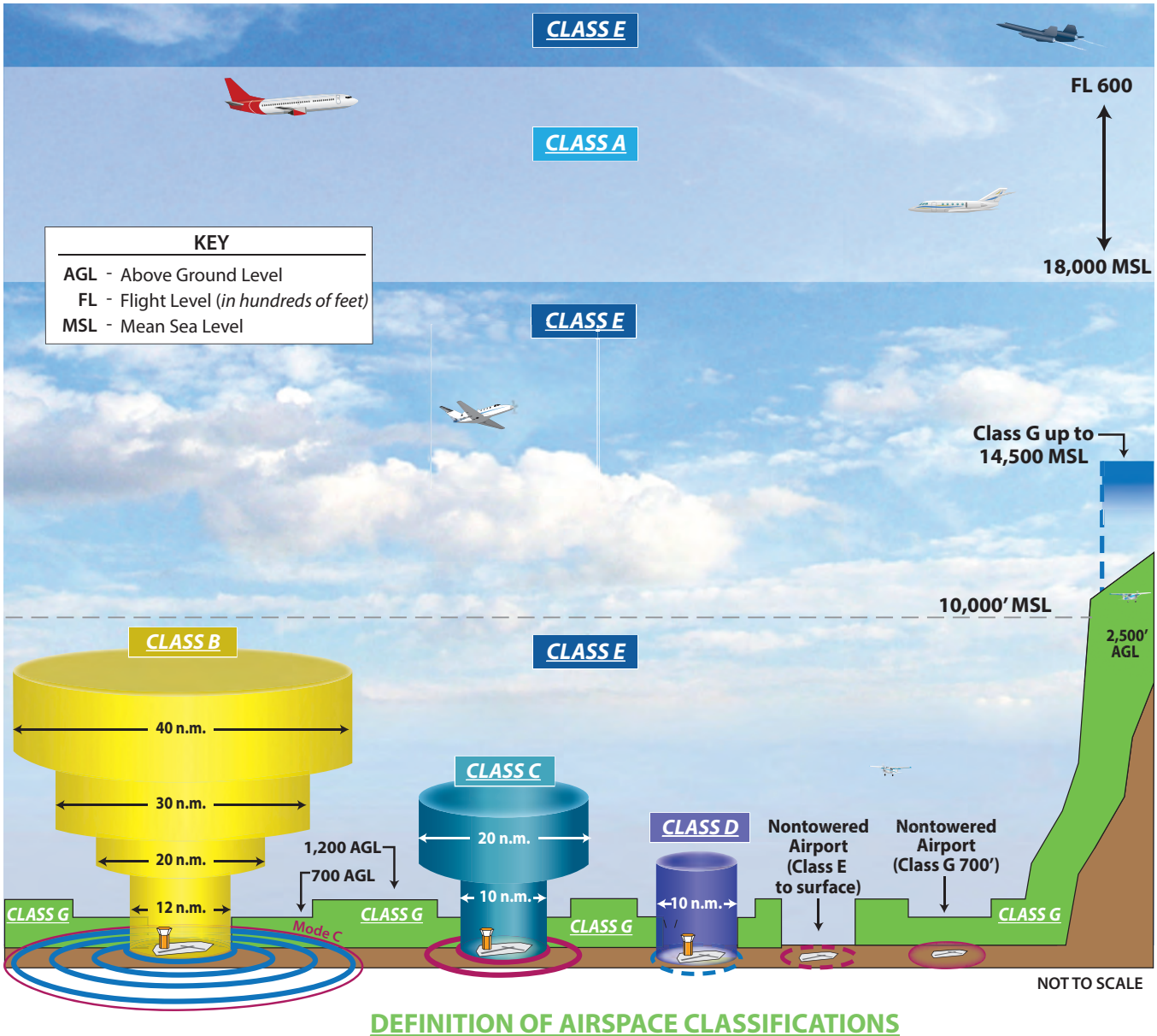
AIRSPACE STRUCTURE

Airspace within the U.S. is broadly classified as either "controlled" or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the U.S., as shown on **Exhibit 1J**. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Airspace near CNO is depicted on **Exhibit 1K**.

Class A Airspace | Class A airspace includes all airspace from 18,000 feet MSL to flight level (FL) 600 (approximately 60,000 feet MSL) over the contiguous 48 states and Alaska. This airspace is designated in Federal Aviation Regulation (F.A.R.) Part 71.33 for positive control of aircraft. All aircraft must be on an IFR clearance to operate within Class A airspace.

Class B Airspace | Class B airspace has been designated around some of the country's major airports, such as Los Angeles International Airport (LAX), to separate all aircraft within a specified radius of the primary airport. Each Class B airspace is specifically tailored for its primary airport. All aircraft operating within Class B airspace must have air traffic control clearance. Certain minimum aircraft equipment and pilot certification requirements must also be met. This airspace is the most restrictive controlled airspace routinely encountered by pilots operating under VFR in an uncontrolled environment. CNO is located east outside of LAX's Class B airspace.

Class C Airspace | The FAA has established Class C airspace at approximately 120 airports around the country that have significant levels of IFR traffic. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. To fly inside Class C airspace, an aircraft must have a two-way radio, an encoding transponder, and have established communication with the ATC facility. Aircraft may fly below the floor of the Class C airspace or above the Class C airspace ceiling without establishing communication with ATC. CNO's designated airspace exists below the Class C airspace that surrounds Ontario International Airport (ONT).



DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A Think A - Altitude. Airspace above 18,000 feet MSL up to and including FL 600. Instrument Flight Rule (IFR) flights only, ADS-B 1090 ES transponder required, ATC clearance required.

CLASS B Think B - Busy. Multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports. ADS-B 1090 ES transponder required, ATC clearance required.

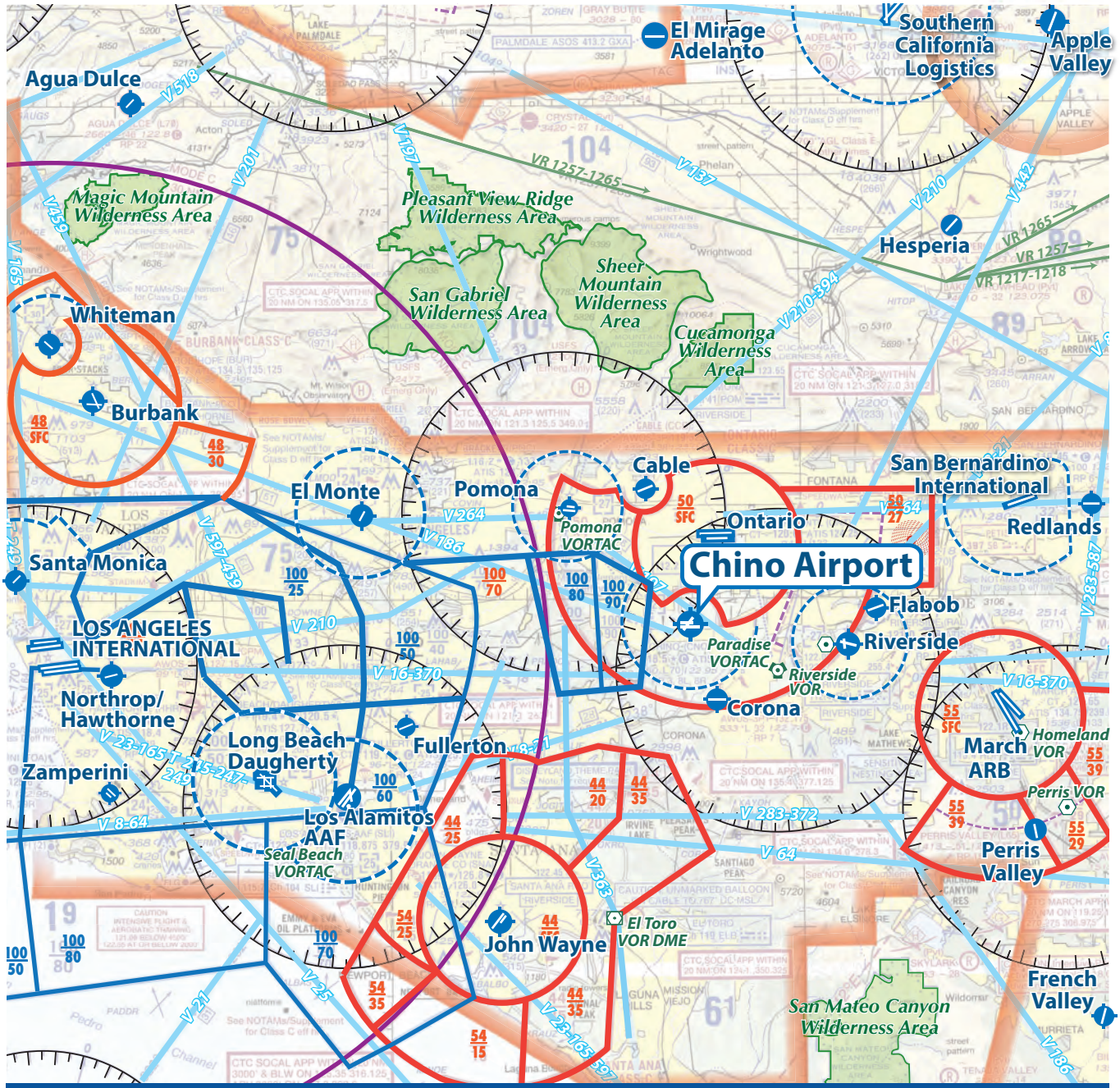
CLASS C Think C - Mode C. Mode C transponder required. ATC communication required. Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.

CLASS D Think D - Dialogue. Pilot must establish dialogue with tower. Generally airspace from the surface to minimum 2,500 feet AGL surrounding towered airports.

CLASS E Think E - Everywhere. Controlled airspace that is not designated as any other Class of airspace.

CLASS G Think G - Ground. Uncontrolled airspace. From surface to a 1,200 AGL (in mountainous areas 2,500 AGL) Exceptions: near airports it lowers to 700' AGL; some airports have Class E to the surface. Visual Flight Rules (VFR) minimums apply.

Source: www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/15_phak_ch15.pdf



LEGEND

- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- VOR
- VOR-DME
- Non-Directional Radiobeacon (NDB)
- Compass Rose
- Wilderness Area
- Class B Airspace
- Class C Airspace
- Class D Airspace
- Class E Airspace
- Class E Airspace with floor 700 ft. above surface
- Mode C
- Victor Airways
- Military Training Routes

NORTH

NOT TO SCALE

Source: Los Angeles Sectional Charts, US Department of Commerce, National Oceanic and Atmospheric Administration 12/05/19 - 6/18/20

Class D Airspace | Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles (NM) from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. As shown on **Exhibit 1J**, CNO operates within Class D airspace beginning at the surface and extending to 3,000 feet MSL during the operational hours of the ATCT. Aircraft operators planning to operate within Class D airspace are required to contact the CNO air traffic control prior to entering or departing CNO airspace and must maintain in contact while within the controlled airspace to land at CNO or to transverse the area. When the ATCT is inactive, CNO airspace reverts to Class G airspace.

Class E Airspace | Class E airspace consists of controlled airspace designed to contain IFR operations near an airport and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with ATC when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with ATC facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Class G Airspace | Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 to 1,200 feet above ground level). While aircraft may technically operate within this Class G airspace without any contact with ATC, it is unlikely that many aircraft will operate this low to the ground. Furthermore, federal regulations specify minimum altitudes for flight. F.A.R. Part 91.119*, Minimum Safe Altitudes*, generally states that except when necessary for takeoff or landing, pilots must not operate an aircraft over any congested area of a city, town, or settlement, or over any open-air assembly of persons, at an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

Over less congested areas, pilots must maintain an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. Helicopters may be operated at less than the minimums prescribed above if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the FAA.

SPECIAL USE AIRSPACE

Victor Airways | For aircraft arriving or departing the regional area using VOR facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet above ground level (AGL) to 18,000 feet MSL and extend between VOR navigational facilities. Victor Airways near CNO are identified on **Exhibit 1K**.

Alert Areas/Military Operations Area (MOA) & Military Training Routes (MTRs)/Restricted Areas | Alert areas, MOAs, MTRs, and restricted areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training, military operations/ activities, or an unusual type of aerial activity. Pilots should exercise caution near and within these areas. All activity within these areas, if granted by the controlling agency, should be conducted in accordance with regulations, without

waiver, and pilots of participating aircraft, as well as pilots transitioning the area, are equally responsible for collision avoidance. MTR VR 1257-1265 is located north of CNO and travels from west to east. There are no alert areas, MOAs, or restricted areas in the immediate vicinity of CNO.

National Park Service, Recreation, and Wilderness Areas | Six wilderness areas exist in proximity to CNO. Aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface of designated Wilderness Areas, which can include National Park Recreation Areas and wildlife breeding grounds. FAA Advisory Circular (AC) 91-36D defines the "surface" as the highest terrain within 2,000 feet laterally of the route of flight or the uppermost rim of a canyon or valley. The airport is located in proximity to the Magic Mountain, Pleasant View Ridge, San Gabriel, Sheer Mountain, Cucamonga, and San Mateo Canyon Wilderness Areas.

AIRSPACE CONTROL

Los Angeles Air Route Traffic Control Center (ARTCC)

The FAA has established 21 ARTCCs throughout the continental U.S. to control aircraft operating under IFR within controlled airspace and while enroute. An ARTCC assigns specific routes and altitudes along Federal Airways to maintain separation and orderly traffic flow. The Los Angeles Center ARTCC controls IFR airspace enroute to and from the Los Angeles metropolitan area, including CNO.

SOCAL Approach/Departure

Southern California (SoCal) Approach/Departure is a consolidated terminal radar approach control (TRACON) facility that handles all the low altitude IFR traffic in southern California and guides about 2.2 million planes over roughly 9,000 square miles in a year. The SoCal TRACON airspaces covers an area from 20 miles north of Burbank to the US/Mexican border and from San Bernardino to Santa Catalina Island, which includes CNO.

Chino Airport Traffic Control Tower (ATCT)

Approaching, departing, and taxiing aircraft at CNO are managed by the Chino ATCT controllers. The tower operates continuously seven days per week and is located on the north side of the airfield. The CNO ATCT is part of the FAA's contract tower program, which utilizes non-federal controllers to operate the tower.

Flight Service Stations (FSS)

FSSs are air traffic facilities which provide pilot briefings, flight plan processing, inflight radio communications, search and rescue (SAR) services, and assistance to lost aircraft and aircraft in emergency situations. FSSs also relay air traffic control clearances, process Notice to Airmen (NOTAMs), and broadcast aviation meteorological and aeronautical information. The Riverside FSS is the nearest FSS to CNO.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures are a series of predetermined maneuvers established by the FAA, using electronic navigational aids that assist pilots in locating and landing at an airport, especially during instrument flight conditions. Precision instrument approaches provide vertical descent information and course guidance information to the pilot. Non-precision approaches only provide course guidance to the pilot; however, the relatively new GPS localizer performance with vertical guidance (LPV) approaches are currently categorized by the FAA as an approach with vertical guidance (APV), which is not considered a precision approach.

Localizer Antenna

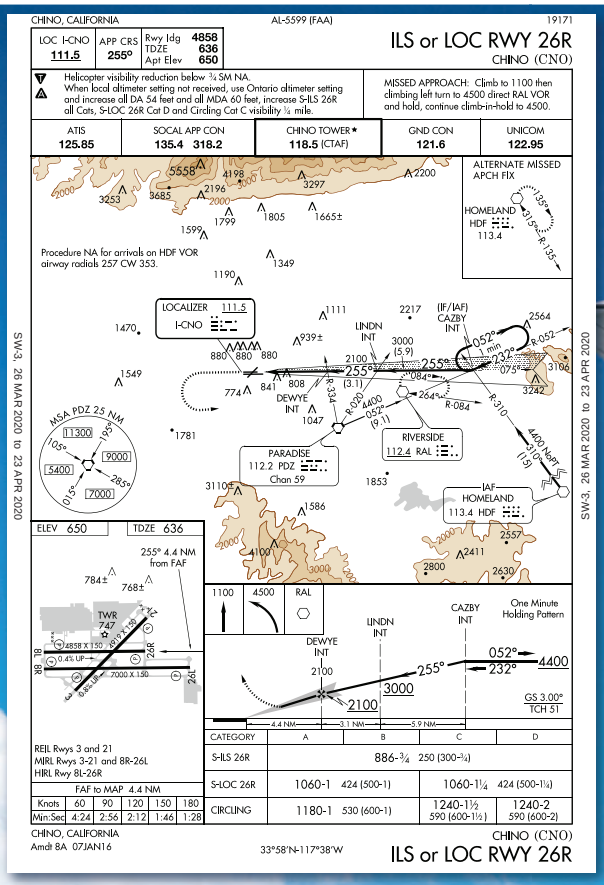
There are currently three published non-precision instrument approach procedures at CNO, each to Runway 26R. **Exhibit 1L** presents the FAA-approved and published instrument approach procedures, including associated weather minimums for CNO. The lowest instrument approach visibility minimums are provided by the instrument landing system (ILS) and localizer (LOC) precision approach serving Runway 26R, which is not lower than ¾-mile. The remaining two instrument approaches serving Runway 26R include an area navigation (RNAV) GPS-based approach and a VOR-based approach.

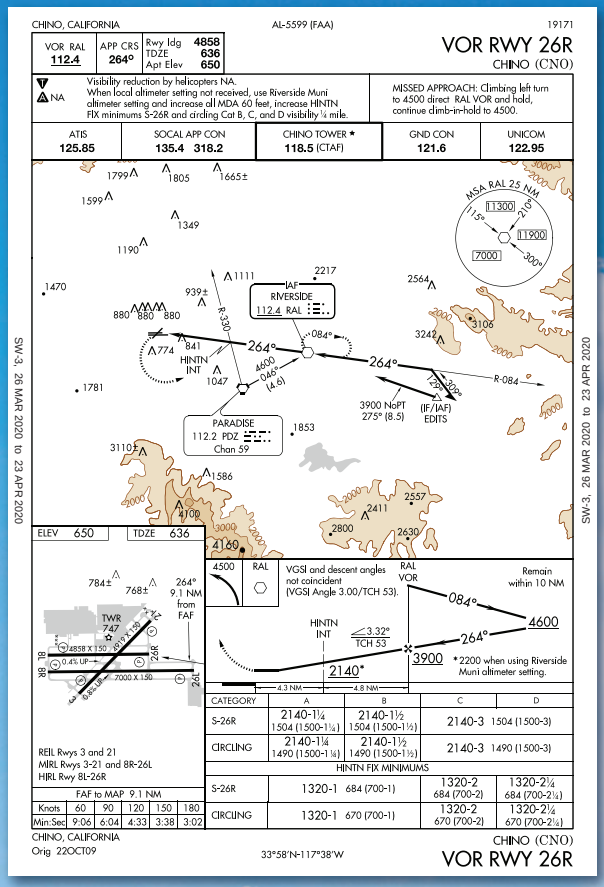
Glide Slope Antenna

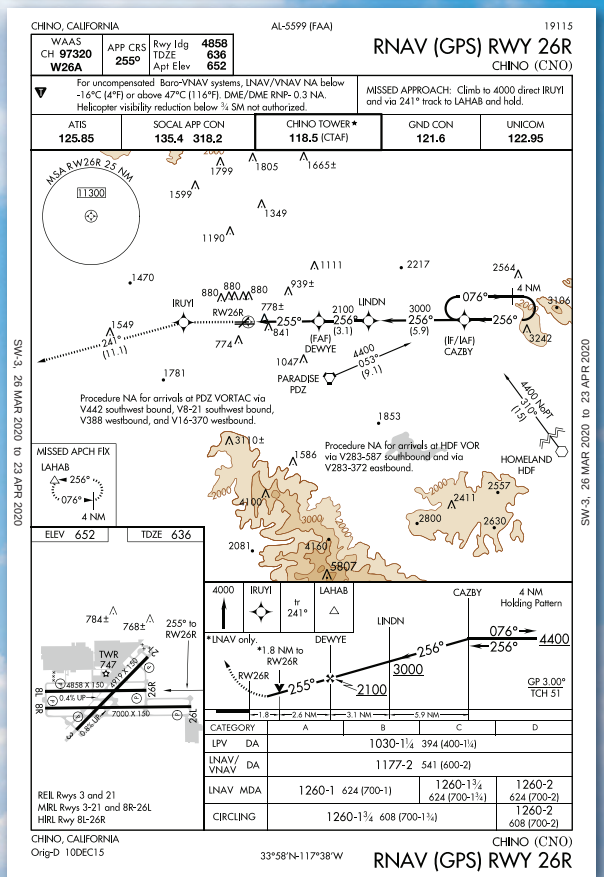
The visibility and cloud height minimums associated with the approach define the capability of an instrument approach procedure. Visibility minimums define the horizontal distance the pilot must be able to see to complete the approach. Cloud height defines the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot legally complete the instrument approach.

REGIONAL AIRPORTS

A review of other public-use airports with at least one paved runway within a 20-nm radius of CNO was conducted to identify and distinguish the types of aviation services provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at CNO. **Table 1F** provides basic level information on 12 public-use airports within the


CHINO, CALIFORNIA
AL-5599 (FAA)
19171
ILS or LOC RWY 26R
CHINO (CNO)
LOC I-CNO 111.5
APP CRS 255°
Rwy Idg 4858
TDZE 636
Apt Elev 650
Helicopter visibility reduction below ¾ SM NA.
When local altimeter setting not received, use Ontario altimeter setting and increase all DA 54 feet and all MDA 60 feet, increase S-ILS 26R all Cats, S-LOC 26R Cat D and Circling Cat C visibility ¼ mile.
MISSED APPROACH: Climbs to 1100 then climbing left turn to 4500 direct RAL VOR and hold, continue climb-in-hold to 4500.
ATIS 125.85
SOCAL APP CON 135.4 318.2
CHINO TOWER* 118.5 (CTAF)
GND CON 121.6
UNICOM 122.95
ALTERNATE MISSED APCH FIX
HOMELAND HDF 113.4
Procedure NA for arrivals on HDF VOR airway radials 257 CW 353.
LOCALIZER 111.5 I-CNO
LINDN INT
CAZBY INT (IF/IAF)
DEWYE INT
PARADISE 112.2 PDZ Chan 59
RIVERSIDE 112.4 RAL
IAF HOMELAND 113.4 HDF
MSA PDZ 25 NM
ELEV 650
TDZE 636
255° 4.4 NM from FAF
One Minute Holding Pattern
GS 3.00° TCH 51
REIL Rwys 3 and 21
MIRL Rwys 3-21 and 8R-26L
HIRL Rwy 8L-26R
FAF to MAP 4.4 NM
Knots 60 90 120 150 180
Min:Sec 4:24 2:56 2:12 1:46 1:28
CATEGORY A B C D
S-ILS 26R 886-¾ 250 (300-¾)
S-LOC 26R 1060-1 424 (500-1) 1060-1¼ 424 (500-1¼)
CIRCLING 1180-1 530 (600-1) 1240-1½ 590 (600-1½) 1240-2 590 (600-2)
CHINO, CALIFORNIA
Amdt 8A 07JAN16
33°58'N-117°38'W
CHINO (CNO)
ILS or LOC RWY 26R
SW-3, 26 MAR 2020 to 23 APR 2020


CHINO, CALIFORNIA
AL-5599 (FAA)
19171
VOR RWY 26R
CHINO (CNO)
VOR RAL 112.4
APP CRS 264°
Rwy Idg 4858
TDZE 636
Apt Elev 650
Visibility reduction by helicopters NA.
When local altimeter setting not received, use Riverside Muni altimeter setting and increase all MDA 60 feet, increase HINTN FIX minimums S-26R and circling Cat B, C, and D visibility ¼ mile.
MISSED APPROACH: Climbing left turn to 4500 direct RAL VOR and hold, continue climb-in-hold to 4500.
ATIS 125.85
SOCAL APP CON 135.4 318.2
CHINO TOWER* 118.5 (CTAF)
GND CON 121.6
UNICOM 122.95
MSA RAL 25 NM
IAF RIVERSIDE 112.4 RAL
HINTN INT
PARADISE 112.2 PDZ Chan 59
3900 NoPT 275° (8.5)
(IF/IAF) EDITS
ELEV 650
TDZE 636
264° 9.1 NM from FAF
VGSI and descent angles not coincident (VGSI Angle 3.00/TCH 53).
Remain within 10 NM
3.32° TCH 53
2140*
3900
*2200 when using Riverside Muni altimeter setting.
REIL Rwys 3 and 21
MIRL Rwys 3-21 and 8R-26L
HIRL Rwy 8L-26R
FAF to MAP 9.1 NM
Knots 60 90 120 150 180
Min:Sec 9:06 6:04 4:33 3:38 3:02
CATEGORY A B C D
S-26R 2140-1¼ 1504 (1500-1¼) 2140-1½ 1504 (1500-1½) 2140-3 1504 (1500-3)
CIRCLING 2140-1¼ 1490 (1500-1¼) 2140-1½ 1490 (1500-1½) 2140-3 1490 (1500-3)
HINTN FIX MINIMUMS
S-26R 1320-1 684 (700-1) 1320-2 684 (700-2) 1320-2¼ 684 (700-2¼)
CIRCLING 1320-1 670 (700-1) 1320-2 670 (700-2) 1320-2¼ 670 (700-2¼)
CHINO, CALIFORNIA
Orig 22OCT09
33°58'N-117°38'W
CHINO (CNO)
VOR RWY 26R
SW-3, 26 MAR 2020 to 23 APR 2020


CHINO, CALIFORNIA
AL-5599 (FAA)
19115
RNAV (GPS) RWY 26R
CHINO (CNO)
WAAS CH 97320 W26A
APP CRS 255°
Rwy Idg 4858
TDZE 636
Apt Elev 652
For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -16°C (4°F) or above 47°C (116°F). DME/DME RNP- 0.3 NA.
Helicopter visibility reduction below ¾ SM not authorized.
MISSED APPROACH: Climb to 4000 direct IRUYI and via 241° track to LAHAB and hold.
ATIS 125.85
SOCAL APP CON 135.4 318.2
CHINO TOWER* 118.5 (CTAF)
GND CON 121.6
UNICOM 122.95
MSA RW26R 25 NM
IRUYI
LINDN
DEWYE
CAZBY
PARADISE PDZ
Procedure NA for arrivals at PDZ VORTAC via V442 southwest bound, V8-21 southwest bound, V388 westbound, and V16-370 westbound.
Procedure NA for arrivals at HDF VOR via V283-587 southbound and via V283-372 eastbound.
MISSED APCH FIX LAHAB 256° 076° 4 NM
HOMELAND HDF
ELEV 652
TDZE 636
255° to RW26R
4 NM Holding Pattern
*LNAV only.
*1.8 NM to RW26R
GP 3.00° TCH 51
REIL Rwys 3 and 21
MIRL Rwys 3-21 and 8R-26L
HIRL Rwy 8L-26R
CATEGORY A B C D
LPV DA 1030-1¼ 394 (400-1¼)
LNAV/VNAV DA 1177-2 541 (600-2)
LNAV MDA 1260-1 624 (700-1) 1260-1¾ 624 (700-1¾) 1260-2 624 (700-2)
CIRCLING 1260-1¾ 608 (700-1¾) 1260-2 608 (700-2)
CHINO, CALIFORNIA
Orig-D 10DEC15
33°58'N-117°38'W
CHINO (CNO)
RNAV (GPS) RWY 26R
SW-3, 26 MAR 2020 to 23 APR 2020

vicinity of CNO. All regional airports, including CNO, combine for approximately 750,000 annual operations and over 1,500 based aircraft. A more detailed discussion of regional airports and their impact on CNO's service area is provided in Chapter Two.

TABLE 1F | Vicinity Public-Use Airports (within 20 NM) - Chino Airport

Airport Name	ID	NM From CNO	FAA Service Level	Based Aircraft	Annual Operations (2019)	Longest Runway (ft)	Lowest Visibility Minimum
Chino Airport	**CNO**	**N/A**	**Reliever**	**624**	**217,000**	**7,000**	**3/4 mile**
Corona Municipal	AJO	4.9 nm S	GA	149	40,000	3,200	1-1/4 mile
Ontario International	ONT	5.2 nm NNE	CS	15	100,000	12,197	CAT II/III
Cable	CCB	8.6 nm NNW	Reliever	227	92,000	3,863	1 mile
Riverside Municipal	RAL	9.6 nm E	Reliever	173	108,000	5,401	3/4 mile
Brackett Field	POC	10.1 nm NW	Reliever	114	116,000	4,840	1 mile
Flabob	RIR	11.3 nm E	N/A	140	11,000	3,190	1-1/4 mile
Fullerton Municipal	FUL	18.2 nm WSW	Reliever	114	69,000	3,121	1 mile

CS: Commercial Service
GA: General Aviation
N/A: Not Applicable
NM: Nautical Mile

Source: Airport Master Record Form 5010; 2021-2025 National Plan of Integrated Airport Systems

AIRPORT ACTIVITY

Aviation activity records are essential for determining required facilities, and they help to determine eligibility for federal funding. The most important components to consider when assessing aviation activity are aircraft operations, passenger enplanements, and based aircraft. It is also important to analyze historical activity levels to aid in projecting future trends. Combining this data will enhance the airport's ability to plan for the potential future facility demands.

ANNUAL OPERATIONS

Aircraft operations (takeoffs and landings) are a primary indicator of aeronautical activity at Chino Airport. Aircraft operations are classified as local or itinerant. Local operations often consist of touch-and-go or pilot training activity. Itinerant operations consist of aircraft that arrive from or depart to destination airports outside the local operating area.

Aircraft operations can be separated into four general categories: air carrier, air taxi, general aviation, and military. The following provides a description of the categories of aircraft operations detailed above.

- **Air Taxi** – operations associated with aircraft originally designed to have less than 60 passenger seats or a cargo payload of less than 18,000 pounds and carries cargo or mail on either a scheduled or charter basis, and/or carries passengers on an on-demand basis or limited scheduled basis.

- **Air Carrier** – operations defined as those conducted commercially by aircraft having a seating capacity of 60 or more seats and a cargo payload capacity of more than 18,000 pounds. There are currently no air carriers operating at the airport by definition of an air carrier operation.

- **General Aviation** – civil aviation operations other than scheduled air services and nonscheduled air transport operations for hire.

- **Military** – operations conducted by aircraft and helicopters with a military designation.

Records of airport operational activities are essential for determining required facilities (types and sizes), as well as eligibility for federal funding. **Table 1G** provides a summary of operational statistics over the past 10 years. According to the FAA's Operations Network (OPSNET), which reports ATCT counts for CNO, the airport experienced peak operations levels in 2019 with over 217,100 operations. The following year total operations declined as the COVID-19 pandemic was happening. In 2022, the airport was back over 200,000 operations . It should be noted that all operations reported in the OPSNET system are confined to the operational hours of the ATCT serving CNO, which operates from 7:00 a.m. to 9:00 p.m.

TABLE 1G | Historical Operations

Year	ITINERANT OPERATIONS				LOCAL OPERATIONS			Total
	AC/AT	GA	MIL	*Subtotal*	GA	MIL	*Subtotal*	
2013	496	62,797	409	*63,702*	104,919	1,082	*106,001*	**169,703**
2014	420	67,468	521	*68,409*	109,819	1,583	*111,402*	**179,811**
2015	360	68,231	476	*69,067*	100,488	1,376	*101,864*	**170,931**
2016	546	69,413	262	*70,221*	106,947	409	*107,356*	**177,577**
2017	409	71,244	446	*72,099*	130,089	902	*130,991*	**203,090**
2018	560	76,044	416	*77,020*	126,584	707	*127,291*	**204,311**
2019	505	78,730	484	*79,719*	136,593	869	*137,462*	**217,181**
2020	712	60,394	395	*61,501*	114,967	523	*115,490*	**176,991**
2021	634	63,023	451	*64,108*	129,441	836	*130,277*	**194,385**
2022	579	64,065	1,586	*66,230*	137,247	1,105	*138,352*	**204,582**

KEY: AC-Air Carrier; AT-Air Taxi; GA-General Aviation; MIL-Military

Source: FAA OPSNET Tower operations database

Air taxi and military activity have constituted a small percentage of annual aircraft operations during the past several years. Military activity can include fixed-wing aircraft, as well as helicopter activity associated with military operations. The largest percentage of aircraft activity experienced at the airport falls within the general aviation category and can range from small aircraft conducting recreational flights, up to large corporate jets transporting passengers for business purposes.

BASED AIRCRAFT

Identifying the current number of based aircraft is important to the planning analysis. An accurate number of based aircraft helps planners determine existing demand for facilities at the airport, including aircraft storage needs, parking apron space, pilot and passenger services, and other support facilities. At present, there are 698 reported aircraft based at the airport, which includes 482 single engine pistons, 86 multi-engine pistons, 70 jets, 40 turboprops, and 20 helicopter aircraft.

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic characteristics are collected and examined to derive an understanding of the dynamics of growth near an airport. This information is crucial in determining aviation demand level requirements, as most general aviation demand is directly related to the socioeconomic condition of the surrounding region. Statistical analysis of population, employment, and income trends provide a picture of the economic strength of the region, as well as the ability of the area to sustain a strong economic base into the future. Additional socioeconomic data will be provided in Chapter Two – Forecasts; however, the information in this chapter will introduce the socioeconomic trends in the study area.

Table 1H summarizes historical and forecast population data for the region.

TABLE 1H | Regional Population Data

	HISTORICAL			FORECAST			
	2012	2022	CAGR 2012-2022	2027	2032	2042	CAGR 2012-2020
City of Chino	79,400	89,494	1.20%	97,070	105,287	123,867	1.64%
City of Chino Hills	75,800	78,059	0.29%	81,548	85,192	92,978	0.88%
City of Ontario	166,300	203,765	2.05%	217,789	232,779	265,924	1.34%
San Bernardino County	2,068,000	2,251,531	0.85%	2,737,434	2,501,937	2,780,193	1.06%
Riverside County	2,245,100	2,549,751	1.28%	2,708,156	2,876,402	3,449,001	1.52%
Los Angeles County	9,922,600	10,431,810	0.50%	10,664,352	10,902,078	11,393,546	0.44%
Orange County	3,071,600	3,291,907	0.70%	3,337,698	3,384,127	3,478,929	0.28%

CAGR: Compound Annual Growth Rate

Source: Southern California Association of Governments - 2016 Demographic Data; Interpolated by Coffman Associates

ENVIRONMENTAL INVENTORY

The environmental inventory addresses existing conditions at Chino Airport and its environs and is intended to help identify relevant environmental issues that should be considered during the preparation of the Airport Update. The inventory is organized using the resource categories contained in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (2015). Information regarding the environmental conditions at the airport and within the surrounding area has been derived from internet resources, agency maps, and existing literature. A comprehensive list of the resources is included in this section.

AIR QUALITY

The concentration of various pollutants in the atmosphere describes the local air quality. The significance of pollution concentration is determined by comparing it to the state and federal air quality standards. In 1971, the U.S. Environmental Protection Agency (EPA) established standards that specify the maximum permissible short- and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for criteria pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead (Pb).

Based on federal air quality standards, a specific geographic area can be classified as either an "attainment," "maintenance," or "non-attainment" area for each pollutant. The threshold for non-attainment designation varies by pollutant.

The airport is located within the California Air Resources Board's South Coast Air Basin of San Bernardino County. Those pollutants for which the county and air basin are designated as a nonattainment or maintenance area are outlined in **Table 1J** below.[1]

TABLE 1J | NAAQS Attainment Status; Los Angeles – South Coast Air Basin

Pollutant	Maintenance / Nonattainment Designation	Date Designated to Maintenance	Classification
8-hour O_3 (2008)	Nonattainment	NA	Extreme
CO (1971)	Maintenance	6/11/2007	Serious
NO_2	Maintenance	9/22/1998	Primary
PM_{10} (1987)	Maintenance	7/26/2013	Serious
$PM_{2.5}$ (1997)	Nonattainment	NA	Moderate
$PM_{2.5}$ (2006)	Nonattainment	NA	Serious
$PM_{2.5}$ (2012)	Nonattainment	NA	Serious

Source: U.S. Environmental Protection Agency Green Book – San Bernardino County, CA, Los Angeles-South Coast Air Basin (data current as of August 31, 2023) (https://www3.epa.gov/airquality/greenbook/anayo_ca.html)

The Los Angeles – South Coast Air Basin of San Bernardino County is in attainment for SO_2 and Pb.

BIOLOGICAL RESOURCES

Biotic resources include the various types of plants and animals that are present in an area. The term also applies to rivers, lakes, wetlands, forests, and other habitats that support plants and animals.

The U.S. Fish and Wildlife Service (USFWS) is charged with overseeing the requirements contained within Section 7 of the *1973 Endangered Species Act* (ESA). The ESA was put into place to protect animal or plant species whose populations are threatened by human activities. Along with the FAA, the USFWS reviews projects to determine if a significant impact to protected species will result in the implementation of a proposed project. Significant impacts occur when the proposed action could jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area.

According to the USFWS Information for Planning and Consultation (IPaC) report, there are nine species federally listed as threatened or endangered which have the potential to occur in the vicinity of the airport, identified in **Table 1K** below. In 2022, a biological survey was performed at the airport, which identified whether sufficient habitat was present at the airport to support these species.[2] General habitat requirements and the potential for occurrence is outlined in **Table 1K**.

[1] U.S. Environmental Protection Agency *Green Book* – State of California (https://www3.epa.gov/airquality/greenbook/anayo_ca.html)
[2] SWCA Environmental Consultants, *Biological Resources Survey Report for Chino Airport, San Bernardino County, California* (October 2022)

TABLE 1K | Federally Listed Endangered Species - Chino Airport

Common Name (*Scientific Name*)	Federal Status	State Status	Habitat	Potential for Occurrence
Mammal				
Stephen's kangaroo rat (*Dipodomys stephensi*)	Threatened	Endangered	The habitat includes sage and miscellaneous scrub, chaparral, grassland, vernal pools, meadow, marsh, riparian areas, woodlands, forest and other non-native vegetation.[1]	**Absent.** The airport lacks the habitat to support the species.
Birds				
Coastal California gnatcatcher (*Polioptila californiaca californica*)	Threatened	Not Listed; Species of Special Concern	Prefers scrub vegetation, such as California sagebrush, California buckwheat, and other sages.[2]	**Absent.** The airport lacks the appropriate nesting habitat to support the species.
Least Bell's vireo (*Vireo bellii pusillus*)	Endangered	Endangered	Habitat is found along rivers and streams in dense shrubs and small trees.[3]	**Absent.** The airport lacks the appropriate nesting habitat to support the species.
Southwestern willow flycatcher (*Empidonax trailii extimus*)	Endangered	Endangered	Habitat includes dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder, saltcedar, Russian olive, buttonbush, and arrowweed are present. Nesting habitat is in thickets of trees and shrubs that are 13 feet (ft) to 23 ft tall, among dense, homogeneous foliage.[4]	**Absent.** The airport lacks the appropriate nesting habitat to support the species.
Fish				
Santa Ana sucker (*Catostomus santaanea*)	Threatened	Not Listed	The primary habitat for the Santa Ana sucker in the Los Angeles River basin, San Gabriel River basin, and Santa Ana River basin.[5]	**Absent.** The airport lacks the habitat to support the species.
Flowering Plants				
San Diego ambrosia (*Ambrosia pumila*)	Endangered	Not Listed	Clonal herbaceous perennial plant found primarily on upper traces of rivers and drainage ways.[6]	**Low.** The airport is outside the range for this species (i.e., Chino [Split]_ 4801.2100 Super Planning Watershed).
Slender-horned spineflower (*Dodecahema leptoceras*)	Endangered	Endangered	Found in chaparral, cismontane woodland, and coastal scrub in sandy conditions at elevations between 655-2,495 feet above mean sea level. [7]	**Low.** The airport is on the verge of being below the known elevational range of this species.
Thread-leaved brodiaea (*Brodiaea filifolia*)	Threatened	Endangered	The thread-leaved brodiaea generally grow in open areas associated with coastal sage scrub.[8]	**Low.** This species has not been documented within the Chino [Split]_ 4801.2100 Super Planning Watershed).
Insect				
Monarch butterfly (*Danaus plexippus)*	Candidate	Not Listed	Winter roost sites extend along coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.[9]	**Absent.** No roosting sites are present at the airport. The nearest known roosting sites are 28 miles west of the airport.

[1] U.S. Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS) – Stephen's kangaroo rat (https://ecos.fws.gov/ecp0/conservationPlan/plan?plan_id=64)
[2] USFWS ECOS – coastal California gnatcatcher (https://www.fws.gov/cno/es/Recovery_Permitting/birds/coastal_calif_gnatcatcher/CoastalCaliforniaGnatcatcher_SurveyGuidelines_19970728.pdf)
[3] USFWS ECOS – least Bell's vireo (https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=B067#crithab)
[4] USFWS ECOS – southwestern willow flycatcher (https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B094)
[5] USFWS ECOS – Santa Ana sucker (https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E07W)
[6] USFWS ECOS – San Diego ambrosia (https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=Q01H#crithab)
[7] SWCA Environmental Consultants, *Biological Resources Survey Report for Chino Airport, San Bernardino County, California* (October 2022)
[8] California Department of Fish and Wildlife (https://wildlife.ca.gov/Conservation/Plants/Endangered/Brodiaea-filifolia)
[9] SWCA Environmental Consultants, *Biological Resources Survey Report for Chino Airport, San Bernardino County, California* (October 2022)

Note: The San Diego ambrosia and thread-leaved brodiaea are newly listed species and not considered as part of the 2012 *Habitat Assessment* evaluation.

Sources: U.S. Fish and Wildlife Service, Information for Planning and Consulting (https://ecos.fws.gov/ipac/); California Department of Fish and Wildlife (https://wildlife.ca.gov/); SWCA Environmental Consultants, Biological Resources Survey Report for Chino Airport, San Bernardino County, California (October 2022)

According to the USFWS critical habitat map,[3] no critical habitat is located on airport property. However, critical habitat for three avian species: least Bell's vireo, southwestern willow flycatcher, and the yellow-billed cuckoo, is located less than two miles south of the airport, around Chino Creek and Cucamonga Creek Canal. The critical habitats for these avian species are identified on **Exhibit 1M**.

An additional federal law that may be applicable to the airport is the *Migratory Bird Treaty Act* (MBTA) and the *Bald and Golden Eagle Protection Act* (BGEPA). These federal acts prohibit activities that will harm migratory and federally protected birds, their eggs, or nests. Birds protected under the MBTA, BGEPA, and ESA may nest, winter, or migrate throughout the area. Under the requirements of the MBTA and BGEPA, all project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. The IPaC report lists 21 migratory bird species of particular concern that could be present at the airport, identified in **Table 1L**.

TABLE 1L | Birds Protected Under the *Migratory Bird Treaty Act* and/or the *Bald and Golden Eagle Protection Act*
Chino Airport

Allen's hummingbird	bald eagle	Belding's savannah sparrow
black skimmer	black tern	Bullock's oriole
California gull	California thrasher	Clark's grebe
common yellowthroat	golden eagle	Lawrence's goldfinch
marbled godwit	Nuttall's woodpecker	oak titmouse
olive-sided flycatcher	short-billed dowitcher	tricolored blackbird
western grebe	willet	wrentit

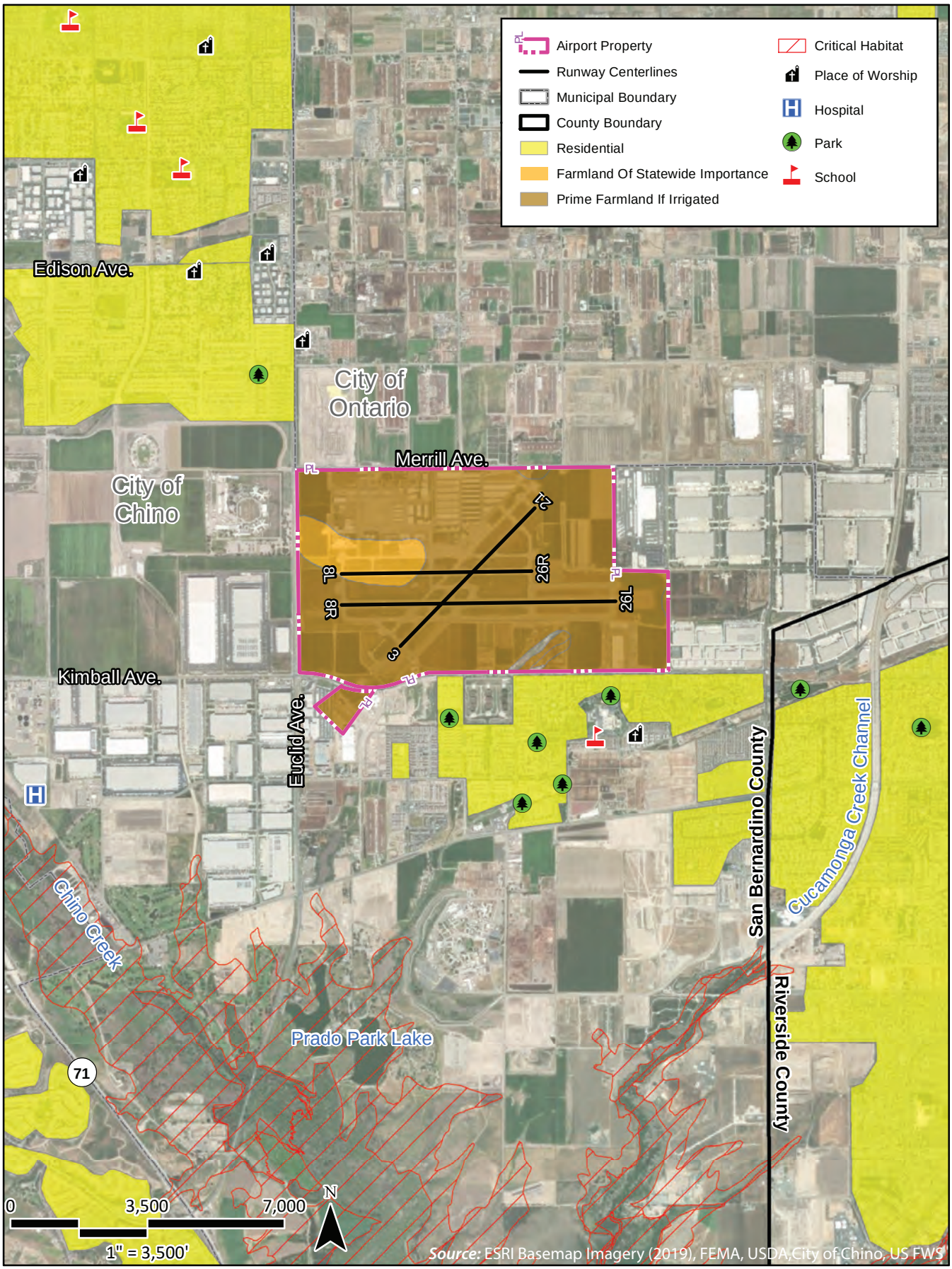
Source: U.S. Fish and Wildlife Service: Information for Planning and Consultation (https://ecos.fws.gov/ipac/)

The 2022 biological resources survey identified suitable habitat at the airport for the burrowing owl (*Athene cunicularia*) and the California horned lark (*Eremophila alpestris actia*), both special-status wildlife species protected under the MBTA. Burrowing owl is also a California Species of Special Concern. Breeding season for the burrowing owl is generally March through August, peaking in April and May. Four individuals were observed during the field survey, including one pair. The California horned lark is a ground-nesting bird, which typically prefers open, sparsely vegetated grasslands, ruderal habitat, and desert scrub communities. Several individuals were observed during the field survey. Foraging habitat for the tricolored blackbird (*Agelaius tricolored*), a state threatened species and California Species of Special Concern may also be present at the airport. Although the airport lacks the appropriate nesting habitat to support this species, the species may occur at the airport for foraging. The California Natural Diversity Database (CNDDB) shows occurrences from 2014 in cattle ponds north of the airport and in a wetland south of the airport.

CLIMATE

Increasing concentrations of GHGs can affect global climate by trapping heat in the Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming with concurrent impacts, such as warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation

[3] U.S. Fish and Wildlife Service Critical Habitat Mapper (https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77)


Airport Property
Runway Centerlines
Municipal Boundary
County Boundary
Residential
Farmland Of Statewide Importance
Prime Farmland If Irrigated
Critical Habitat
Place of Worship
Hospital
Park
School
Edison Ave.
City of Ontario
Merrill Ave.
City of Chino
Kimball Ave.
Euclid Ave.
San Bernardino County
Riverside County
Cucamonga Creek Channel
Chino Creek
Prado Park Lake
71
PL
8L
26R
8R
26L
4
9
0
3,500
7,000
1" = 3,500'
N
Source: ESRI Basemap Imagery (2019), FEMA, USDA,City of Chino, US FWS

events. This climate change is a global phenomenon that can also have local impacts.[4] GHGs, such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3), are both naturally occurring and anthropogenic (man-made).

Research has also shown a direct correlation between fuel combustion and GHG emissions. GHGs from anthropogenic sources include CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.

The U.S. EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2021* shows total U.S. emissions have decreased by 2-percent from 1990 to 2021, down from 15.8 percent above 1990 levels in 2007. During 2020 to 2021, the U.S. saw an increase in economic activity driven by businesses and persons rebounding after the COVID-19 pandemic. This resulted in an increase in total U.S. GHG emissions, of which CO_2 emissions accounted for the majority of GHG emissions.

In 2021, the transportation sector and power generation accounted for 79.3 percent of total CO_2 emissions. However, the overall aviation industry (excluding international bunkers) has shown a decrease in CO_2 emissions by 18 percent between 1990 and 2021.[5] Commercial aircraft emissions have highly fluctuated over the past thirty years, with a 27 percent increase between 1990 and 2007, a 2 percent decrease from 2007 to 2019, and a 33 percent decrease from 2019 to 2020, followed by a 23 percent increase from 2020 to 2021. This represents an overall 8 percent difference between 1990 and 2021 commercial aircraft emissions. Between 1990 and 2021 emissions from military aircraft decreased 65 percent.

Information regarding the climate in the City of Chino and the surrounding region, including wind, temperature, and precipitation, is discussed earlier in Chapter One.

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

Section 4(f) of the DOT Act, which was recodified and renumbered as Section 303(c) of 49 USC, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a historic site, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.

Table 1M summarizes the nearest properties of each type that may be protected under Section 4(f) of the DOT Act. **Exhibit 1M** identifies parks within proximity to the airport.

[4] Intergovernmental Panel on Climate Change *AR5 Synthesis Report: Climate Change 2014* (https://www.ipcc.ch/)

[5] U.S EPA, Inventory of U.S. Greenhouse Gasses: Chapter 3 Energy (https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021)

TABLE 1M | Department of Transportation Section 4(f) Resources - Chino Airport

Facility	Distance from Airport (miles)	Direction from Airport
National Register of Historic Places		
Yorba-Slaughter Adobe	2.3	West
Euclid Avenue	3.7	Northwest
Lake Norconian Club	4.3	Southeast
Hofer Ranch	5.2	Northeast
Galleano Winery	5.3	Northeast
National Recreation Area		
Santa Monica Mountains National Recreation Area	40.8	West
Wilderness Area		
Cucamonga Wilderness Area	15.2	North
Wildlife Refuge		
Mt. San Antonio College Wildlife Sanctuary	12.0	Northwest
Seal Beach National Wildlife Refuge	28.5	Southwest
Parks		
Evergreen Park	<0.1	South
Founders Park	<0.1	South
Mulberry Park	<0.1	South
Hidden Hallow Park	0.1	South
Secret Garden Park	0.1	South
Forest Park	0.2	South
Garden Park	0.3	South
Constellation Park	0.5	Northwest
North/West Meridian Park	0.6	South
American Heroes Dog Park	0.9	Southeast
Avonlea Park	1.0	Southwest
Prado Regional Park	1.1	Southeast
Deer Creek Park	1.2	East
Chino Creek Wetlands and Educational Park	1.6	Southwest
Mountain View Park	1.6	Southwest
Cypress Trails Park	1.8	Northwest
Fairfield Ranch Park	1.8	West
McCune Family Park	2.0	Southeast
Prado Regional Park	2.0	South

Sources: Google Earth Aerial Imagery (imagery date August 28, 2018); Coffman Associates analysis

FARMLANDS

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and take into account the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines, developed by the U.S. Department of Agriculture (USDA), apply to airport activities where federal funds are applied and involves the irreversible conversion of important farmland to non-agricultural uses. Important farmland is classified as prime, unique, or of state or local importance, as determined by the appropriate government agency and concurred by the Secretary of Agriculture. FPPA can be exempt when:

- Land is not considered important farmland. Such instances include land which is already developed or irreversibly converted.
- Land is already committed to urban development, including land designated as an urban area by the U.S. Census Bureau.
- Land committed to water storage.
- The construction of non-farm structures to support agricultural operations.
- The construction or land development for national defense purposes.

Information obtained from the Natural Resource Conservation Service's (NRCS) Web Soil Survey (WSS) indicates that more than 99 percent of the airport property is classified as "prime farmland if irrigated" or "farmland of statewide importance." Roughly seven acres, or 0.6 percent, of the airport is not classified as significant farmland soil defined under FPPA guidelines. **Table 1N** below breaks down the ratio of each soil type and is depicted in **Exhibit 1M**.

TABLE 1N | Farmland Classification - Chino Airport

Farmland Classification	Acres of Farmland	Percent of Airport
Prime Farmland if Irrigated	1,013.5	91.9%
Farmland of Statewide Importance	82.7	7.5%
Not Prime Farmland	7.1	0.6%
Total	**1,103.3**	**100.0%**

Source: U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

According to the 2010 U.S. Census Bureau, the airport is in a non-urbanized area.[6] The Urban boundary map has not yet been updated for the 2020 census.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminates may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources. According to the EPA's *EJSCREEN*, there are no Superfund or brownfield sites within three miles of the airport, and it is not currently included on the National Priorities List (NPL).[7]

The State of California's Department of Toxic Substances Control (DTSC) EnviroStor[8] database was accessed to determine whether hazardous waste sites are located at or in the vicinity of the airport. According to the DTSC's Hazardous Waste and Substance Site List, there are no hazardous materials release sites at the airport that are currently in the State's Brownfields and Environmental Restoration Program.

[6] U.S. Census Bureau – Los Angeles-Long Beach-Anaheim, CA, Panel 7 (2010) (https://www2.census.gov/geo/maps/dc10map/UAUC_RefMap/ua/ua51445_los_angeles--long_beach--anaheim_ca/)
[7] U.S. Environmental Protection Agency *EJSCREEN* Mapping Tool (https://ejscreen.epa.gov/mapper/)
[8] California Department of Toxic Substances Control *ENVIROSTOR* (https://www.envirostor.dtsc.ca.gov/public/)

The Chino Airport is listed on the U.S. Army Corps of Engineers (USACE) Formerly Used Defense Sites (FUDS) program list (listed as the Cal-Aero Airport) as a former military flight academy and aircraft sales/storage facility. However, as of 2018, while the airport is eligible for site clean-up, it is currently not included in the FUDS clean-up program.[9]

Although the airport is currently not listed on the NPL, EnviroStor database, or the FUDS clean-up program, the airport has undergone site testing and clean up. Since 1989, the following remediation activities have been performed[10]:

- Closure of underground storage tanks (USTs) (1991). The removal of ten inactive USTs, soil excavation and sampling, and the removal of a four-foot-by-four-foot sump.
- Drum and container removal (1992). The removal and disposal of 310 drums and containers of hazardous waste.
- Removal of buried drums (2010). During a storm water pipeline project, a total of 51 drums of a jellied mixture of gasoline and polystyrene, aluminum canisters, wood pallets, and impacted soils were removed and disposed of. Soil samples were taken to determine the presence of volatile organic compounds.

The Caltrans Upland Maintenance Station, a solid waste facility, is located approximately 3.5 miles north of the airport.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

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

Table 1P lists properties identified on the National Register of Historic Places (NRHP) within the vicinity of the airport.

TABLE 1P | Properties on the National Register of Historic Places - Chino Airport

Historic Resource	Distance from Airport (miles)	Direction from Airport
Yorba-Slaughter Adobe	2.3	West
Euclid Avenue	3.7	Northwest
Lake Norconian Club	4.3	Southeast

Source: National Park Service – National Register of Historic Places (https://www.nps.gov/subjects/nationalregister/index.htm)

[9] U.S. Army Corps of Engineers Formerly Use Defense Sited Program (https://www.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/)

[10] Tetra Tech *Final Feasibility Study Chino Airport, San Bernardino County*, California (May 2017)

The airport is in a region historically occupied by Native Americans known as Gabrielino; the name "Gabrielino" (sometimes spelled Gabrieleno or Gabrieleño) is a term designated through Spanish custom, which named local tribes according to the nearest mission. However, the closest known Gabrielino settlement identified in a search of ethnographic literature is named *Pasinongna* and is estimated to have been approximately 2.1 km (1.3 mile) southwest of the airport. There are no federally recognized Native American tribal lands in the vicinity of the airport. The closest tribal lands are the San Manuel Off-Reservation Trust Land, located approximately 25.5 miles northeast. A search of the Native American Heritage Commission's Sacred Lands File was negative with respect to the airport.

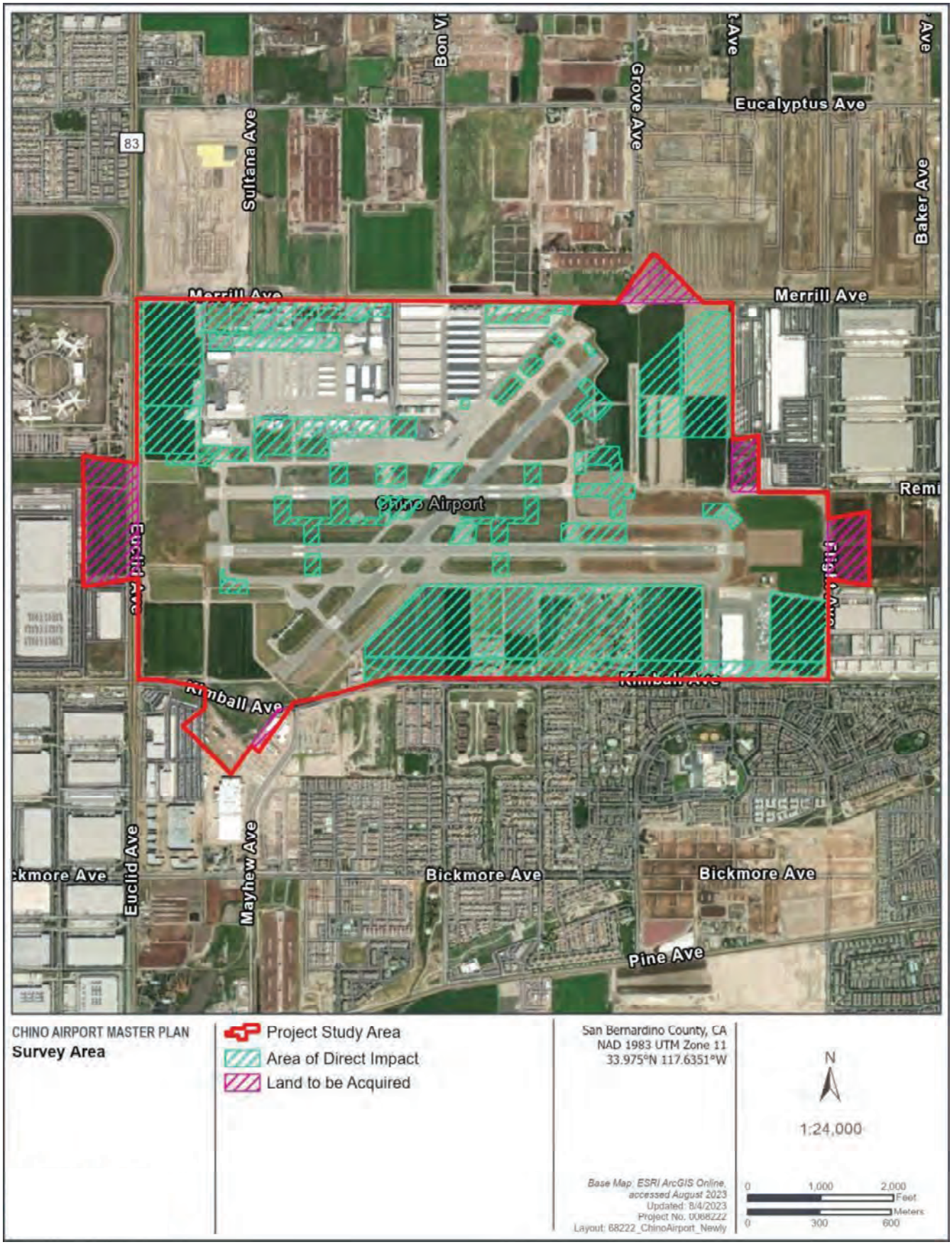
Literature and records searches and prehistoric and historic cultural surveys were completed as part of this current planning effort.[11] For archaeological resources, approximately 352 acres of the airport's potential "areas of direct impact" (ADI) were surveyed based on a preliminary conceptual development plan and areas identified as Non-Aeronautical Revenue Support (**Exhibit 1N**). An overall project study area comprised of the airport property and 57 acres of potential future land acquisition were included in the record and literature search.

The records search indicates that 39 previous cultural resources studies overlap the project study area and a 1.6-km (1.0-mile) radius. Three previously recorded resources intersect the project study area consisting of two historic-era buildings and a historic-era site. During the archaeological survey of the ADI, nine Historic period archaeological features were identified, including one concrete foundation and associated partially destroyed walls, seven concrete foundations, and one partially destroyed concrete bunker-like structure. The nine features are part of the larger Chino Airport resource discussed and evaluated in the architectural resources report (see discussion below). No Prehistoric period resources were identified during the survey.

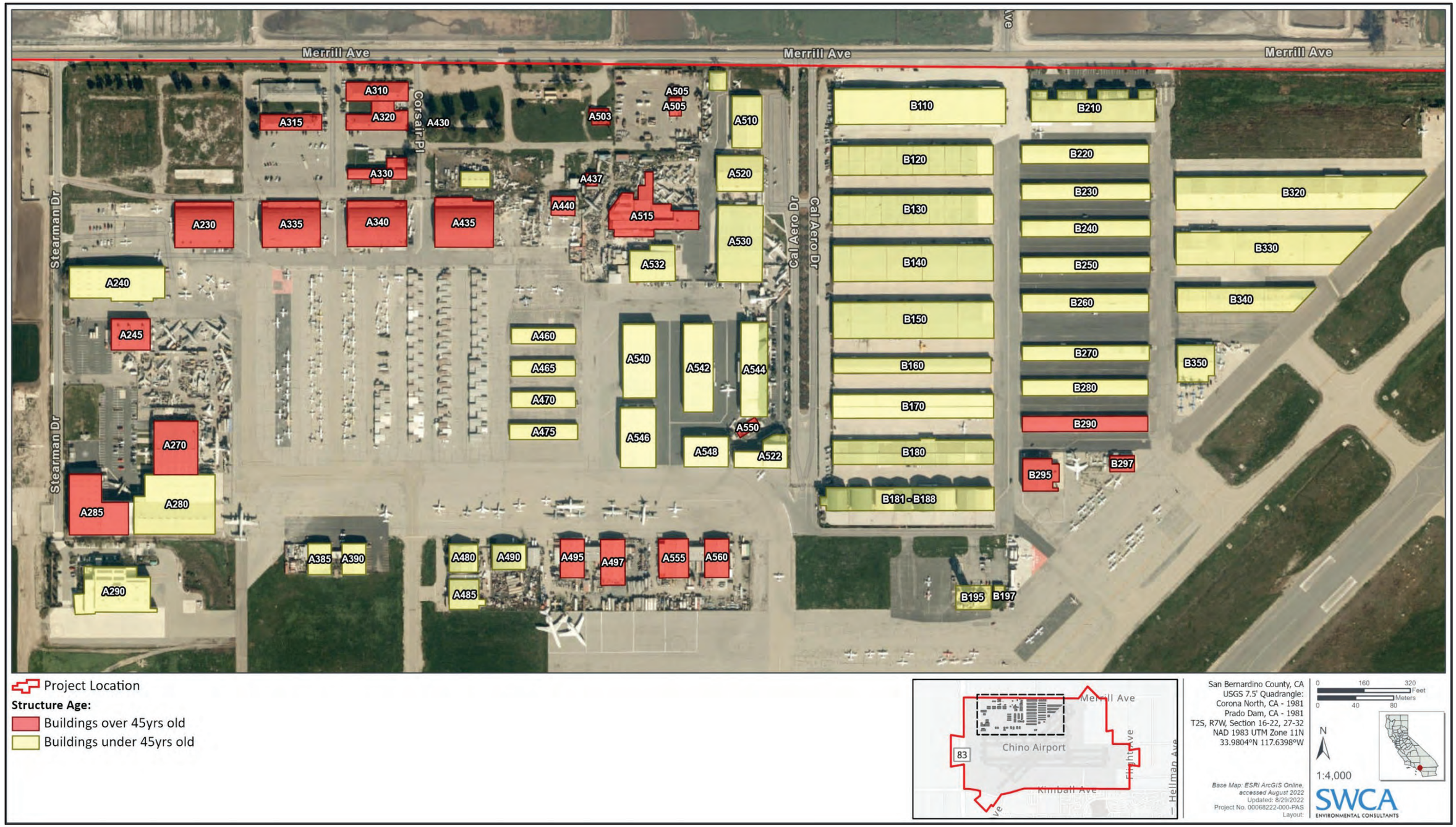
Archival research identified nine areas which were historically the location of residential development within the project study area; these are located throughout the eastern portion of the project study area and predated the CNO. Since this initial development, numerous improvements have been undertaken at the airport. These improvements include the construction, reconstruction, and relocation of runways and taxiways, as well as the acquisition of land for future growth. As a result, the project study area has been heavily disturbed. The project study area is located within the vicinity of three Native American village sites along with the Santa Ana River, which increases the likelihood of Prehistoric archaeological resources. Additionally, the continued use of the project study area since the nineteenth century increases the likelihood of buried Historic period archaeological deposits within the project study area. However, the level of ground disturbance that has occurred within the project study area since the nineteenth century has likely compromised the integrity of any archaeological deposits that may have been present on the surface or in near-surface strata. For these reasons, the ADI has a low sensitivity for intact Prehistoric and Historic period archaeological resources.

A historic resources survey was conducted at the airport to evaluate built environment resources aged 45 years and older within airport property at the time of the survey (i.e., constructed prior to 1977) (**Exhibit 1P**). Based on the records search and background research, three built environment resources were previously evaluated and recorded within the project study area and were found to be ineligible for listing in the NRHP. These properties are no longer extant, and all three locations are planned for

[11] SWCA Environmental Consultants *Historic Resources Survey Report, Chino Airport, Chino, California* (October 2022) SWCA Environmental Consultants *Archaeological Resources Assessment for the Chino Airport, Chino, San Bernardino County, California* (August 2023)



Source: SWCA Environmental Consultants, October 2023



Project Location

Structure Age:

Buildings over 45yrs old

Buildings under 45yrs old

San Bernardino County, CA
USGS 7.5' Quadrangle:
Corona North, CA - 1981
Prado Dam, CA - 1981
T2S, R7W, Section 16-22, 27-32
NAD 1983 UTM Zone 11N
33.9804°N 117.6398°W

0 160 320 Feet
0 40 80 Meters

N

1:4,000

Base Map: ESRI ArcGIS Online, accessed August 2022
Updated: 8/29/2022
Project No. 00068222-000-PAS
Layout:

SWCA ENVIRONMENTAL CONSULTANTS

Source: SWCA Environmental Consultants, August 2022

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future development. An additional 25 historic-age properties were surveyed, and none were found individually eligible for listing on the NRHP, the California Register of Historic Resources (CRHR), or designated on local historic registers.

The historic resources survey also considered potential eligibility for historic districts. A particular area of focus for a potential historic district was the area of the former Cal-Aero Academy campus, which represented the earliest aviation-related development of the property, in 1940. However, the discontinuation of the Civilian Pilot Training Program, closure of the Cal-Aero Academy, change in use of the property, and development and expansion of the Chino Airport resulted in the demolition of most of the Cal-Aero Academy campus buildings and facilities. These changes also brought a significant amount of new construction throughout the airport, as facilities were adapted and added in response to new uses and demand. Considered together over time, alterations and additions over the years have resulted in a loss of integrity for a potential historic district in the survey area, including for the former Cal-Aero Academy campus.

LAND USE

Land uses around the airport are described earlier in Chapter One and are presented on **Exhibits 1C** and **1D**.

Chapter 20.09 Overlay Districts – Zoning Code of the City of Chino. Chapter 20.09 – *Overlay Districts* establishes higher standards and regulations than afforded under the base zoning district, and generally institute specific characteristics, prevent hazards and land use conflicts, or provide flexible development standards. Chapter 20.09.050 discusses the Airport Overlay District (AOD), [12] which follows the county's Airport Land Use Compatibility Plan (ALUCP). According to the zoning ordinance, the AOD is intended to:

- Implement the airport's comprehensive land use plan;
- Identify areas subject to noise and land use conflicts; and
- Encourage compatible land use development around the airport.

Uses permitted in the AOD are regulated by the ALUCP's safety zones and are delineated in the Zoning Code. New development permits or use permits within a 10,000-ft radius of the airport are required to record an avigation easement notifying current and future landowners of the possible impacts of overflight noise, vibration, or dust.

NOISE AND NOISE-COMPATIBLE LAND USE

Federal land use compatibility guidelines are established under 14 CFR Part 150 (Part 150), *Airport Noise Compatibility Planning*. According to 14 CFR 150, residential land uses and schools are noise-sensitive land uses that are not considered compatible with a 65 decibel (dB) Day-Night Average Sound Level (DNL). Other noise-sensitive land uses (such as religious facilities, hospitals, or nursing homes), if located within a 65 dB DNL contour, are generally compatible when an interior noise level reduction of 25 dB is incorporated into

[12] City of Chino *Zoning Code*, Chapter 20.09.050 *Airport Overlay District* (https://www.cityofchino.org/city_hall/departments/community_development/planning/zoning)

the design and construction of the structure. Special consideration also needs to be given to noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in 14 CFR Part 150 do not account for the value, significance, and enjoyment of the area in question (FAA 2015).

In the State of California, the Community Noise Equivalent Level (CNEL) is the required metric for determining the cumulative exposure of aircraft noise to individuals, used in place of the DNL metric.

Noise-sensitive land uses near the airport consist primarily of residential uses to the east, northeast, and southwest. A Part 150 study was prepared for the airport in 2009. At that time, there were noise-sensitive land uses within the 65 DNL noise contours for the airport.

The AOD in the *City of Chino Zoning Code*, in concert with California Administrative Code Section 5000, establishes regulations regarding noise in the vicinity of airports. The ALUCP for Chino Airport established noise contours, which sets the target for compatible land uses around the airport. **Table 1Q** provides the community noise compatibility standards outlined in the ALUCP.

TABLE 1Q | Community Noise Standards for the City of Chino Airport Overlay - Chino Airport

Land Use	Maximum Interior/ Exterior Noise Levels (DNL)	Noise Contour (CNEL[1])						
		55	60	65	70	75	80	85
Residential	45/ 60							
Lodging Places	45/ 60							
Educational Facilities	45/ 65							
Hospitals/Nursing Homes	45/ 65							
Assembly Uses	45/ No Limit							
Sports Arenas & Outdoor Spectator Sports	45/ No Limit							
Parks, playgrounds, recreation centers, fairgrounds, picnic grounds	50/ 65							
Libraries, museums, art galleries	45/ 65							
Golf courses, commercial riding stables, water recreation	50/ 65							
Commercial Office	45/ 65							
Commercial Retail	50/ No Limit							
Manufacturing and warehousing/distribution	No Limit/ No Limit							
Public utilities	No Limit/ No Limit							
Livestock, animal breeding, animal keeping	No Limit/ No Limit							
Agriculture (commercial growing and field crops)	No Limit/ No Limit							
Conservation Areas and natural recreation areas	45/ 65							

[1] *CNEL – Community Noise Equivalent Level*

Source: City of Chino Zoning Code, Chapter 20.09.050 Airport Overlay District, Table 20.09-2 (https://www.cityofchino.org/city_hall/departments/community_development/planning/zoning)

The *Chino Zoning Code*, in conjunction with the ALUCP, requires a noise impact notification to be recorded against all property deeds with new development projects and/or use permits within the 65 CNEL contour.

Noise-sensitive land uses near the airport consist primarily of residential uses to the south and east. Additional noise-sensitive land uses within one mile of the airport are outlined in **Table 1R** and identified on **Exhibit 1M**.

TABLE 1R | Noise-Sensitive Land Uses within One Mile of the Airport - Chino Airport

Facility	Distance from Airport (miles)	Direction from Airport
Schools/Child Care Centers		
Egan Lyle High School	0.3	West
Cal Aero Preserve Academy	0.5	Southeast
Crosspoint Children's Center	1.0	Northwest
Places of Worship		
Victory Baptist Church	1.0	Northwest
Crosspoint Church	1.0	Northwest

Sources: Google Earth Aerial Imagery (imagery date August 28, 2018); Coffman Associates analysis

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature. A socioeconomic analysis evaluates how elements of the human environment, such as population, employment, housing, and public services, might be affected by the proposed action and alternative(s).

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. Meaningful Involvement[13] ensures that:

- people have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- the public's contribution can influence the regulatory agency's decision;
- their concerns will be considered in the decision-making process; and
- the decision-makers seek out and facilitate the involvement of those potentially affected.

Children's Environmental Health and Safety Risks refers to the requirement that federal agencies are to make it a high priority to identify and assess the environmental health and safety risks that may disproportionately impact children, as per Executive Order (E.O.) 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. Such risks include those that are detectable in products or substances that a child is likely to encounter, ingest (air, water, food, or drinking water), or to which they may be exposed.

[13] Requirements for meaningful public involvement by minority and low-income populations are addressed in Paragraph 2-5.2.b of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures,* specifically requires that a federal action causing disproportionate impacts to an environmental justice population (i.e., a low-income or minority population) be considered, as well as an evaluation of environmental health and safety risks to children. The EPA's *EJSCREEN* online tool identifies the presence of environmental justice areas within the airport environs. The population within two miles of the airport center is approximately 25,400, of which 19 percent of the population is considered low income and 75 percent are people of color. Likewise, according to *EJSCREEN*, 22 percent of the population is under the age of 18 (approximately 5,600 children) within a two-mile radius of the airport.

VISUAL EFFECTS

Visual effects deal broadly with the extent to which a proposed action or alternative(s) would either (1) produce light emissions that create an annoyance or interfere with activities; or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Each jurisdiction will typically address outdoor lighting, scenic vistas, and scenic corridors in zoning ordinances and their general plan.

Light emissions include any light that originates from a source into the surrounding environment, such as airfield and apron flood lighting, navigational aids, parking lot illumination, and roadway lighting. Glare is a type of light emission that occurs when light is reflected off a surface, including solar panels or window glass.

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed action or alternative(s).

Visual character refers to the overall visual makeup of the existing environment where a proposed action or its alternative(s) would be located. For example, densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts, etc.

Light Emissions. Light emission impacts typically relate to the extent to which any light or glare result from a source that could create an annoyance for people or would interfere with normal activities. Generally, local jurisdictions will include ordinances in the local code addressing outdoor illumination to reduce the impact of light on surrounding properties.

Currently, the City of Chino Zoning Ordinance[14] does not specifically address lighting within the surrounding airport environs. In general, lighting on private and public property is to be designed to provide safe and adequate illumination, but also must be designed to minimize light spill onto adjacent properties.

[14] City of Chino, CA *Municipal Code, Title 20 – Zoning* (https://www.cityofchino.org/city_hall/departments/community_development/planning/zoning)

Visual Resources and Visual Character. Visual resources and visual character generally relate to the aesthetic quality of a region as it relates to development, construction, and demolition. Impacts considered to the visual resource and character of an area include whether there is the potential to affect the nature of the character of an area, whether there is potential contrast, and whether view will be blocked or otherwise obstructed. Local jurisdictions typically will address visual resources and character in their comprehensive plans and ordinances.

Zoning ordinances generally do not address a jurisdiction's visual resources or character. Policies and goals addressing those topics are typically outlined in the city's general plan. According to the City of Chino's *Envision Chino General Plan 2025* (General Plan),[15] the intent of the general plan is to "provide a fundamental basis for the City's land use and development policy, and represents the basic community values, ideals, and aspirations to govern a shared environment…," outlining the comprehensive goal of preserving community character and visual resources. The General Plan Community Character Element is intended to provide ongoing guidance as to how development is to look and function, while attaining a sense of place.

WATER RESOURCES

Wetlands. The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States (WOTUS), including wetlands with a continuous surface connection to a traditional navigable water, under Section 404 of the *Clean Water Act* (CWA). Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Wetlands can include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: the soil is inundated or saturated to the surface at some time during the growing season (hydrology), has a population of plants able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and soils that are saturated enough to develop anaerobic (absent of air or oxygen) conditions during the growing season (hydric).[16] Based on information from the NRCS-WSS, there are no hydric soils present on airport property.

According to USFWS, which manages the National Wetlands Inventory (NWI) on behalf of all federal agencies, identify riverines, freshwater emergent wetlands, and freshwater ponds on airport property. Most, if not all of these were verified in the field during the biological resources survey. However, a full jurisdictional delineation was not completed, and the definitions of jurisdictional wetlands have been recently revised by the U.S. Supreme Court (Sackett vs. EPA) and a related Final Rule issued by the U.S. EPA and the U.S. Army Corps of Engineers in September 2023.

There are several areas at the airport that contain hydrophytic vegetation such as tall flatsedge (Facultative Wetland [FACW]), fringed willowherb (*Epilobium ciliatum* ssp. *ciliatum*; FACW), and arroyo willow (*Salix lasiolepis*; FACW). There are also two channelized natural features at the airport, one on

[15] City of Chino *Envision Chino General Plan 2025* (July 2010) (https://www.cityofchino.org/cms/One.aspx?portalId=10382662&pageId=11469788)
[16] National Resources Conservation Service – U.S. Department of Agriculture (https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961)

the east side and one on the west side. The largest is on the east side. Potential wetland in the southeast portion of the airport is mapped as a Freshwater Emergent Wetland on the NWI. The airport also contains numerous interconnected agricultural ditches and four detention basins. An intermittent drainage in the southwest part of the airport is mapped as a Freshwater Pond in the NWI (**Exhibit 1Q**).[17]

Floodplains. E.O. 11988 directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. Based on a review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) dated March 16, 2015 (panels 06071C9335H and 06071C9375H effective August 28, 2008), the western end of the airport is an area of undetermined flood hazard (Zone D), while the east end of the airport is classified as Zone X, or an area of a 0.2 percent annual chance of a flood event (i.e., 500-year floodplain). The closest mapped 100-year floodplains are along Chino and Cucamonga creeks south of the airport (**Exhibit 1Q**).

On May 25, 2021, E.O. 14030, *Climate-Related Financial Risk* was established. Section 5(e) of E.O. 14030 reinstates E.O. 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* (originally set forth January 30, 2015). E.O. 13690 amends E.O. 11988 and mandates that a Federal Flood Risk Management Standard (FFRMS) be created. One of the primary purposes of the FFRMS is to expand the management of floodplains from a "base flood" evaluation to include a higher vertical elevation (and the corresponding floodplain) to protect against future flood risks for federally funded projects.

Under E.O. 13690 and its guidelines, one of several approaches should be used to identify floodplains and their risks to critical[18] or non-critical federally funded actions:

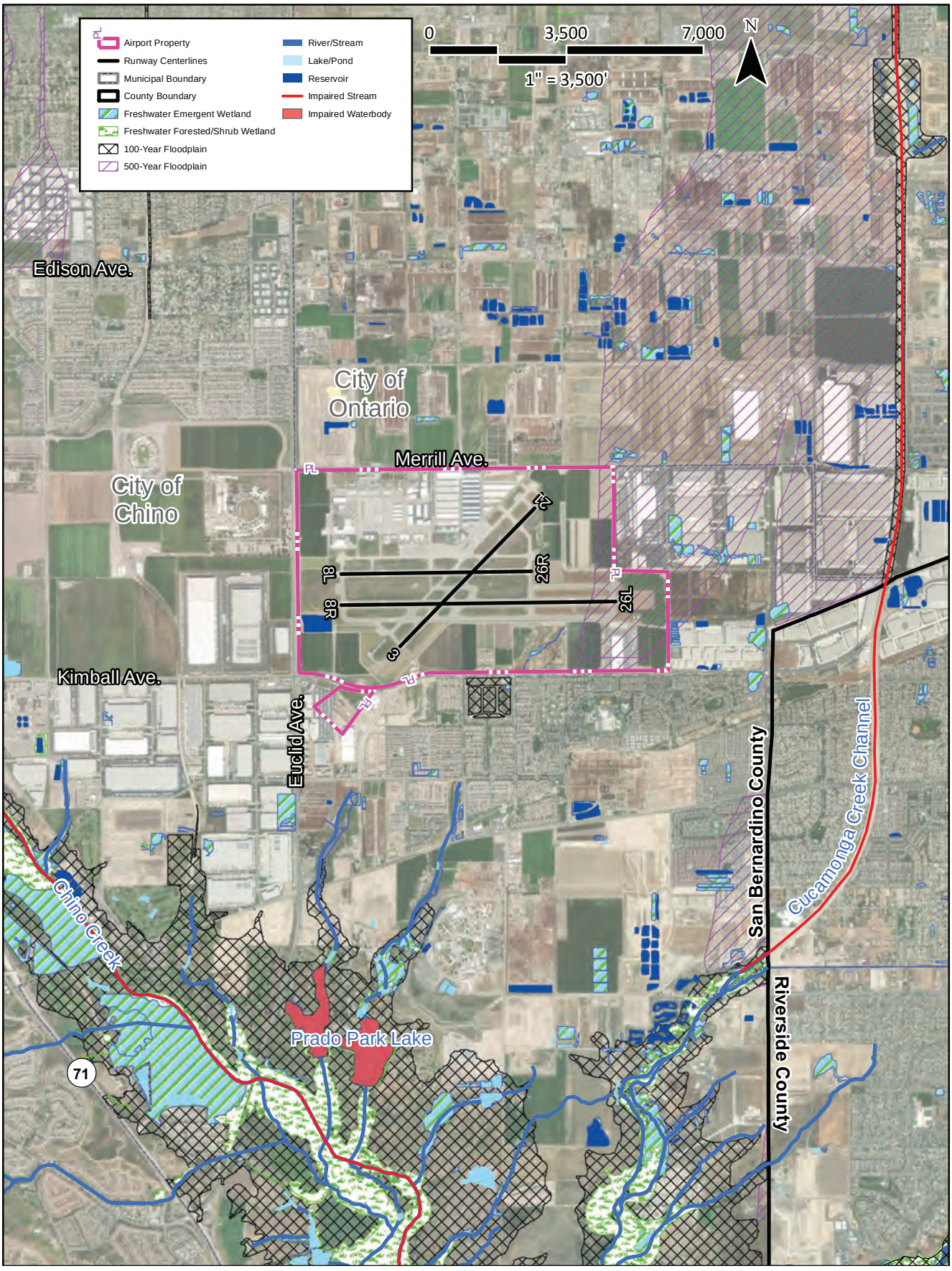
- Climate-Informed Science Approach (CISA) – the elevation and flood hazard area (i.e., 100-year floodplain) using data that integrates climate science with an emphasis on possible future effects on critical actions.
- Freeboard Value Approach – the elevation and flood hazard area and additional 2 or 3 feet above the base flood elevation depending on whether the proposed federal action is critical or non-critical,
- 500-year Floodplain Approach – all areas subject to the 0.2 percent annual chance flood.
- Other methods resulting from updates to FFRMS.

Of the four approaches listed above, federal departments and agencies should use the CISA approach when data to support such an analysis is available.

Surface Waters. The CWA provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, and regulate other issues concerning water quality. Water quality concerns related to airport development are most often associated with the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc.

[17] SWCA Environmental Consultants, *Biological Resources Survey Report for Chino Airport, San Bernardino County, California* (October 2022)

[18] A critical action is defined in E.O. 13690 and the 2015 Guidelines for Implementing E.O. 11988 as any activity for which even a slight change of flooding is too great.



Source: ESRI Basemap Imagery (2019), FEMA, USDA, City of Chino, U.S. FWS.

In 1972, Congress mandated (under the CWA) the National Pollutant Discharge Elimination System (NPDES). This program addresses non-agricultural stormwater discharges, and through the use of NPDES permits, certain procedures are required to prevent contamination of water bodies from stormwater runoff. The EPA can delegate this permitting authority to individual states. The County of San Bernardino holds a current NPDES General Permit Number CAS618036 and is assigned Waste Discharge Identification number 8-36S0049096, which ensures that pollution control measures are in place at the airport. The airport also has a current Storm Water Pollution Prevention Program (SWPPP), which addresses potential pollution sources and describes practices to minimize and control pollutants.

The EPA *EJSCREEN* indicates that there are three water bodies defined under Section 303(d) of the CWA as impaired. These water bodies are listed in **Table 1S** below.

TABLE 1S | Impaired Waters under Section 303(d) of the *Clean Water Act* - Chino Airport

Water Body	Source of Contamination	Distance from Airport (miles)	Direction from Airport
Cucamonga Creek Channel	Cadmium, coliforms, copper, lead, zinc	approximately 1.2	East and North
Chino Creek	Chemical oxygen demand, nutrients, pathogens	approximately 1.9	West and South
Prado Park Lake	Nutrients and pathogens	approximately 1.6	South

Source: U.S. Environmental Protection Agency EJSCREEN Mapping Tool (https://ejscreen.epa.gov/mapper/)

Groundwater. Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater, such as to wells, springs, and other water sources. Examples of direct impacts to groundwater could include withdrawal of groundwater for operational purposes, or reduction of infiltration or recharge area due to new impervious surfaces. The airport is underlain by unconsolidated sand and gravel indicative of the California Coastal Basin aquifer, which is high in hydric conductivity.[19]

Historic uses of the airport have resulted in groundwater contamination, which was initially detected in the 1980s. The county conducted numerous testing activities, including soil boring, well monitoring, and site samplings of soil, gas, and water. These investigations, as reported by the State of California State Water Resources Board (WRB),[20, 21] concluded the groundwater around the airport is contaminated with trichloropropane, dichloroethene, and trichloroethylene. Between 1990 and 2010, the county completed three removal actions at the airport, and as of May 2017, according to the WRB, remediation is ongoing. In January 2019, the county Board of Supervisors approved a Draft Interim Remedial Action Plan, currently under review by Regional Water Quality Control Board.

There is no sole source aquifer near the airport.[22] The closest sole source aquifer is the Campo/ Cottonwood Creek Aquifer, which is approximately 96 miles southeast of the airport.

[19] U.S. Geological Survey – Groundwater Information (https://water.usgs.gov/ogw/aquifer/101514-wall-map.pdf)
[20] State of California Water Resource Board *GeoTracker* (https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL208634049)
[21] San Bernardino County Department of Airports – Chino Airport Groundwater Remedial Project (http://cms.sbcounty.gov/airports/Airports/Chino/CAGRP.aspx)
[22] U.S. Environmental Protection Agency - Sole Source Aquifers (https://epa.maps.arcgis.com/)

Wild and Scenic Rivers. The *National Wild and Scenic Rivers Act* was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of current and future generations. The closest designated Wild and Scenic River is the Bautista Creek, located approximately 49 miles southeast of the airport.[23]

The Nationwide River Inventory (NRI) is a list of over 3,400 rivers or river segments that appear to meet the minimum *Wild and Scenic Rivers Act* eligibility requirements based on their free-flowing status and resource values. The development of the NRI resulted from Section 5(d)(1) in the *Wild and Scenic Rivers Act*, directing Federal agencies to consider potential wild and scenic rivers in the comprehensive planning process.[24] The river closest to the airport, which appears on the NRI is a segment of the Lytle Creek, is located approximately 17 miles northeast of the airport.

ENVIRONMENTAL INVENTORY SOURCES

A variety of resources were used during the inventory process. The following listing reflects a compilation of these sources.

U.S. Environmental Protection Agency, Green Book Currently Designated Nonattainment Areas for All Criteria Pollutants:
https://www3.epa.gov/airquality/greenbook/anayo_ca.html

U.S. Environmental Protection Agency, *EJSCREEN:*
http://www.epa.gov/ejscreen

FEMA Flood Map Service Center:
https://msc.fema.gov/portal/search?AddressQuery=chino%20airport%2C%20chino%2C%20ca#searchresultsanchor

Natural Resources Conservation Service, Web Soil Survey:
https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

U.S. Fish and Wildlife Service Information, Planning and Consultation System:
https://ecos.fws.gov/ipac/

U.S. Fish and Wildlife Service National Wetlands Inventory:
https://www.fws.gov/wetlands/

USGS National Map:
https://www.usgs.gov/core-science-systems/national-geospatial-program/national-map

[23] National Wild and Scenic Rivers System (https://rivers.gov/wsr-act.php)
[24] National Park Service – Nationwide Rivers Inventory (https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm)

CHAPTER TWO

FORECASTS

SAN BERNARDINO COUNTY

CHAPTER TWO

FORECASTS

FORECAST INTRODUCTION

This forecasting element was completed in June of 2023 with a base year of 2022. The base year reflects the impact caused by the COVID-19 pandemic, which began to impact the aviation industry in March of 2020. Since this time, a clearer understanding of the impact to aviation has come into focus. Commercial air travel was significantly impacted by the pandemic; however, general aviation activity was impacted much less. In fact, some general aviation airports, particularly reliever airports, realized very little negative impact and, in many cases, saw increases in activity.

At Chino Airport (CNO), there were approximately 217,000 operations in 2019. In 2020, there were 177,000 operations; however, in 2021, the airport had rebounded significantly to approximately 194,000 operations and in 2022, the airport had nearly 205,000 operations. It appears that the airport is well on its way to a full recovery from any negative pandemic impacts. The following forecast reflects the pandemic years and the ongoing recovery.

FORECASTS OF AVIATION DEMAND

The definition of demand that may reasonably be expected to occur during the useful life of an airport's key components (e.g., runways, taxiways, terminal buildings, etc.) is an important factor in facility planning. In airport forecasting, this involves projecting potential aviation activity for at least a 20-year timeframe. Aviation demand forecasting for CNO will primarily consider based aircraft, aircraft operations, and peak activity periods.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. FAA will review individual airport forecasts with the objective of comparing them to its *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). Though the TAF is updated annually, there has been a disparity between the TAF and airport planning forecasts in the past because the TAF forecasts are the result of a top-down model that does not consider local conditions or recent trends. While the TAF forecasts are to be a point of comparison for airport forecasts, they serve other purposes, such as asset allocation by the FAA.

When reviewing a sponsor's airport forecast, the FAA must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. As stated in FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems* (NPIAS) *and Airports Capital Improvement Plan* (ACIP), forecasts should be:

- Realistic;
- Based on the latest available data;
- Reflective of current conditions at the airport (as a baseline);
- Supported by information in the study; and
- Able to provide adequate justification for airport planning and development.

The forecast process for an airport planning study consists of basic steps that vary in complexity depending upon the issues addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and evaluation and documentation of the results. FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, outlines seven standard steps involved in the forecast process:

1) **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
2) **Review Previous Airport Forecasts**: May include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.
3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4) **Select Forecast Methods**: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.
6) **Summarize and Document Results**: Provide supporting text and tables as necessary.
7) **Compare Forecast Results with FAA's TAF**: For general aviation airports such as Chino Airport, forecasts for based aircraft and total operations are considered consistent with the TAF if they meet the following criteria:
    - Forecasts differ by less than 10 percent in the 5-year forecast period and 15 percent in the 10-year forecast period, or
    - Forecasts do not affect the timing or scale of an airport project, or
    - Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.5, *Formulation of the NPIAS and ACIP*.

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for CNO was produced following these basic guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined, along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation demand projections for CNO that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

The forecasts for this study will utilize a base year of 2022, with a long-range forecast year of 2042.

The forecast base year is 2022. The long-range forecast year is 2042.

AIRPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define its generalized service area for various segments of aviation the airport can accommodate. The airport service area is determined primarily by evaluating the location of competing airports, their capabilities, their services, and their relative attraction and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of that airport as well as the specific areas of aviation demand the airport is intended to serve. The primary role of Chino Airport is to serve general aviation demand in the area.

The airport service area is a geographical area where there is a potential market for airport services. Access to general aviation airports and transportation networks are part of the equation to determine the size of a service area. Also, to be factored are subjective criteria, such as the quality of aviation facilities and services.

As in any business enterprise, the more attractive the facility is in terms of services and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of the service area. If facilities are adequate and rates and fees are competitive at Chino Airport, some level of aviation activity might be attracted to the airport from more distant locales.

Defining a service area for an airport is also important in the forecasting process. Once a general service area is identified, various statistical comparisons can be made for projecting aviation demand. For example, in rural areas, where there may be one general aviation airport in each county, the service area could reasonably be defined as the entire county. This would facilitate comparisons to county population and other factors pertaining to that county for forecasting purposes.

In urban areas, where there are many general aviation airports, the definition of a service area is not as simple. Aircraft owners in urban areas have many more choices when it comes to basing their aircraft. The number one reason aircraft owners select an airport at which to base their aircraft is convenience to home or work. Other reasons may include the capability of the runway system, services available, availability of hangar space, airport congestion, etc.

A defined service area is developed for the purposes of identifying a geographic area from which to further develop aviation demand projections. The service area will generally represent where most, but not all, based aircraft will come from. It is not unusual for some based aircraft to be registered outside the region or even outside the state. Particularly in urban areas, airport service areas will likely overlap to some extent as well.

As previously discussed, the generalized service area of an airport can be approximated by its proximity to other airports providing similar levels of service. Chino Airport is one of several airports serving the general aviation needs of the eastern Los Angeles metropolitan area. **Table 2A** summarizes the capabilities of the airports within 20 miles of Chino Airport. The service area for Chino Airport is primarily limited to the east and south by the proximity of other general aviation airports in neighboring Riverside County. Corona Municipal, Riverside Municipal, and Flabob Airports are all located approximately 10 nautical miles (nm) from Chino Airport and offer an array of general aviation services, including 100LL and Jet A fuel, aircraft maintenance, hangar storage, etc. It is estimated that there are approximately 469 aircraft are based at these three airports.

TABLE 2A | Area Airports and Capabilities

Identifier	Airport Name	Distance/Direction from CNO	Tower[1]	AWOS/ ASOS[2]	Longest Runway	IAP[3]	Based Aircraft	Annual Operations
CNO	Chino Airport	NA	Yes	Yes	7,000	Yes	698[4]	194,000
AJO	Corona Muni	5.0 nm S	No	Yes	3,200	Yes	130	35,000
ONT	Ontario Int'l Airport	5.0 nm N	Yes	Yes	12,100	Yes	15	100,000
CCB	Cable Airport	9.0 nm N	No	Yes	3,863	Yes	168	92,000
RAL	Riverside Muni	10.0 nm E	Yes	Yes	5,400	Yes	217	116,000
POC	Brackett Field Airport	10.0 nm NW	Yes	Yes	4,840	Yes	94	106,000
RIR	Flabob Airport	11.0 nm E	No	No	3,190	Yes	122	11,000
FUL	Fullerton Muni	18.0 nm W	Yes	Yes	3,121	Yes	271	73,000

Key:
[1] Tower - Does the airport have a control tower?
[2] AWOS/ASOS - Does the airport have on-field weather reporting station?
[3] IAP - Does the airport have instrument approach procedures?
[4] Validated based aircraft from www.basedaircraft.com

Source: Airnav.com

Available runway length and the capability of instrument approaches are significant factors when aircraft owners choose an airport at which to base. Excluding Ontario International Airport because it is a commercial passenger service facility, Chino Airport provides the longest runway (7,000 feet) and the most sophisticated instrument approaches (Instrument Landing System [ILS] with ¾-mile visibility minimums) among general aviation airports within a 20-nautical-mile radius. The next closest airport with similar capability to CNO is Riverside Municipal Airport, located approximately 10 nm to the east in neighboring Riverside County. The primary runway at Riverside Municipal Airport is 5,400 feet long; therefore, Chino Airport is the most advanced general aviation airport in the area. Riverside also has an ILS; however, the lowest visibility minimum is 1-mile. Flabob Airport has a runway length of 3,190 feet and a circling approach with 1-mile visibility minimums. Corona Airport has a runway length of 3,200 feet and no instrument approach.

Still farther east, San Bernardino International and Redlands Municipal Airports, both of which are located in San Bernardino County, cater to general aviation demands serving the eastern Los Angeles metropolitan area. At 10,001 feet, only San Bernardino International Airport provides a longer runway than Chino Airport's 7,000-foot primary runway. These airports range from 15 to 25 nm east of Chino and are home to approximately 360 based aircraft combined.

Approximately five nm northeast of Chino Airport is Ontario International Airport. Although mainly served by commercial airlines, Ontario does support some general aviation corporate operations; however, a trend continues to show based aircraft and annual operations remaining static. This can be attributed to the airport's focus on accommodating commercial airline and air cargo services.

Cable and Brackett Field Airports, located approximately 10 nm northwest of Chino Airport, will limit the airport's service area in this direction. These two airports total approximately 260 based aircraft and provide a variety of general aviation services. While Cable Airport is limited to serving mainly small aircraft due to its 3,863-foot runway, Brackett Field provides a 4,840-foot primary runway and can accommodate some larger and more sophisticated aircraft.

While a significant number of general aviation facilities exist in proximity to the northwest, east, and southeast sides of Chino Airport, the same cannot be said for areas to the southwest of the airport, extending into populated areas of Orange County. Fullerton Municipal and John Wayne-Orange County Airports are the only public-use facilities serving aviation needs in Orange County. Fullerton Municipal Airport is dedicated to serving general aviation needs, while John Wayne-Orange County Airport's primary role is to serve commercial airline service. In terms of accommodating additional general aviation growth, Fullerton Municipal Airport is at capacity from a facility standpoint being in a built-out urban environment, and John Wayne-Orange County Airport continues to accommodate general aviation activity, but oftentimes experiences significant air traffic control (ATC) hold times for departing aircraft. Still farther southwest, Long Beach-Daugherty Field Airport serves the needs of general aviation and commercial service in southern Los Angeles County. Airspace complexities and congestion surrounding these airports may also encourage aircraft operators to look elsewhere for hangar space and ease of operations.

The previously mentioned airports' available levels of service and facilities will play a role in determining the airport's service area. However, Chino Airport has remained a very important facility that meets the needs of general aviation operators in the region. This includes recreational flying in single engine aircraft up to corporate business jets and charter operators. The airport is also home to significantly more aircraft than any other airport in the region. In addition, Chino Airport is a designated reliever airport. In this capacity, the airport should be maintained to accommodate a full range of general aviation aircraft.

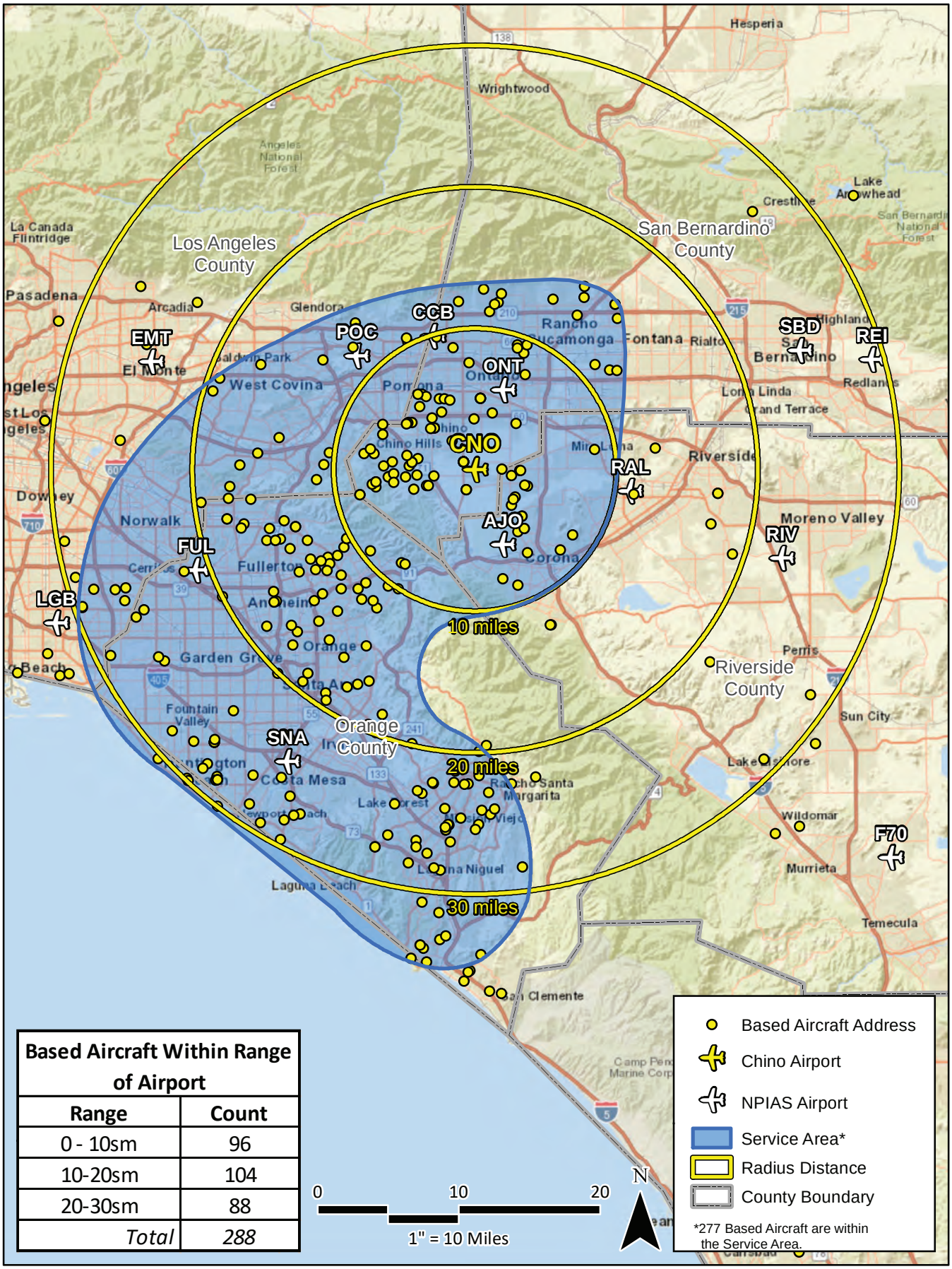
An indication of Chino Airport's general service area can also be obtained through an examination of its based aircraft owners. **Exhibit 2A** depicts the FAA registered address locations of current based aircraft owners according to airport records. It was determined that the majority of Chino based aircraft owners reside in communities in southwestern San Bernardino County, western Los Angeles County, northwestern Riverside County, and a large portion of Orange County.

Table 2B shows the percentage breakdown of where, in proximity to the airport, based aircraft owners have their aircraft registered. Approximately 46 percent of based aircraft are registered within 30 miles of the airport. Another 28 percent are registered in California but are more than 30 miles from the airport. Out of state registrations account for nearly 26 percent of based aircraft owners.

TABLE 2B | Based Aircraft Location Analysis

Range	Percentage
Within 10 miles	15.38%
Within 10-20 miles	16.67%
Within 20-30 miles	14.10%
Other in-state	27.88%
Summary	
Total within 30 miles	46.15%
Total in-state	74.03%
Total out-of-state	25.96%
Total in Service Area	44.39%

While Chino Airport draws significantly from neighboring communities such as Chino, Chino Hills, Ontario, and Upland, it also serves a significant general aviation need throughout much of Orange County. This is most likely due to the lack of available general aviation facilities in Orange County as alluded to earlier.



Based Aircraft Within Range of Airport	
Range	**Count**
0 - 10sm	96
10-20sm	104
20-30sm	88
Total	*288*

Source: ESRI Basemap (2018), FAA Aircraft Registry; Database: FAA Census of US Civil Aircraft

Considering all factors, a primary service area has been determined and is also illustrated in **Exhibit 2A**. The primary service area extends to areas west of U.S. Interstate 15, north to include the communities of Upland and Pomona, and southwest to encompass portions of Los Angeles County and a large majority of incorporated Orange County. The service area generally follows the outline of based aircraft owner addresses, and 44 percent of based aircraft owners have their aircraft registered to addresses within the service area. It should be noted that socioeconomic indicators for the primary communities within the Chino Airport service area have been further broken down and referenced in the forecast section to follow.

SOCIOECONOMIC TRENDS

Socioeconomic conditions provide an important baseline for preparing aviation demand forecasts. Local socioeconomic variables, such as population and employment, are indicators for understanding the dynamics of the community and can relate to local trends in aviation activity. Analysis of the demographics will give a more comprehensive understanding of the socioeconomic situations affecting the region that supports the airport.

The Southern California Association of Governments develops demographic projections every four years for use by planning in a variety of studies. This local socioeconomic data is used to inform the development of the aviation demand forecasts. The data is from 2016.

REGIONAL POPULATION

Table 2C summarizes historical and forecast population trends for the region, including the proximate cities of Chino, Chino Hills, and Ontario. Also included is the population information for the four counties in which the service area falls. Chino and Chino Hills are both forecast to realize significant population growth over the next 20 years (2022-2042), exceeding the trend over the last eight years (2012-2020). The City of Ontario has been growing at a very high rate over the last eight years (2.05 percent) and is forecast to slow somewhat over the next 20 years (1.34 percent), however this is still a strong growth rate.

TABLE 2C | Regional Population Data

	HISTORICAL			FORECAST			
	2012	2022	CAGR 2012-2022	2027	2032	2042	CAGR 2012-2020
City of Chino	79,400	89,494	1.20%	97,070	105,287	123,867	1.64%
City of Chino Hills	75,800	78,059	0.29%	81,548	85,192	92,978	0.88%
City of Ontario	166,300	203,765	2.05%	217,789	232,779	265,924	1.34%
San Bernardino County	2,068,000	2,251,531	0.85%	2,737,434	2,501,937	2,780,193	1.06%
Riverside County	2,245,100	2,549,751	1.28%	2,708,156	2,876,402	3,449,001	1.52%
Los Angeles County	9,922,600	10,431,810	0.50%	10,664,352	10,902,078	11,393,546	0.44%
Orange County	3,071,600	3,291,907	0.70%	3,337,698	3,384,127	3,478,929	0.28%
CAGR: Compound Annual Growth Rate							

Source: Southern California Association of Governments - 2016 Demographic Data; Interpolated by Coffman Associates

San Bernardino, Riverside, and Los Angeles Counties are forecast to have stronger population growth over the next 20 years than they had over the past 8 years. San Bernardino County is project to grow at 1.06 percent annually through 2042 which is higher than the 0.85 percent realized from 2012 to 2020. Riverside County is projected to have about the same annual growth rate over the next 20 years. Los Angeles and Orange Counties are projected to see population growth slow compared to the last eight years, but this still results in a net gain over the next 20 years.

REGIONAL EMPLOYMENT

Employment data is a good indicator of the health of the economy and the health of the aviation industry. The aviation industry tends to track closely to the economy. When there are recessions, all segments of aviation activity tend to decline at or near the same time. Conversely, when the economy is strong, aviation activity tends to increase in kind.

Table 2D presents the historical and forecast employment data for three nearby cities and the four counties over which the service area falls. These jurisdictions experienced moderate to strong employment growth from 2012 to 2020 with Riverside County leading the way with an annual growth rate of 3.62 percent. For the forecast years, all jurisdictions are projected to experience slightly lower growth in employment.

TABLE 2D | Regional Employment Data

	HISTORICAL			FORECAST			
	2012	2022	CAGR 2012-2022	2027	2032	2042	CAGR 2012-2020
City of Chino	42,600	46,076	0.79%	47,547	49,066	52,250	0.63%
City of Chino Hills	11,500	14,377	2.26%	15,641	17,017	20,142	1.70%
City of Ontario	103,300	134,138	2.65%	147,154	161,398	194,155	1.87%
San Bernardino County	659,500	814,559	2.13%	880,742	952,302	1,060,732	1.33%
Riverside County	616,600	879,813	3.62%	962,679	1,053,349	1,261,112	1.82%
Los Angeles County	4,246,600	4,713,900	1.05%	4,844,894	4,979,528	5,260,124	0.55%
Orange County	1,526,500	1,748,453	1.37%	1,794,415	1,841,585	1,939,678	0.52%
CAGR: Compound Annual Growth Rate							

Source: Southern California Association of Governments - 2016 Demographic Data; Interpolated by Coffman Associates.

SERVICE AREA POPULATION AND EMPLOYMENT

Further analysis was undertaken to extract an estimate of historical and forecast population for the defined airport service area. The SCAG demographic data provides historical and forecast data by city. For this estimate, if most of a city fell within the service area, then it was included in the analysis. **Table 2E** shows that the population grew at an annual rate of 0.65 percent from 2012 to 2020. This represents the addition of approximately 309,000 people over the eight-year period. Over the next 20 years, the population growth rate is forecast to slow somewhat to 0.44 percent annually. Employment figures for the service area were especially strong from 2012-2020 showing an annual growth rate of 1.33 percent. Over the next 20 years employment is forecast to grow 0.53 percent annually.

TABLE 2E | Service Area Population and Employment

	2012	2022	CAGR 2012-2022	2027	2032	2042	CAGR 2022-2042
Population	4,628,700	4,937,757	0.65%	5,053,256	5,171,457	5,382,654	0.43%
Employment	2,125,500	2,426,282	1.33%	2,500,280	2,576,535	2,698,247	0.53%

Source: Coffman Associates analysis of SCAG 2016 socioeconomic data.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the public. The current edition upon preparation of this ALP Update was *FAA Aerospace Forecast – Fiscal Years 2023-2043*, published in early 2023. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the *FAA Aerospace Forecast*.

Since its deregulation in 1978 and the great recession of 2007-09, the U.S. commercial air carrier industry experienced a series of boom-to-bust cycles. The volatility that was associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor. However, the great recession of 2007-09 marked a fundamental change in the operations and finances of U.S Airlines. Since the end of the recession in 2009 through 2019, U.S. airlines revamped their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry experienced an unprecedented period of consolidation with three major mergers in five years. The results of these efforts were impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry.

The outbreak of the COVID-19 pandemic in 2020, however, brought a rapid and cataclysmic end to those boom years. Airline activity and profitability tumbled almost overnight and without the financial and competitive strength built up during the boom, airlines would have faced even greater challenges. As it was, they were able to slash capacity and costs, and then, relying on their balance sheets, credit ratings and value inherent in their brands, to raise capital through borrowing and restructuring fleets allowing them to withstand the period of losses. Although several small regional carriers ceased operations in 2020, no mainline carriers did. Cargo activity was one of few bright spots as it surged, boosted by consumers purchasing goods to enhance time spent at home as necessitated by the pandemic, and by surface transportation disruptions caused by worker shortages due to COVID-19 illnesses.

Since 2020, conditions and the outlook have brightened considerably. As vaccines were introduced and local and international travel restrictions were lifted, leisure travel re-bounded. Initially concentrated in outdoor recreation spots, whether beach or mountain, the recovery in leisure demand spread first

to domestic destinations in 2021 and then expanded to many traditional international vacation destinations and by the summer of 2022, most carriers were reporting lei-sure demand was exceeding pre-pandemic levels. A rebound in business travel, which had been severely curtailed with the onset of the pandemic, lagged that of leisure demand. However, by the end of 2022, U.S. airlines were reporting that business demand had recovered to 70-80% of pre-pandemic levels. Higher fares accompanied the strong rebound in leisure demand leading to positive financial results. For all of CY 2022, the top nine U.S. passenger carriers posted operating profits of $7.8 billion and net profits of $1.8 billion.

The general aviation (GA) sector was less affected by the COVID-19 crisis than the airlines and recovered faster. Private aviation became an attractive substitute for wealthier individuals who could afford to pay during the heaviest times of the pandemic. Even though there are recent indicators that with airlines increasing frequency of their scheduled flights, some reversal in this trend is expected, many have continued to fly privately. At the lower end of the industry, new comers to private flying included student, private and commercial pilots, joining the existing GA pi-lot population. The long-term outlook for general aviation is promising, as growth at the higher-end offsets continuing retirements at the traditional low end, mostly piston-powered part of the sector. The active GA fleet is forecast to increase by 3.5 percent between 2023 and 2043, after declining slightly in 2022 from the year before. The turbine aircraft fleet, including rotorcraft, did not experience a decline between 2019 and 2021, and is estimated to have shown a small increase between 2021 and 2022. The total of piston fleet (single and multi-engine pistons, light-sport aircraft, and piston rotorcraft) declined by 2.0 percent between 2019 and 2021 and is estimated to have fallen by an additional 0.7 percent in 2022. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed wing piston aircraft will continue to shrink over the forecast period, just to be offset by the growing turbine fleet. Despite the minimal growth of the active GA fleet between 2021 and 2043, the number of GA hours flown is projected to increase by 16.6 percent from 2021 to 2043 (an average of 0.7 percent per year), as growth in turbine, rotorcraft, and experimental hours more than offset a decline in fixed wing piston hours.

FAA GENERAL AVIATION FORECASTS

The FAA forecasts the fleet mix and hours flown for single and multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and other aircraft (gliders and balloons). The FAA forecasts “active aircraft,” not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category.

The long-term outlook for general aviation is stable to optimistic, as growth at the high-end offsets continuing retirement of aging aircraft at the traditional low-end of the segment. The active general aviation fleet is forecast to remain relatively stable between 2022 and 2042. The largest segment of the fleet – fixed-wing piston aircraft – is predicted to wane over the forecast period due to unfavorable pilot demographics, increasing cost of ownership, the availability of lower-cost alternatives for recreational uses, and new aircraft deliveries not keeping pace with the retirement of aging aircraft. Turbine aircraft, including helicopters, are projected to grow the most due to steady growth in both U.S. GDP and corporate profits. **Table 2F** shows the primary general aviation demand indicators as forecast by the FAA.

TABLE 2F | FAA National General Aviation Forecast

Demand Indicator	2022	2042	CAGR 2022-2042
Total General Aviation Fleet	**209,140**	**215,390**	**0.15%**
Total Fixed Wing Piston	137,465	119,350	-0.70%
Total Fixed Wing Turbine	26,145	38,980	2.02%
Total Helicopters	10,175	13,680	1.49%
Total Other (experimental, light sport, etc.)	35,355	43,380	1.03%
Total General Aviation Operations	**28,664,223**	**33,222,776**	**0.74%**
Local	14,029,412	16,562,635	0.83%
Itinerant	14,634,811	16,660,141	0.65%
Total General Aviation Hours Flown[1]	**21,796,739**	**23,890,063**	**0.46%**
Total Pistons	14,036,321	11,927,178	-0.81%
Total Turbine	7,760,418	11,962,885	2.19%
Total General Aviation Pilots[2]	**476,346**	**509,525**	**0.34%**

[1]Excludes Experimental, Light Sport, and Others (gliders, balloons, etc.)
[2]Excludes student pilots
CAGR: compound annual growth rate

Source: FAA Aerospace Forecast - Fiscal Years 2023-2043

General Aviation Fleet Mix

For 2022, the FAA estimates there are 137,465 piston-powered fixed-wing aircraft in the national fleet. This number is forecast to decline by 0.70 percent annually from 2022-2042, resulting in 119,350 by 2042. This includes a decline of 0.7 percent annually for single engine pistons and a decline of 0.2 percent for multi-engine pistons.

Total turbine aircraft are forecast to grow at an annual rate of 2.02 percent through 2042. The FAA estimates there are 26,145 fixed-wing turbine-powered aircraft currently in the national fleet. Turbine-powered aircraft include both turboprops – aircraft with propellers that are driven by a turbine engine – and jet aircraft. Annual growth rates for turboprops are 0.8 percent and 2.7 percent for business jets, resulting in a total of 38,980 turbine fixed wing aircraft by 2042.

The total number of helicopters, both piston- and turbine-powered, are forecast to grow at an annual growth rate of 1.49 percent through 2042. The FAA estimates there are 10,175 helicopters in 2022, which are predicted to grow to 13,680 by 2042. This includes annual growth rates of 0.5 percent for piston helicopters and 1.8 percent for turbine helicopters.

The FAA also forecasts changes in experimental, light sport, and other aircraft (including balloons and gliders). Combined, there is an estimated 35,355 of these aircraft in 2022 which is forecast to grow to 43,380 by 2042, a combined annual growth rate of 1.03 percent.

All combined, the total number of active aircraft in the national general aviation fleet in 2022 is 209,140. With a subtle annual growth rate of 0.15 percent, the national fleet is forecast to rise to 215,390 by 2042.

General Aviation Operations

The FAA also forecasts total operations based upon activity at control towers across the U.S. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military. Air carrier operations are those conducted by scheduled commercial air carriers, such as United Airlines or Southwest. While these operations are vital to forecasting activity at airports with such activity, because CPT does not see scheduled air service, this part of the forecast is omitted. Military aircraft do use civilian airports across the country, but due to the inherent difficulty in predicting their operations, the FAA traditionally uses a zero-growth forecast for military operations.

General aviation (GA) is comprised of all non-commercial or military operations. Air taxi/commuter operations is another segment of commercial aviation that is conducted by aircraft with 59 seats or less that carry passengers or cargo for hire. Through 2042, total GA operations are forecast to grow 0.74 percent annually. This includes annual growth rates of 0.83 percent for local operations, 0.65 percent for itinerant operations, and 0.8 percent for air taxi/commuter operations. Local GA operations are expected to increase from 14.03 million in 2022 to 16.56 million in 2042, while itinerant GA operations are expected to grow from 14.63 million in 2022 to 16.66 million in 2042. Air taxi/commuter operations, which are always classified as itinerant, are projected to grow from 6.52 million in 2022 to 7.03 million in 2042.

Exhibit 2B presents the historical and FAA forecast of the U.S. active general aviation aircraft fleet and operations.

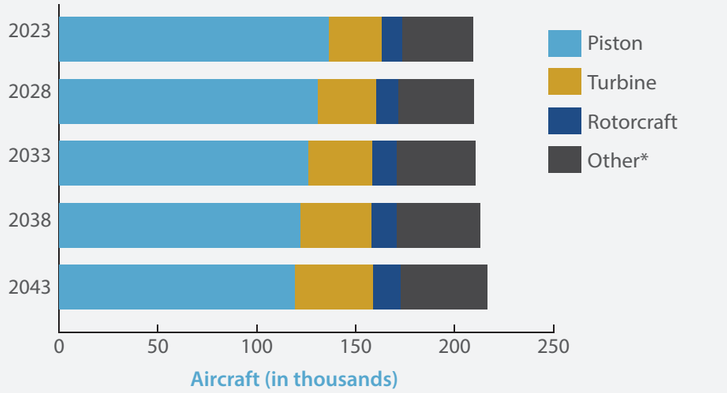
U.S. PILOT POPULATION

There were 466,900 active pilots certificated by the FAA at the end of 2019. Despite the COVID-19 pandemic, the total number of active pilots in the U.S. increased to an estimated 476,346 in 2022 and is forecast to grow 0.34 percent annually through 2042. The greatest amount of growth expected is in licensed sport pilots (up 2.5 percent annually), followed by helicopter pilots (1.0 percent annual growth) and airline transport pilots (ATP 0.7 percent annually). Private pilot certificates are projected to decrease at an annual average rate of -0.2 percent, through 2042. Commercial pilot certificates are projected to have zero net growth through 2042.

RISKS TO THE FAA FORECAST

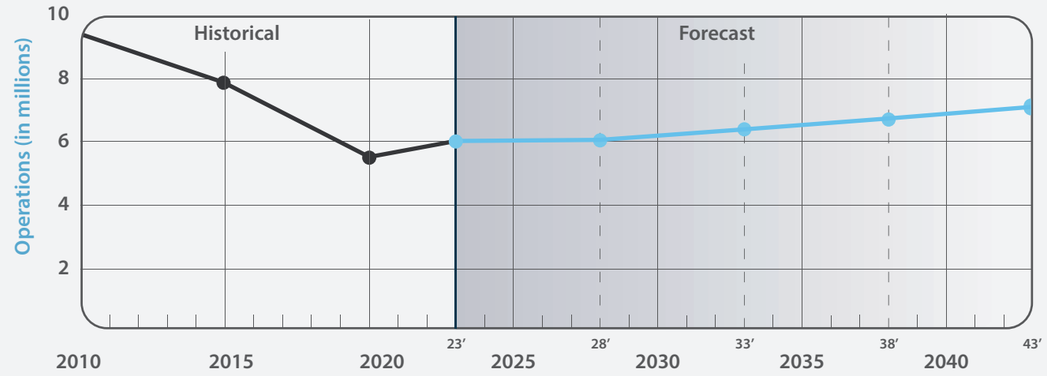
The FAA forecasts of aviation demand are driven by models built on forecasts of economic activity. There are many assumptions in both the economic forecasts and in the FAA models that could affect the degree to which these forecasts are realized. This year's forecast is driven, at least in the near-term, by the pace of recovery from the impacts to the U.S. and global economies and the aviation industry resulting from the novel coronavirus (COVID-19). It does go without saying that terrorism remains among the greatest world-wide risks to aviation growth. Any terrorist incident aimed at aviation could have an immediate and significant impact on the demand for aviation services that could be greater than its impact on overall economic activity.

U.S. Active General Aviation Aircraft

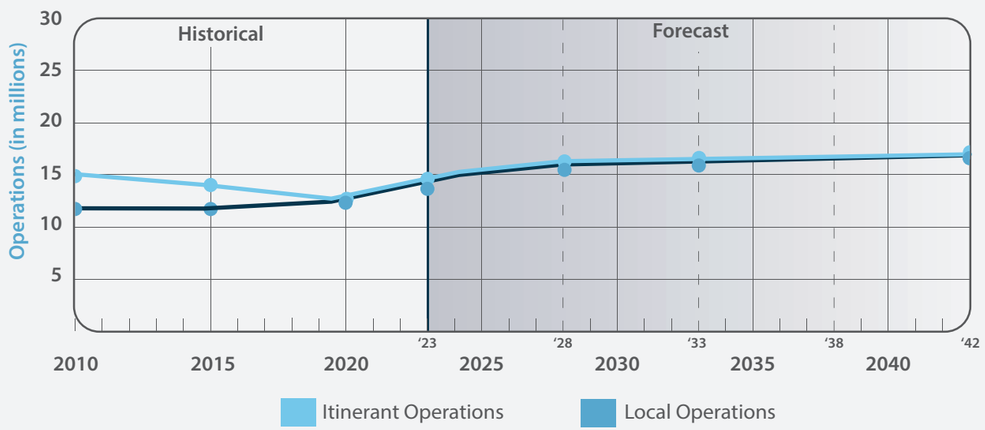


*Other includes Experimental and LSA aircraft

U.S. Air Taxi Operations

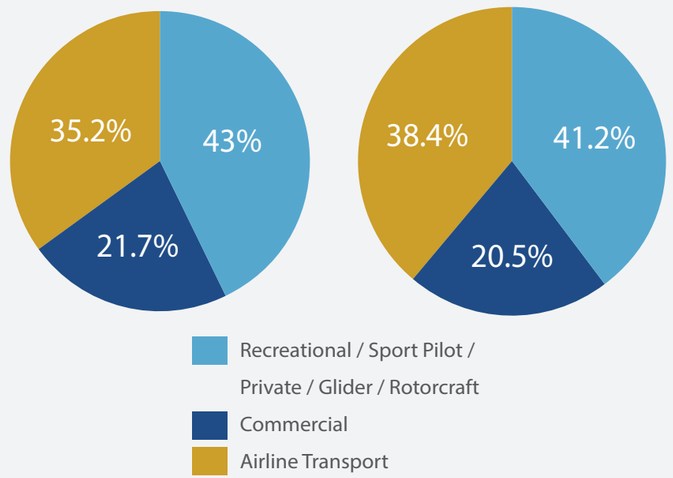


U.S. General Aviation Operations



Source: FAA Aerospace Forecasts FY2023-2043

Active Pilots By Certificate



Excludes Student Pilot Certificates

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In addition, sudden changes in the geo-political landscape could lead to outcomes that are very different than the forecasts portray. As experienced in 2020, the rapid spread of a novel coronavirus or other pathogen, may also have a sudden and negative impact on the forecasts. The future direction of oil prices may also impact the FAA forecasts.

FORECASTING APPROACH

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

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

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

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

Regression Analysis: Regression analysis measures statistical relationships between dependent and independent variables, yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures association between the changes in the dependent variable and the independent variable(s). If the "r^2" value (coefficient determination) is greater than 0.90, it indicates good predictive reliability. A value less than 0.90 may be used, but with the understanding that the predictive reliability is lower.

Socioeconomic Methodologies: Though trend line extrapolation and market share analysis may provide mathematical and formulaic justification for demand projections, many factors beyond historical levels of activity may identify trends in aviation and impact aviation demand locally. Socioeconomic or correlation analysis examines the direct relationship between two or more sets of historical data from which future aviation activity projections are developed.

Professional Judgement: Judgmental methods are educated estimations of future events based on the industry knowledge, experience, and intuition of the forecaster. This method permits the inclusion of a broad range of relevant information in the forecasting process and is usually used to refine the results of the other methods.

Forecasts will age the farther they are from the base year, thus the less reliable a forecast may become due to changing local and national conditions. Nonetheless, the FAA indicates that a 20-year forecast be developed for long-range airport planning. Facility and financial planning usually require at least a 10 -year view since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts that do not overestimate revenue-generating capabilities or understate demand for facilities required to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of aviation activity in both the local and national markets. Historically, the nature and trend of the national economy have had direct impacts on the level of aviation activity. Recessionary periods have been closely followed by declines in aviation activity. Nonetheless, over time trends emerge and provide the basis for airport planning.

Future facility requirements, such as hangar and apron needs, are derived from projections of various aviation demand indicators. Using a broad spectrum of local, regional, and national socioeconomic and aviation information, and analyzing the most current aviation trends, forecasts are presented for the following aviation demand indicators:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Air Taxi and Military Operations
- Operational Peaks

This forecasting effort was completed in June 2023, with a base year of 2022.

EXISTING FORECASTS

Consideration is given to any forecasts of aviation demand for the airport that have been completed in the recent past. These are typically sourced from the FAA *Terminal Area Forecast* (TAF), previous airport master plans, and state or regional aviation plans. The most recent completed master plan is from 2003, and a draft master plan was developed in 2011 but never finalized. The previous regional aviation system plan is from 2003 and is considered too dated to be of value. Elements of the *California Aviation System Plan* (CASP) are periodically updated; however, the CASP uses the FAA forecasts and the FAA's Terminal Area Forecast and new forecasts are not created for the CASP.

DRAFT MASTER PLAN (2011)

A master plan update for Chino Airport was completed through the draft final phase in 2011. The forecasts for that master plan update were approved by the FAA. Ultimately, the draft master plan was not finalized to allow for certain litigation related to the airport to be completed. The draft master plan is now nearly 10 years old which is typically when a master plan would be updated in a normal cycle. The forecasts from the 2011 draft master plan do provide insight to the assumptions and projections at the time. **Table 2G** presents the approved aviation demand forecasts from the 2011 draft master plan.

TABLE 2G | 2011 Draft Master Plan Forecasts

	Actual	FORECAST				CAGR
	2009	2015	2020	2025	2030	2009-2030
ANNUAL OPERATIONS						
Itinerant						
General Aviation	61,109	65,000	69,000	74,000	80,000	1.29%
Air Taxi	332	400	500	700	900	4.86%
Military	200	200	200	200	200	0.00%
Total Itinerant	*61,641*	*65,600*	*69,700*	*74,900*	*81,100*	*1.32%*
Local						
General Aviation	101,767	108,000	115,000	124,000	133,000	1.28%
Military	873	300	300	300	300	-4.96%
Total Local	*102,640*	*108,300*	*115,300*	*124,300*	*133,300*	*1.25%*
3% Nighttime Adjustment	4,928	5,200	5,600	5,800	6,400	1.25%
Total Operations	**169,209**	**179,100**	**190,600**	**205,000**	**220,800**	**1.28%**
BASED AIRCRAFT						
Based Aircraft	**620**	**675**	**730**	**790**	**860**	**1.57%**
CAGR - Compound annual growth rate						

FAA *TERMINAL AREA FORECAST* (TAF March 2022)

On an annual basis, the FAA publishes the *Terminal Area Forecast* (TAF) for each airport included in the *National Plan of Integrated Airport Systems* (NPIAS). The TAF is a generalized forecast of airport activity used by FAA primarily for internal planning purposes. It is available to airports and consultants to use as a baseline projection and an important point of comparison while developing local forecasts. The TAF was published in February 2023 and is based on the federal fiscal year (October-September).

Table 2H presents the 2022 TAF (published in Feb. 2023) for CNO. For based aircraft, the TAF shows 522 in 2022 and 682 in 2042 for a projected compound annual growth rate of 1.35 percent. For total operations, the TAF shows 201,378 in 2022 and 230,753 in 2042 for a projected annual growth rate of 0.68 percent. It should be noted that the TAF is rarely in concert with actual data for an airport. For example, the airport recently updated its based aircraft count in the official FAA database (basedaircraft.com), and there are 698 validated aircraft based at the airport. In the calendar year of 2022, the control tower counted 204,582 total operations.

TABLE 2H | 2022 FAA Terminal Area Forecast

	2022	2027	2032	2042	CAGR 2022-2042
ANNUAL OPERATIONS					
Itinerant					
Air Carrier	70	70	70	70	0.00%
Air Taxi	531	531	531	531	0.00%
General Aviation	63,680	76,852	77,546	78,954	1.08%
Military	1,443	1,443	1,443	1,443	0.00%
Total Itinerant	*65,724*	*78,896*	*79,590*	*80,998*	*1.05%*
Local					
General Aviation	134,400	137,794	141,274	148,501	0.50%
Military	1,254	1,254	1,254	1,254	0.00%
Total Local	*135,654*	*139,048*	*142,528*	*149,755*	*0.50%*
Total Operations	***201,378***	***217,944***	***222,118***	***230,753***	**0.68%**
BASED AIRCRAFT					
Based Aircraft	***522***	***557***	***592***	***682***	***1.35%***

CAGR - Compound annual growth rate

Source: FAA Terminal Area Forecast (TAF), March 2023

The FAA also provides a TAF for all airports in each state. Statewide TAF data is helpful as a projection tool and as a point of comparison to assess the reasonableness of the forecasts developed here. In the State of California, based aircraft are projected to grow 0.83 percent and total general aviation operations are projected to grow 0.44 percent annually.

BASED AIRCRAFT FORECAST

General aviation encompasses all portions of civil aviation except commercial service and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity at the airport, certain elements of this activity must be forecast. These indicators of general aviation demand include based aircraft, aircraft fleet mix, operations, and peak periods.

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft for CNO, other demand indicators can be projected. The process of developing forecasts of based aircraft begins with an analysis of aircraft ownership in the primary general aviation service area through a review of historical aircraft registrations. An initial forecast of service area registered aircraft is developed and will be used as one data point to arrive at a based aircraft forecast for CNO.

Forecasts of based aircraft may directly influence needed facilities and the applicable design standards. The needed facilities may include hangars, aprons, taxilanes, etc. The applicable design standards may include separation distances and object clearing surfaces. The size and type of based aircraft are also an important consideration. The addition of numerous small aircraft may have no effect on design standards, while the addition of a few larger business jets can have a substantial impact on applicable design standards.

Because of the numerous variables known to influence aviation demand, several separate forecasts of based aircraft are developed. Each of the forecasts is then examined for reasonableness, and any outliers are discarded or given less weight. The remaining forecasts collectively will create a planning envelope. A single planning forecast is then selected for use in developing facility needs for the airport. The selected forecast of based aircraft can be one of the several forecasts developed, based on the experience and judgment of the forecaster, or it can be a blend of the forecasts.

BASED AIRCRAFT INVENTORY

There are currently 698 based aircraft at Chino Airport.

Documentation of the historical number of based aircraft at CNO has been somewhat intermittent. For many years, FAA did not require airports to report the number of based aircraft. It is only in recent years that the FAA has established a based aircraft inventory in which it is possible to cross-reference based aircraft claimed by one airport with other airports. The FAA is now utilizing this based aircraft inventory as a baseline for determining how many, and what type of, aircraft are based at any individual general aviation airport. This database evolves daily as aircraft are added or removed, and it does not provide an annual history of based aircraft. It is the responsibility of the sponsor (owner) of each airport to input based aircraft information into the FAA database (www.basedaircraft.com). The FAA based aircraft database currently shows 698 validated based aircraft at CNO. The mix of aircraft is comprised of 482 single engine pistons, 86 multi-engine pistons, 40 turboprops, 70 jets, and 20 helicopters.

REGISTERED AIRCRAFT FORECAST

Analysis presented earlier identified an approximate service area for the airport. Aircraft ownership trends (registered aircraft) for the service area typically dictate the based aircraft trends for an airport. As such, a forecast of registered aircraft for the airport service area is developed for use as an input to the subsequent based aircraft forecast.

Table 2J presents the number of registered aircraft in the airport service area from 2010 through 2021. These figures are derived from the FAA aircraft registration database that includes an address and zip code. Those zip codes of registered aircraft that fall within the airport service area were then extracted to establish the baseline and history of registered aircraft. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in the service area but based at an airport outside the county or vice versa.

In 2021, there were 2,552 aircraft registered in zip codes within the airport service area. The highest registered aircraft count during the time period was 3,644 in 2011. Like most areas of the country, the decline in registered aircraft since 2011 may in part be attributable to two primary factors: the impact of the 2008-2009 recession and the FAA's 2010-2013 re-registration process. Over the last five years, the decline in registered aircraft has begun to slow significantly. In the last five years, the service area has decreased by 215 registered aircraft while from 2011 to 2015, there was a decline of 937 registered aircraft. From 2019 to 2021, the decline was only 19 registered aircraft suggesting that perhaps the

declining trend is beginning to stabilize and a return to growth could be on the horizon. Now that the actual number of registered aircraft has been identified, several projections of future registered aircraft are considered for the 20-year planning horizon.

TABLE 2J | Registered Aircraft Fleet Mix in Chino Airport Service Area

Year	Single Engine Piston	Multi-Engine Piston	Jet	Turboprop	Other	Helicopter	Total
2011	2,626	348	171	101	205	193	3,644
2012	2,434	314	169	96	185	172	3,370
2013	2,126	251	167	67	133	120	2,864
2014	2,054	236	163	69	115	108	2,745
2015	2,000	236	166	72	105	128	2,707
2016	2,013	240	191	70	103	150	2,767
2017	1,948	233	218	66	101	153	2,719
2018	1,825	207	223	72	103	158	2,588
2019	1,800	181	237	76	100	177	2,571
2020	1,804	170	232	94	129	161	2,590
2021	1,770	158	238	95	126	165	2,552
Compound Annual Growth Rate from 2011-2021							**-3.50%**
Compound Annual Growth Rate from 2016-2021							**-1.60%**

Source: FAA Aircraft Registry Database; FAA Census of U.S. Civil Aircraft

Statewide TAF Growth Rate Projection

The first projection of registered aircraft for the airport service area considers the statewide growth rate of based aircraft in the FAA TAF (0.83 percent). By applying this annual growth rate to the current number of registered aircraft in the service area, a forecast emerges. **Table 2K** presents this analysis.

TABLE 2K | Registered Aircraft Growth Rate Projection

Year	Service Area Registered Aircraft[1]
2021/2022	2,552
Statewide Based Aircraft Growth Rate from FAA TAF (CAGR = 0.83%)	
2027	2,660
2032	2,772
2042	3,011

[1]FAA Aerospace Forecasts Fiscal Years 2021-2041

Market Share Projections

Three market share projections have been developed. The first considers the service area maintaining its 2021/2022 share of the national active fleet of general aviation aircraft (1.2202 percent). By extending this percentage to the plan years, a forecast emerges. The U.S. active general aviation fleet is projected by the FAA to remain relatively steady for the next 10 years and then begin to show modest growth thereafter. This forecast for registered aircraft, over the next 20 years, is shown in **Table 2L**.

TABLE 2L | Registered Aircraft Market Share of National GA Fleet Projection

Year	Service Area Registered Aircraft	U.S. Active Aircraft[1]	Percent of U.S. Active Aircraft
2021/2022	2,552	209,140	1.2202%
Constant Market Share of U.S. Fleet (CAGR = 0.07%)			
2026	2,555	209,425	1.2202%
2031	2,565	210,175	1.2202%
2041	2,628	215,390	1.2202%

[1]FAA Aerospace Forecasts Fiscal Years 2021-2041

The second and third market share projections consider the relationship of aircraft ownership in the service area to the employment and population in the service area. In 2021, there was 1.0582 registered aircraft in the service area per 1,000 employed persons. By carrying forward this ratio a constant share forecast emerges as outlined in **Table 2M**. This forecast shows an annual growth rate of 0.54 percent through the 20-year planning period and the addition of 289 registered aircraft in the service area. For population in the service area, there were 0.5192 registered aircraft per 1,000 people. By maintaining this as a constant share, another forecast emerges with an annual growth rate of 0.43 percent and the addition of 231 registered aircraft in the service area.

TABLE 2M | Registered Aircraft Market Share of Population and Employment Forecasts

Year	Service Area Registered Aircraft[1]	Service Area Population[2]	Aircraft Per 1,000 People	Service Area Employment[2]	Aircraft Per 1,000 Employed People
2021/2022	2,552	4,937,757	0.5168	2,426,282	1.0518
Constant Market Share of Employed People Forecast (CAGR= 0.54%)					
2027	2,630	5,023,256	0.5204	2,500,280	1.0518
2032	2,710	5,171,457	0.5240	2,576,535	1.0518
2042	2,838	5,382,654	0.5273	2,698,247	1.0518
Constant Market Share of Population Forecast (CAGR= 0.43%)					
2027	2,612	5,023,256	0.5168	2,500,280	1.0446
2032	2,673	5,171,457	0.5168	2,576,535	1.0374
2042	2,782	5,382,654	0.5168	2,698,247	1.0310

[1]FAA Aircraft Registration Database
[2]Southern California Association of Governments - Demographic Data 2016

Selected Registered Aircraft Forecast

Four forecasts of registered aircraft in the Chino Airport service area have been presented and are summarized in **Table 2N**. It is now the responsibility of the forecast analyst to choose a selected forecast that will be utilized when forecasting based aircraft. While registered aircraft in the service area have been declining in recent years, the decline appears to be slowing significantly and may ultimately level off or begin to grow again. Because it may take several years to realize registered aircraft growth, a forecast that is in the mid-range of the several developed is preferred. The selected forecast is the constant market share of employment in the airport service area. Employment levels tend to relate to aviation demand because a strong economy often correlates with strong employment. This forecast falls within the planning envelope created by the four forecasts, which is preferred.

TABLE 2N | Registered Aircraft Forecast Summary

Projection Sources	2027	2032	2042	CAGR 2022-2042
Constant Market Share of Population	2,612	2,673	2,782	0.43%
Constant Market Share of National GA Fleet	2,555	2,565	2,628	0.15%
TAF State Growth Rate	2,660	2,772	3,011	0.83%
Constant Market Share of Employment - Selected Forecast	***2,630***	***2,710***	***2,838***	***0.53%***
CAGR: Compound annual growth rate				

Source: Coffman Associates analysis

Exhibit 2C presents the Chino Airport service area registered aircraft forecasts and the selected forecast that will serve as an input into the based aircraft forecast.

BASED AIRCRAFT FORECAST

Based Aircraft Market Share of Registered Aircraft Forecast

Utilizing the forecast of registered aircraft in the airport service area, a forecast of based aircraft has been developed. In 2022, the 698 aircraft based at the airport represented 27.35 percent of the aircraft registered in the county. By maintaining this ratio as a constant through the plan years, a forecast emerges. **Table 2P** presents this analysis, which results in 719 based aircraft in 2027, 741 in 2032, and 776 in 2042.

TABLE 2P | Based Aircraft Market Share of Registered Aircraft Forecast

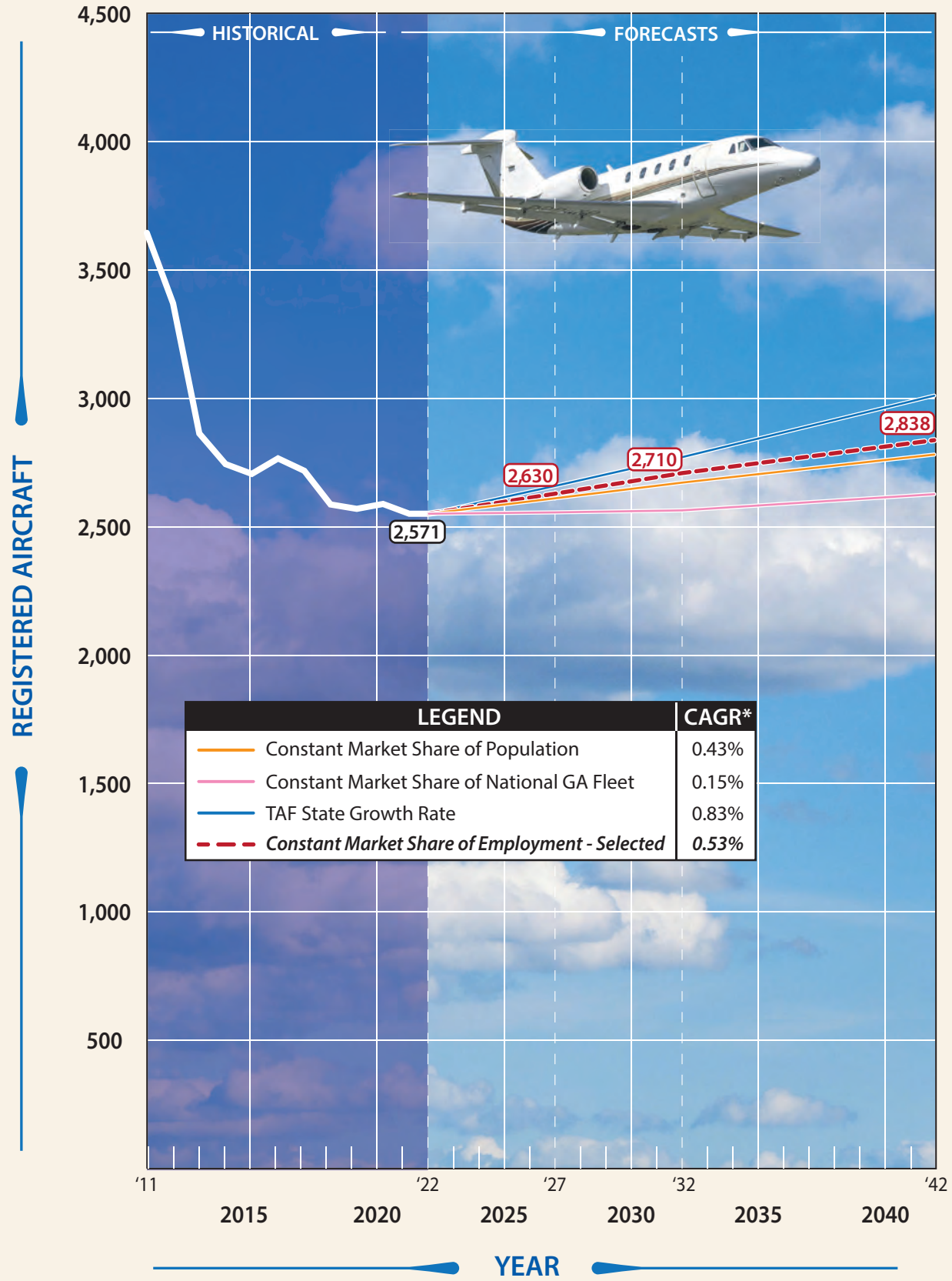
Year	Service Area Registered Aircraft	Aircraft Based at CNO	Percent of Service Area Registered Aircraft Based at CNO
2022	2,552	698	27.35%
Constant Market Share (CAGR = 0.53%)			
2027	2,630	719	27.35%
2032	2,710	741	27.35%
2042	2,838	776	27.35%
CAGR: Compound annual growth rate			

Source: Coffman Associates analysis

FAA Terminal Area Forecast Growth Rate Projections

The FAA produces a Terminal Area Forecast for all airports included in the NPIAS as previously noted. One method to forecasting is to utilize the annual growth rate associated with both the airport specific TAF and the larger statewide TAF. The airport specific TAF presents an annual growth rate of 1.35 percent for based aircraft; however, the 2022 TAF based aircraft figure is only 522 (698 is the validated baseline for this ALP Update). When we apply the 1.35 percent annual growth rate to the known base line of 698, a forecast emerges with 736 based aircraft by 2027, 798 by 2032, and 913 by 2042.

The statewide TAF projects an annual growth rate of 0.83 percent across California airports over the next 20 years. By applying this growth rate to the baseline of 698 based aircraft at CNO, another forecast emerges. This forecast results in 727 based aircraft in 2027, 758 based aircraft by 2022, and 823 by 2042. **Table 2Q** summarizes the TAF growth rate forecasts of based aircraft for Chino Airport.



* Compound Annual Growth Rate

TABLE 2Q | FAA TAF Based Aircraft Growth Rate Projections

Forecast Year	Statewide TAF Growth Rate Projection (CAGR = 0.83%)	Airport TAF Growth Rate Projection (CAGR = 1.37%)
2022	698	698
FORECAST		
2027	727	736
2032	758	798
2042	823	913

Note: TAF growth rates sourced from FAA TAF (published Feb. 2023).
CAGR: compound annual growth rate

Selected Based Aircraft Forecast

Selecting a based aircraft forecast ultimately relies on the judgment of the forecast analyst. A selected forecast should be reasonable and based upon a sound methodology. The methodology presented in this analysis first examines the history of aircraft ownership in the airport service area. Aircraft ownership was obtained from the FAA aircraft registration database. While it is known that not all aircraft registered in any specific airport service area will base at that airport, overall, the data does provide a general understanding of aircraft ownership in the service area. Several forecasts of registered aircraft were developed, and a selected forecast was chosen.

The registered aircraft forecast was then utilized as one data input to arrive at one based aircraft forecast. A second based aircraft forecasting methodology was also employed, which applied the annual growth rate from the FAA's *Terminal Area Forecast* for both the state (0.83%) and for the airport (1.35%).

Two additional forecasts are developed here to examine the direct relationship between based aircraft and socioeconomic characteristics. One was developed by applying the forecast growth rate in the service area population and the other by using the projected employment growth for the service area.

All five projections of based aircraft are summarized in **Table 2R**. Now the forecast analyst must either select one of the forecasts to be used in this ALP Update or present another alternative that may be a combination of two or more of the forecasts.

TABLE 2R | Based Aircraft Forecast Summary

Projection Sources	2027	2032	2042	CAGR 2021-2041
Constant Market Share of Registered Aircraft	719	741	776	0.53%
Constant Market Share of Service Area Population	713	729	761	0.43%
Constant Market Share of Service Area Employment	717	736	776	0.53%
CNO TAF Growth Rate	746	798	913	1.35%
State TAF Growth Rate - Selected Forecast	***727***	***758***	***823***	***0.83%***

CAGR: Compound annual growth rate
Source: Coffman Associates analysis

Chino Airport is one of the most capable general aviation airports in the region and can accommodate more based aircraft, provided land is developed with hangars. According to the 2003 master plan, there were 947 aircraft based at the airport in 2000. In 2009 there were 620 based aircraft. The baseline for this ALP Update shows there are 698 based aircraft in 2022. Since the number of based aircraft at the airport appears to have stabilized over the last 10 years, a forecast that shows a reasonable growth trend should be selected as it appears that the airport may see growth in based aircraft again.

Of the five based aircraft forecasts considered, the airport TAF growth rate (1.35%) forecast appears to fall outside of the tight range of the other forecasts. The 2042 forecast is 90 based aircraft higher than the next highest forecast. Because this forecast may be considered too aggressive and perhaps is an outlier, it is not the selected forecast.

The two forecasts developed by examining the relationship of based aircraft with population and employment appear reasonable. The last forecast applies the statewide TAF growth rate for based aircraft (0.83 percent). This forecast is in the mid-range of the five considered, and it represents a modest but reasonable growth rate from which facility planning can be accomplished. This is the selected based aircraft forecast.

Exhibit 2D graphically shows the based aircraft forecasts and the selected forecast. The airport TAF for based aircraft is also shown for comparison purposes.

BASED AIRCRAFT FLEET MIX FORECAST

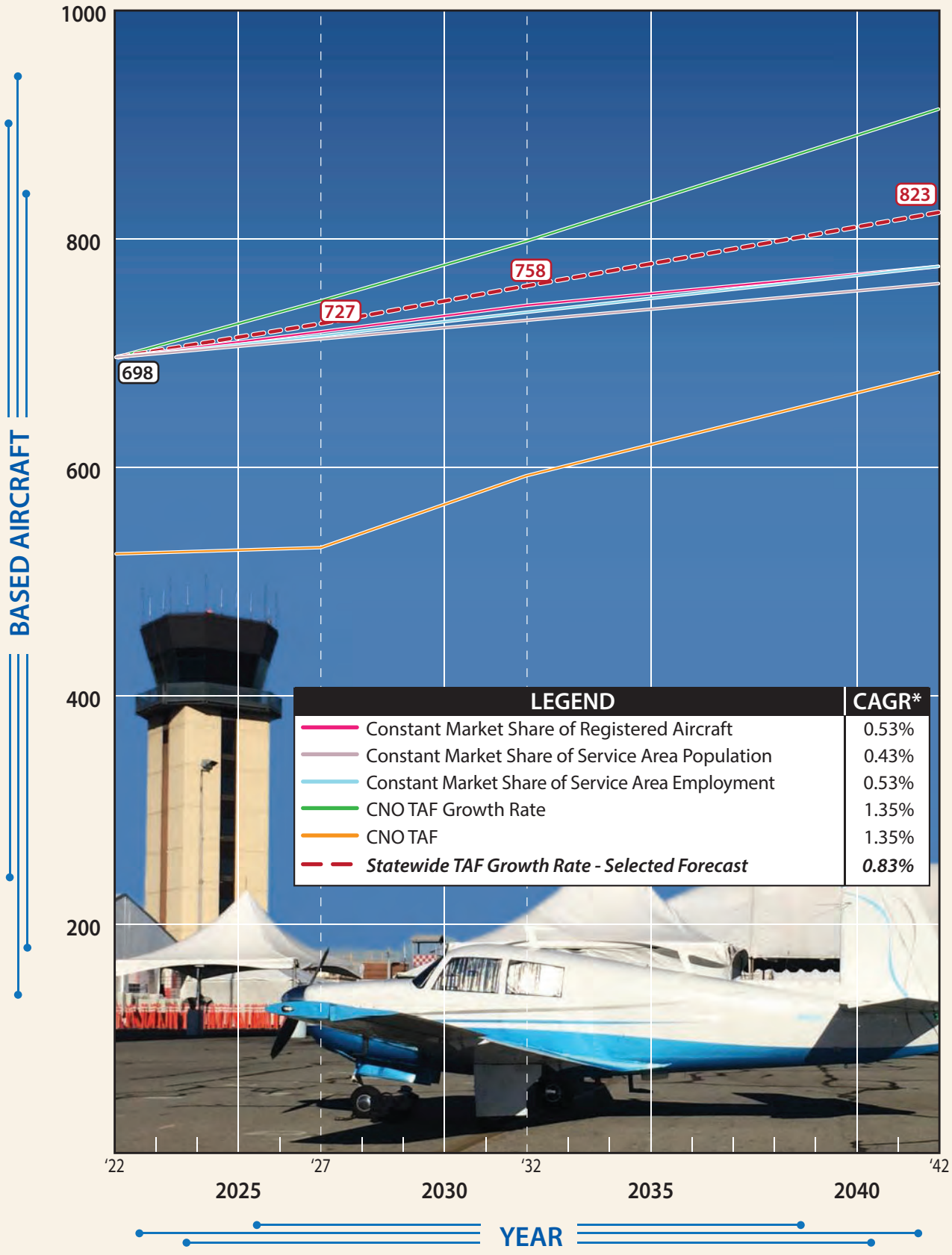
It is important to understand the current and projected based aircraft fleet mix at an airport to ensure the planning of proper facilities. For example, the addition of one or several larger turboprop or business jet aircraft to the airfield can have a significant impact on the separation requirements, the various obstacle clearing surfaces, and the need for hangar space.

The current based aircraft fleet mix consists of 482 single engine piston aircraft, 86 multi-engine piston aircraft, 40 turboprops, 70 jets, and 20 helicopters. The role of the airport is expected to remain as a reliever general aviation facility; therefore, a significant departure from the current fleet mix is not anticipated. The future fleet mix is expected to continue to be dominated by single engine piston aircraft with moderate increases in turboprops, jets, and helicopters. Multi-engine piston aircraft are projected to decline as a percentage of total based aircraft. These forecast growth trends in the based aircraft fleet mix are consistent with FAA projections of the national general aviation fleet mix. **Table 2S** presents the forecast fleet mix for based aircraft at Chino Airport.

TABLE 2S | Based Aircraft Fleet Mix

Aircraft Type	2022	Percent	2027	Percent	2032	Percent	2042	Percent
Single Engine Piston	482	69.1%	494	68.0%	507	66.9%	527	64.0%
Multi-Engine Piston	86	12.3%	86	11.8%	86	11.3%	86	10.4%
Turboprop	40	5.7%	45	6.2%	50	6.6%	70	8.5%
Jet	70	10.0%	80	11.0%	90	11.9%	110	13.4%
Helicopters	20	2.9%	22	3.0%	25	3.3%	30	3.6%
Total	**698**	**100.0%**	**727**	**100.0%**	**758**	**100.0%**	**823**	**100.0%**

Source: Coffman Associates analysis.



* Compound Annual Growth Rate TAF: Terminal Area Forecast

OPERATIONS FORECAST

Airport operations are classified as air carrier (passenger flights), air taxi, general aviation, and military. Air carrier operations are those passenger flights conducted by aircraft with a seating capacity of 60 or more. Air taxi operations are those conducted by aircraft operating under FAR Part 135, otherwise known as "for-hire" or "on-demand" activity. Air taxi operations typically include commuter (60 seats or less), air cargo, air ambulance, and many fractional ownership operations. General aviation operations include a wide range of activity from recreational use to business and corporate uses. Military operations include those operations conducted by various branches of the U.S. military.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of an airport or which executes simulated approaches or touch-and-go operations at an airport. Generally, local operations are characterized by training activity. Itinerant operations are those performed by aircraft with a specific origin or destination away from an airport. Typically, itinerant operations increase with business and commercial use since business aircraft are used primarily to transport passengers from one location to another.

The following sections present several new general aviation operations forecasts. Once a forecast of general aviation operations has been selected, they will be combined with a forecast of air taxi and military operations to provide a total operations forecast for use in determining facility requirements for the airport. Since Chino Airport does not have commercial passenger service, any operations in this category will be combined with air taxi.

Several methods for determining general aviation operations have been employed to develop a reasonable planning envelope. Counts from the airport traffic control tower (ATCT) were utilized in this analysis, and historical operations for the last 12 years are presented in **Table 2T**.

TABLE 2T | Historical Operations

Year	ITINERANT OPERATIONS				LOCAL OPERATIONS			Total
	AC/AT	GA	MIL	*Subtotal*	GA	MIL	*Subtotal*	
2010	292	63,821	168	*64,281*	115,081	325	*115,406*	**179,687**
2011	284	60,061	108	*60,453*	106,344	236	*106,580*	**167,033**
2012	442	58,891	324	*59,657*	106,965	471	*107,436*	**167,093**
2013	496	62,797	409	*63,702*	104,919	1,082	*106,001*	**169,703**
2014	420	67,468	521	*68,409*	109,819	1,583	*111,402*	**179,811**
2015	360	68,231	476	*69,067*	100,488	1,376	*101,864*	**170,931**
2016	546	69,413	262	*70,221*	106,947	409	*107,356*	**177,577**
2017	409	71,244	446	*72,099*	130,089	902	*130,991*	**203,090**
2018	560	76,044	416	*77,020*	126,584	707	*127,291*	**204,311**
2019	505	78,730	484	*79,719*	136,593	869	*137,462*	**217,181**
2020	712	60,394	395	*61,501*	114,967	523	*115,490*	**176,991**
2021	634	63,023	451	*64,108*	129,441	836	*130,277*	**194,385**
2022	579	64,065	1,586	*66,230*	137,247	1,105	*138,352*	**204,582**

KEY: AC-Air Carrier; AT-Air Taxi; GA-General Aviation; MIL-Military

Source: FAA OPSNET Tower operations database

Operations at the airport in 2022 were nearly 16 percent higher over 2020, when COVID impacted aviation initially. In 2019, the airport reached a 12 year high with more than 217,000 operations.

It is typical for aviation operations activity to track closely with the condition of the national economy. Following the Great Recession of 2008-2009, operations were down. Again, with the COVID pandemic in 2020, operations were down. In both cases, operations at CNO rebounded within a couple of years. To inform the operations forecast, the forecast analyst has examined 22 years of operations history. Over the last 22 years, total operations have increased 1.10 percent annually. **Exhibit 2E** presents the operations history at CNO over the last 22 years, which is meant to inform the reader of the long-term operational trends at the airport.

ITINERANT GENERAL AVIATION OPERATIONS FORECAST

Itinerant operations are associated with aircraft arriving from or departing to another airport. Itinerant operations do not include training or touch-and-go operations. Within the State of California, the FAA forecasts itinerant general aviation activity to grow at an annual average rate of 0.45 percent between 2022 and 2042, which is slightly lower than the national projections (0.65 percent). The market share and growth rate techniques were employed to arrive at an itinerant general aviation operation forecast for CNO.

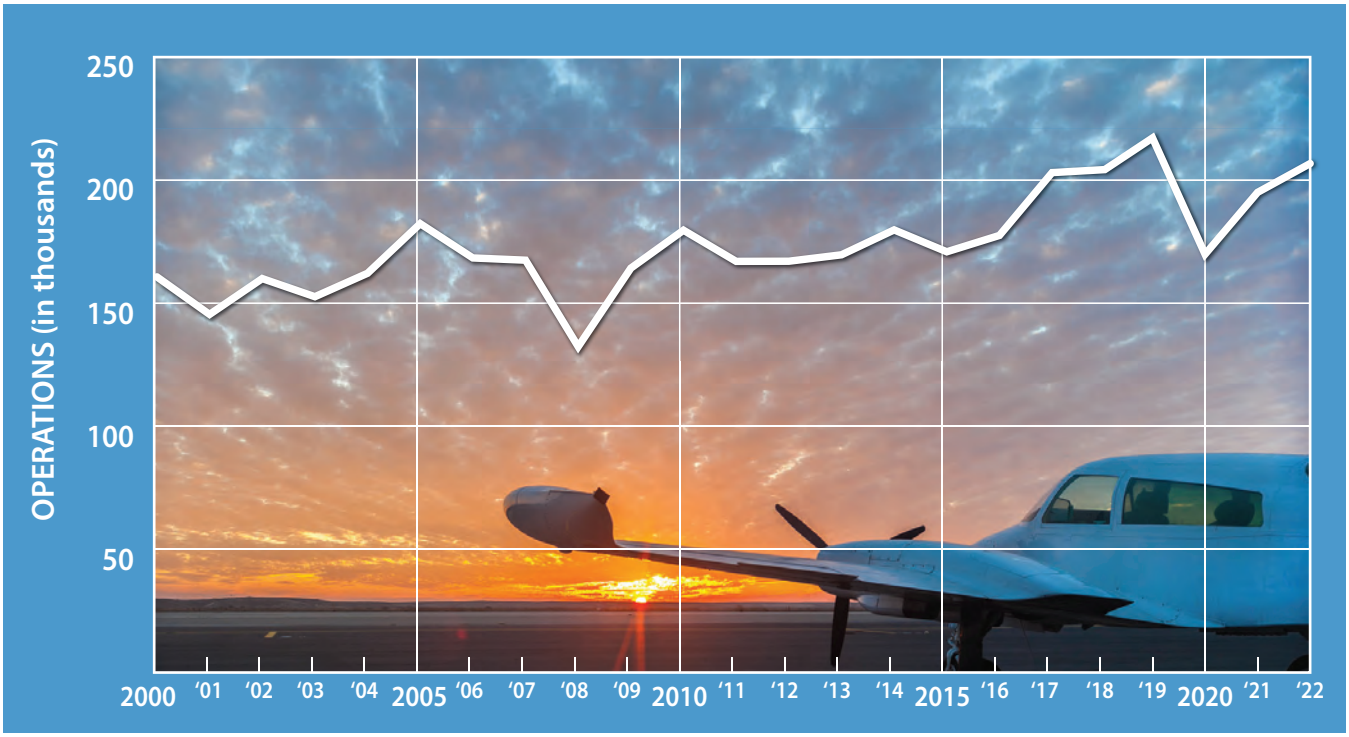
Market Share Forecasts

Market share analysis compares known historical data points to arrive at a ratio for the unknown variable (itinerant general aviation operations) that is carried forward to forecast years. Two forecasts that consider the historical market share of itinerant general aviation operations at CNO to the FAA national forecast of itinerant general aviation operations are presented in **Table 2U**.

TABLE 2U | Market Share Forecast of National Itinerant Operations

Year	CNO Itinerant GA Operations[1]	National Itinerant GA Operations[2]	CNO Market Share of National Itinerant GA Operations
2018	76,044	14,130,495	0.5382%
2019	78,730	14,244,787	0.5527%
2020	60,394	12,608,003	0.4790%
2021	63,023	13,774,861	0.4575%
2022	64,065	14,634,811	0.4378%
Constant Market Share of National Itinerant GA Operations (CAGR = 0.65%)			
2027	70,159	16,026,989	0.4378%
2032	71,060	16,232,627	0.4378%
2042	72,931	16,660,141	0.4378%
Increasing Market Share of National Itinerant GA Operations (CAGR = 1.52%)			
2027	76,609	16,026,989	0.4780%
2032	80,352	16,232,627	0.4950%
2042	86,633	16,660,141	0.5200%
Airport TAF Growth Rate Forecast of Itinerant GA Operations (CAGR = 1.08%)			
2027	67,600	16,026,989	0.4218%
2032	71,330	16,232,627	0.4394%
2042	79,419	16,660,141	0.4767%

[1]FAA Opsnet database sourced from CNO tower operations counts.
[2]*FAA Aeronautical Forecasts 2023-2043*



Year	ITINERANT OPERATIONS				LOCAL OPERATIONS			Total
	AC/AT	GA	MIL	Subtotal	GA	MIL	Subtotal	
2000	224	84,754	249	85,227	75,445	57	75,502	160,729
2001	349	80,451	115	80,915	64,548	28	64,576	145,491
2002	557	81,144	201	81,902	78,103	37	78,140	160,042
2003	324	72,872	193	73,389	79,266	25	79,291	152,680
2004	335	74,156	106	74,597	87,584	21	87,605	162,202
2005	176	68,979	55	69,210	113,125	22	113,147	182,357
2006	210	66,647	154	67,011	101,159	252	101,411	168,422
2007	247	68,902	148	69,297	97,788	423	98,211	167,508
2008	281	61,437	167	61,885	70,058	448	70,506	132,391
2009	332	61,109	200	61,641	101,767	873	102,640	164,281
2010	292	63,821	168	64,281	115,081	325	115,406	179,687
2011	284	60,061	108	60,453	106,344	236	106,580	167,033
2012	442	58,891	324	59,657	106,965	471	107,436	167,093
2013	496	62,797	409	63,702	104,919	1,082	106,001	169,703
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2016	546	69,413	262	70,221	106,947	409	107,356	177,577
2017	409	71,244	446	72,099	130,089	902	130,991	203,090
2018	560	76,044	416	77,020	126,584	707	127,291	204,311
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2020	712	60,394	395	61,501	114,967	523	115,490	176,991
2021	634	63,023	451	64,108	129,441	836	130,277	194,385
2022	579	64,065	1,586	66,230	137,247	1,105	138,352	204,582
CAGR 2000-2022	4.41%	-1.26%	8.78%	-1.14%	2.76%	14.43%	2.79%	1.10%
CAGR 2013-2022	1.56%	0.20%	14.51%	0.39%	2.72%	0.21%	2.70%	1.89%
CAGR 2018-2022	0.67%	-3.37%	30.69%	-2.97%	1.63%	9.34%	1.68%	0.03%

CAGR = Compound annual growth rate ***Source:*** FAA OPSNET tower count from CNO.

The first forecast carries the 2022 CNO market share (0.44378 percent of national itinerant general aviation operations) forward to the plan years. This results in an annual growth rate of 0.65 percent and a long-term forecast of 72,931 itinerant general aviation operations. This long-term forecast was exceeded as recently as 2018 and 2019, but it is consistent with the past 15 years or so.

Because itinerant general aviation operations at CNO were on an increasing trend for more than eight straight years prior to COVID, a second market share forecast is presented that applies an increasing trend to the plan years. This forecast results in 86,633 itinerant general aviation operations by 2042 and an annual growth rate of 1.52 percent.

Table 2U shows a third forecast which applies the airport TAF growth rate for itinerant general aviation operations (1.08 percent). By including this forecast in the table one can see the market share of national itinerant GA operations as a comparison to the two market share forecasts. This forecast results in 79,419 operations by 2042.

Another market share forecast was developed that compares the number of based aircraft to itinerant general aviation operations. In 2022, there were 92 itinerant general aviation operations per based aircraft. If the number of itinerant general aviation operations per based aircraft remains constant through the plan years, the total number of itinerant general aviation operations will increase because based aircraft are forecast to increase. **Table 2V** shows the results of this market share forecast.

TABLE 2V | Constant Market Share of Itinerant GA Operations per Based Aircraft

Year	CNO Itinerant GA Operations[1]	CNO Based Aircraft[2]	Operations per Based Aircraft
2022	64,065	698	92
Constant Market Share of Itinerant GA Operations per Based Aircraft (CAGR = 0.83%)			
2027	66,727	727	92
2032	69,572	758	92
2042	75,538	823	92

[1]FAA Opsnet database sourced from CNO tower operations counts.
[2]*basedaircraft.com*

Itinerant General Aviation Operations Forecast Summary

A total of four forecasts of itinerant general aviation operations were developed, and they form the planning envelope. There is a statistical case to be made for selecting any of these forecasts. It is the opinion of the forecast analyst that the growth rate from the airport TAF is to serve as the selected forecast of itinerant general aviation operations for planning purposes. This forecast presents a balance between the high and low forecasts, and it takes into consideration the fact that operations are growing at a high rate in recent years. **Table 2W** summarizes the itinerant general aviation operations forecasts and the selected forecast.

TABLE 2W | Itinerant General Aviation Operations Forecast Summary

Method	2027	2032	2042	CAGR
Constant Market Share of CNO Itinerant GA Ops per Based Aircraft	66,727	69,572	75,538	0.83%
Constant Market Share of National Itinerant GA Operations	70,159	71,060	72,931	0.65%
Increasing Market Share of National Itinerant GA Operations	76,609	80,352	86,633	1.52%
Airport TAF Growth Rate Forecast of Itinerant GA Operations	**67,600**	**71,330**	**79,419**	**1.08%**

CAGR = Compound annual growth rate

Exhibit 2F presents the forecasts of itinerant general aviation operations that were developed. Also included is the airport TAF as a point of comparison.

LOCAL GENERAL AVIATION OPERATIONS FORECAST

Local general aviation operations are associated with training activity or touch-and-go activity. Local general aviation operations have been growing for the last 22 years at CNO at an annual growth rate of 2.76 percent. In 2019 the airport recorded a record high for local general aviation operations. Following a COVID induced downturn in 2020, local operations returned to set a new high in 2022 with more than 137,000 local operations. Over the last five years, the airport has averaged nearly 129,000 annual local operations.

The same general methodology used to forecast itinerant general aviation operations was utilized to forecast local general aviation operations. Three market share forecasts and a trend-line forecast were developed.

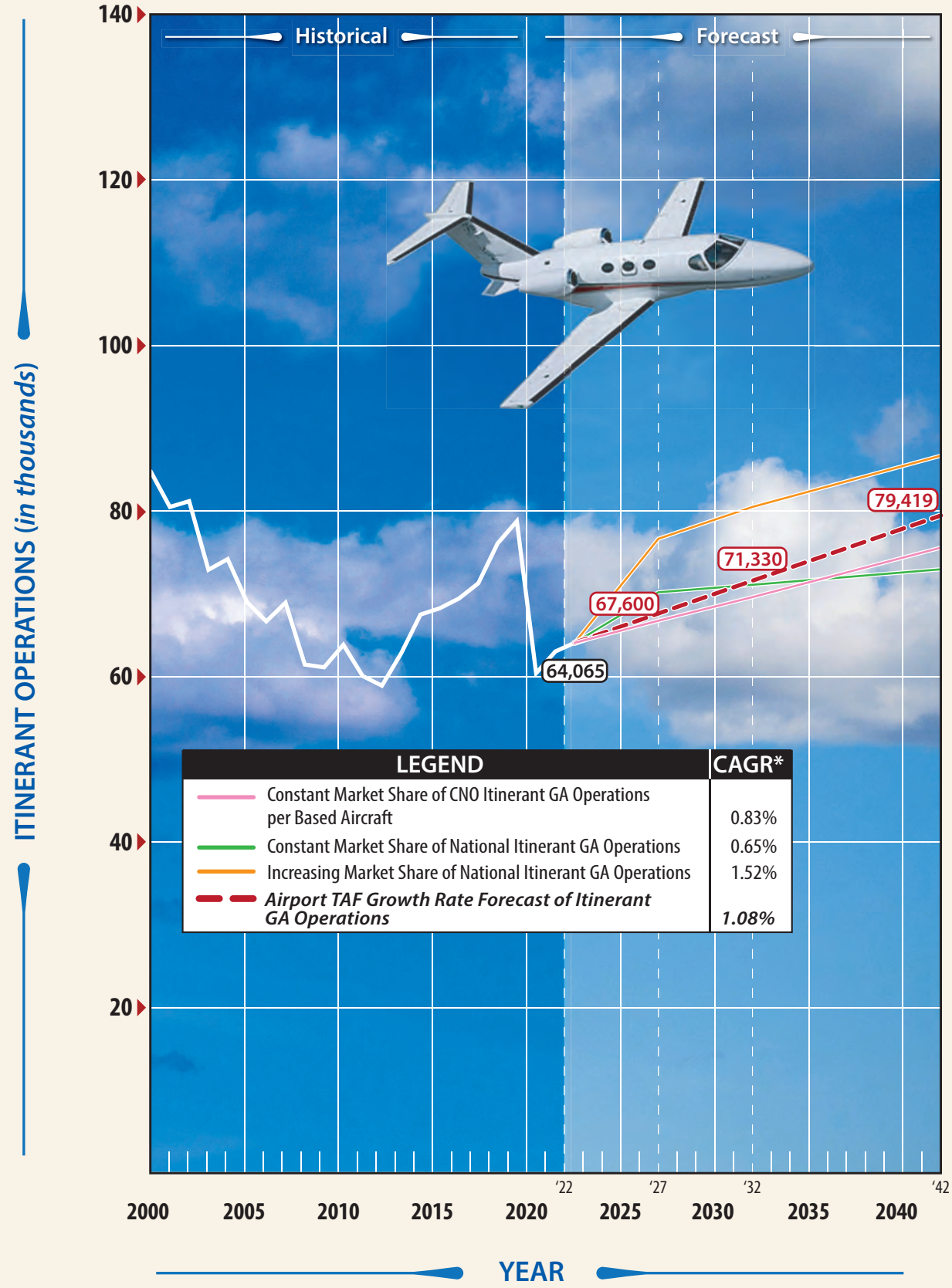
Market Share Forecasts

The first market share forecast considers that the airport captured 0.9783 percent of national local general aviation operations in 2022. By keeping this share constant through the plan years, a forecast emerges. **Table 2Y** presents this forecast with an annual growth rate of 0.83 percent.

TABLE 2Y | Market Share Forecasts of National Local GA Operations

Year	CNO Local GA Operations[1]	National Local GA Operations[2]	CNO Market Share of National Local GA Operations
2018	126,584	12,354,014	1.0246%
2019	136,593	13,109,215	1.0420%
2020	114,967	12,332,877	0.9322%
2021	129,441	13,479,087	0.9603%
2022	137,247	14,029,412	0.9783%
Constant Market Share of National Local GA Operations (CAGR = 0.83%)			
2027	153,724	15,713,699	0.9783%
2032	156,402	15,987,407	0.9783%
2042	162,029	16,562,635	0.9783%
Increasing Market Share of National Local GA Operations (CAGR = 0.92%)			
2027	153,994	15,713,699	0.9800%
2032	157,476	15,987,407	0.9850%
2042	164,798	16,562,635	0.9950%

[1]FAA Opsnet database reflecting CNO tower operations counts
[2]*FAA Aeronautical Forecasts 2023-2043*



* Compound Annual Growth Rate

The second market share forecast considers the fact that CNO has been capturing an increasing share of national local general aviation operations over the last three years. The increasing market share forecast results in 162,029 local general aviation operations by 2042 and an annual growth rate of 0.92 percent.

Local Operations Per Based Aircraft Forecast

With 698 validated based aircraft at the airport this represents 197 local operations per based aircraft. By maintaining this ratio, a forecast emerges because based aircraft are forecast to increase over the 20-year planning period. This forecast results in 161,826 local general aviation operations by 2042 and an annual growth rate of 0.83 percent. **Table 2Z** presents this analysis. It should be noted that the 197 local operations per based aircraft accounts for all local operations annually and not just local operations conducted by owners of based aircraft.

TABLE 2Z | Local Operations per Based Aircraft

Year	CNO Local GA Operations[1]	CNO Based Aircraft	Operations per Based Aircraft
2022	137,247	698	197
Constant Local Operations Per Based Aircraft (CAGR = 0.83%)			
2027	142,949	727	197
2032	149,045	758	197
2042	161,826	823	197

[1]*FAA Opsnet database reflecting CNO tower operations counts*
CAGR: Compound annual growth rate

Trend-Line Analysis

Trend-line analysis is a statistical regression that aims to "fit" a growth line through historical data and extend that line to the forecast years. The regression returns an "r^2" value. The closer the "r^2" value is to 1.0 the higher the statistical reliability the results are considered. A trend line was run for the last 22 years of data, which had an annual growth rate of 2.76 percent. The result for the forecast years is a long-term projection of 185,368 annual local general aviation operations with an annual growth rate of 1.51 percent. **Table 2AA** presents the results of this trend-line analysis and additionally shows the resulting operations per based aircraft as a point of comparison. The trend-line analysis produced an "r^2" value of 0.70.

TABLE 2AA | 22-Year Trend-Line Analysis - Local GA Operations

Year	CNO Local GA Operations	CNO Based Aircraft	Operations Per Based Aircraft
2000	75,445	840[1]	90
2022	137,247	589	197
22-Year Trend-Line for Local GA Operations (CAGR = 1.51%)			
2027	146,041	727	201
2032	159,150	758	210
2042	185,368	823	225

[1] Terminal Area Forecast

Source: Coffman Associates analysis.

Note: The forecast analyst examined the trend line for itinerant general aviation operations; however, the "r^2" value was very low, so the results were not included in the previous section.

Local General Aviation Operations Forecast Summary

Table 2BB presents a summary of the forecasts considered for local general aviation operations. The selected forecast is the constant ratio of 197 local general aviation operations per based aircraft. This forecast was selected over the others because it shows moderate growth over the other three, and moderate growth was preferred because the airport is already achieving record local operations. **Exhibit 2G** shows the local general aviation forecasts and the selected forecast.

TABLE 2BB | Local General Aviation Operations Forecast Summary

Method	2027	2032	2042	CAGR
Constant Market Share of National Local GA Operations	153,724	156,402	162,029	0.83%
Increasing Market Share of National Local GA Operations	153,994	157,476	164,798	0.92%
22-Year Trend Line Analysis	146,041	159,150	185,368	1.51%
Constant Market Share of Local GA Operations Per Based Aircraft - Selected	***142,949***	***149,045***	***161,826***	***0.83%***

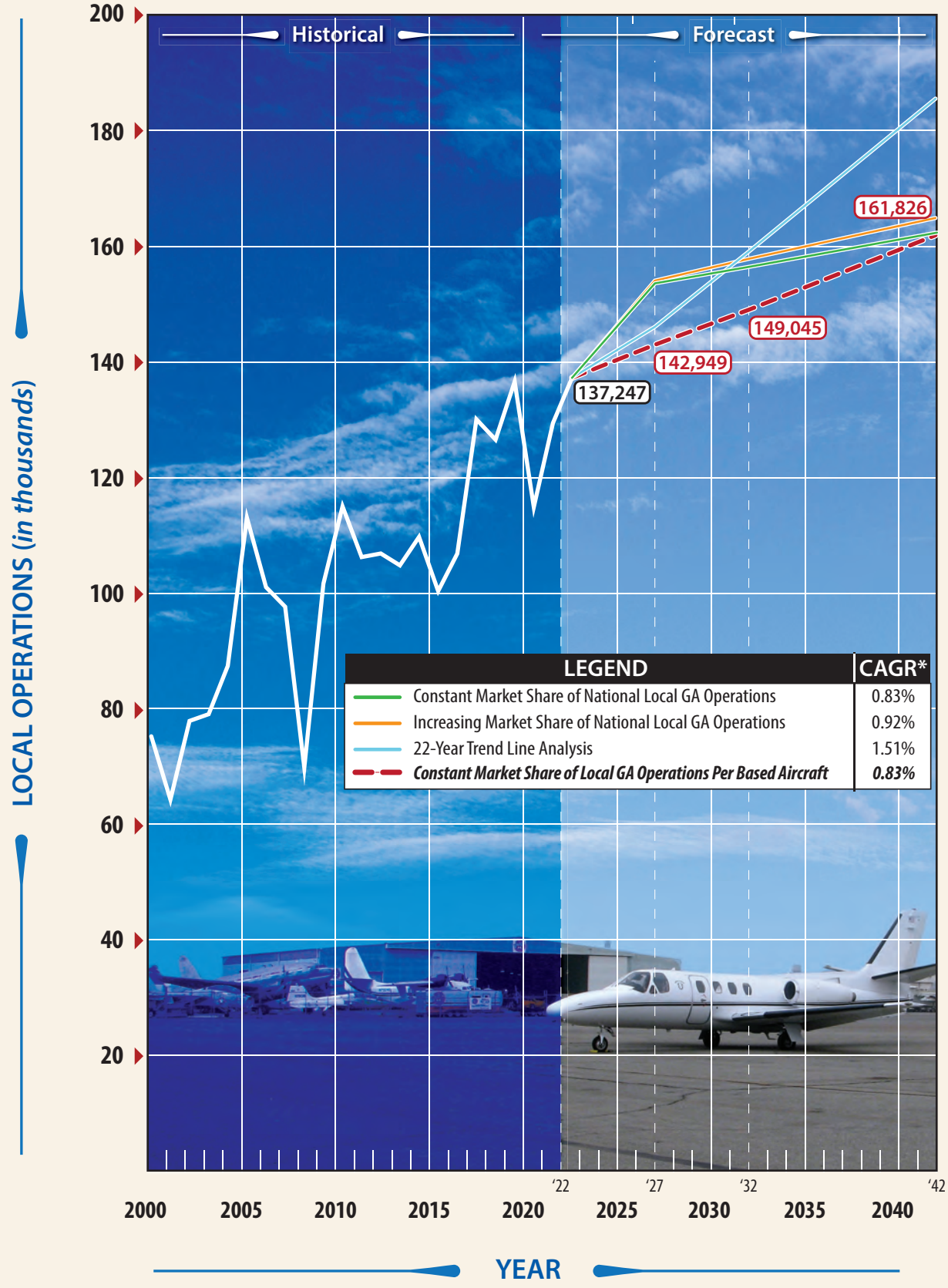
CAGR = Compound annual growth rate

Air Taxi Operations Forecast

As discussed previously, air taxi operations are those that provide "on-demand" or "for-hire" transportation of persons or property via aircraft with fewer than 60 passenger seats. Air taxi includes a broad range of operations, including some smaller commercial service aircraft, some charter aircraft, air cargo aircraft, many fractional ownership aircraft, and air ambulance services.

Nationally, the FAA forecasts show declining air taxi figures through 2027 and a return to slow growth after that. The air taxi category includes commercial aircraft with less than 60 seats, which are rapidly being replaced with larger commuter aircraft (air carrier). Since Chino is not a commercial service airport with commuter service, the air taxi category does not include commuter aircraft. Chino has been experiencing a steady increase in air taxi operations and is capturing a larger market share of national air taxi operations (reference Exhibit 2E – Historical Operations).

Several methods of forecasting air taxi operations have been employed, each of which is summarized in **Table 2CC**. The first air taxi forecast considers the airport continuing to capture an increasing percentage of national air taxi operations. The second forecast applies the 10-year average annual growth rate in air taxi operations to the forecast years. A third forecast was developed using the trend-line regression methodology which resulted in an "r^2" value of 0.68 indicating a moderate level of statistical reliability.



* Compound Annual Growth Rate

TABLE 2CC | Air Taxi Operations Forecast Summary

Method	2027	2032	2042	CAGR
Increasing Market Share of US Air Taxi Operations	601	950	1,406	5.28%
Historical Growth Rate (12-Year)	629	789	1,239	7.30%
Trend Line (12-Year) - Selected	***688***	***801***	***1,026***	***3.64%***
CAGR = Compound annual growth rate				

The trend-line projection is the selected forecast for planning purposes. Trend-line analysis utilizes mathematical formulas that can be easily replicated. The results of the trend-line analysis appear reasonable and are reflective of the recent growth trends. The trend line also provides a more moderate growth trend in the future as compared to the historical growth rate forecast. **Exhibit 2H** shows the air taxi operations forecasts and the selected forecast.

Air Carrier Operations Forecast

Air carrier operations are those conducted by passenger aircraft with more than 60 seats. These types of operations are very infrequent at the airport because most air carriers will utilize a commercial service airport but occasionally a larger charter aircraft will utilize CNO. Since 2000, annual air carrier operations have never exceeded 80 in any year. The TAF for the airport projects 70 annual air carrier operations for each year of the 20-year forecast. This figure will be utilized in this ALP Update.

Military Operations Forecast

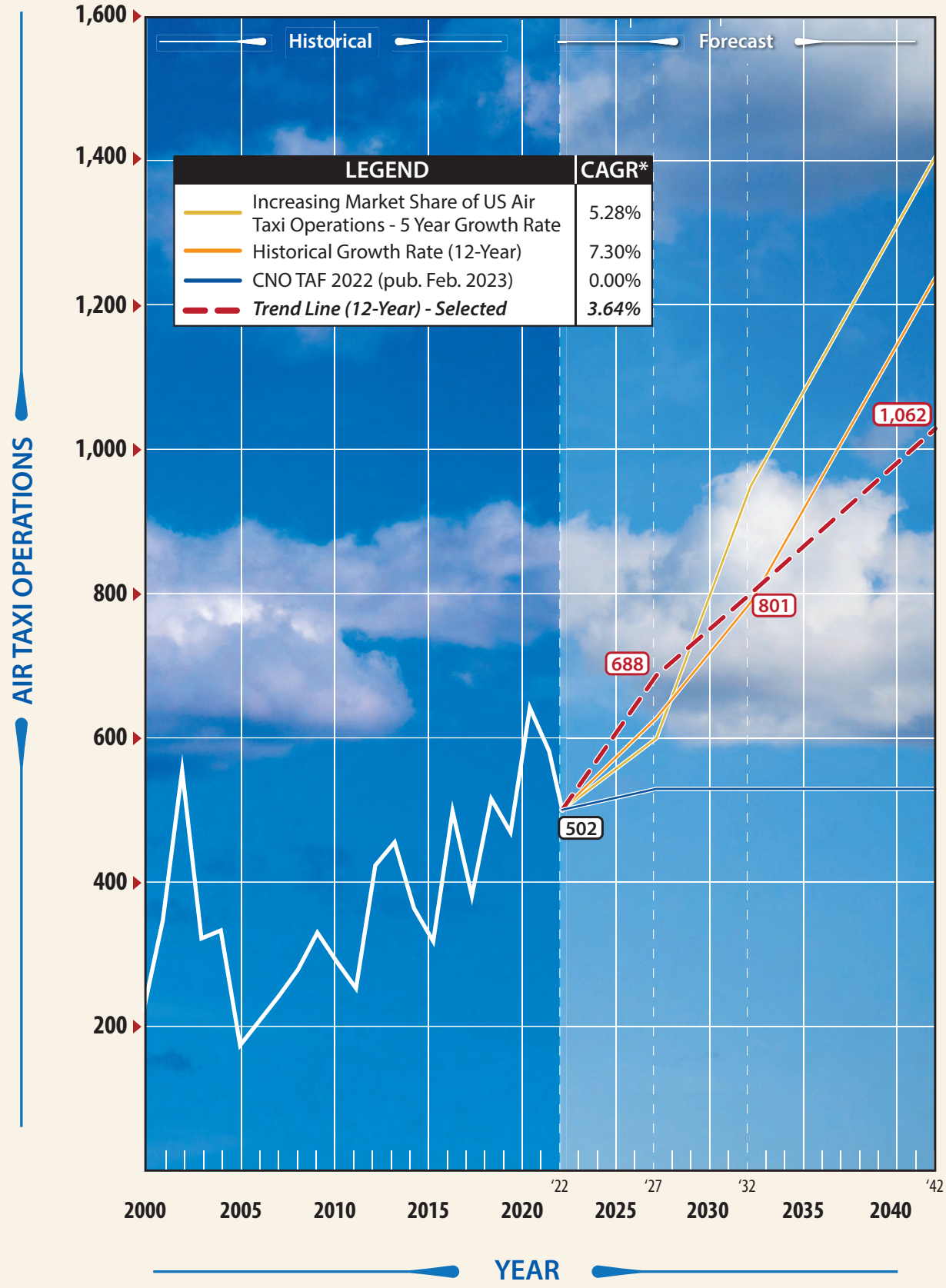
Military aircraft can and do utilize civilian airports across the country. Chino Airport does have activity by military aircraft. Forecasts of military activity are inherently difficult to predict because of the national security nature of their operations and the fact that their missions can change without notice. Thus, it is typical for the FAA to use a flatline forecast for military operations. For Chino Airport, the FAA TAF has used 1,443 annual itinerant and 1,254 local military operations for every year. This estimate is also utilized for this airport forecast.

Total Operations Forecast Summary

The selected total operations forecast to be used for planning purposes is as follows:

- 2022 – 204,582 total operations (actual)
- 2027 – 214,005 total operations
- 2032 – 223,943 total operations
- 2042 – 245,038 total operations

Table 2DD presents the classification of the selected operations forecast. The airport experiences a mix of operation types, including general aviation, air taxi, and military.



* Compound Annual Growth Rate

TABLE 2DD | Total Operations Forecast

Year	LOCAL OPERATIONS			ITINERANT OPERATIONS					Grand Total
	General Aviation	Military	Total	Air Carrier	Air Taxi	General Aviation	Military	Total	
2022	137,247	1,105	138,352	77	502	64,065	1,586	66,230	**204,582**
2027	142,949	1,254	144,203	70	688	67,600	1,443	69,801	**214,005**
2032	149,045	1,254	150,299	70	801	71,330	1,443	73,644	**223,943**
2042	161,826	1,254	163,080	70	1,026	79,419	1,443	81,958	**245,038**
CAGR	0.83%	0.63%	0.83%	-0.48%	3.64%	1.08%	-0.47%	1.07%	**0.91%**

CAGR = Compound Annual Growth Rate

PEAKING CHARACTERISTICS

Many aspects of facility planning relate to levels of peaking activity – times when an airport is busiest. For example, the appropriate size of terminal facilities can be estimated by determining the number of people that could reasonably be expected to use the facility at a given time. The following planning definitions apply to the peak periods:

- **Peak Month** – The calendar month when peak aircraft operations occur.
- **Design Day** – The average day in the peak month.
- **Design Hour** – The peak hour within the design day.

The peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. The peak period forecasts represent reasonable planning standards that can be applied without overbuilding or being too restrictive.

Tower operations data provides an understanding of the peak operational periods for the airport. In 2022, the peak month was August when there were 20,043 operations which was 9.8 percent of annual operations. The design day is the peak month (August) divided by the number of days in the peak month (31). The design hour is an average of the peak day operations for each week of the peak month, which calculated to 11.4 percent of design day operations. **Table 2EE** summarizes the peak operational characteristics for the airport.

TABLE 2EE | Peaking Characteristics

Peaking Parameter	Factor	2022	2027	2032	2042
Annual Operations	**100% of Tower Count**	**204,582**	**214,005**	**223,943**	**245,038**
Peak Month[1]	9.8% of Annual Operations	20,043	20,972	21,946	24,014
Design Day	Peak Month Divided by 31	647	677	708	775
Design Hour[2]	11.4% of Design Day	74	77	81	88

Source: [1]FAA OPSNET Database of CNO Tower Operations
[2]CNO Tower hourly operations for the peak month of August 2022.

OPERATIONS BY FLEET MIX

Developing an understanding of the operational fleet mix, including the approximate volume of operations by aircraft type, is an important input in determining future facility needs. The FAA Traffic Flow Management System Count (TFMSC) database captures operations that file a flight plan. Nearly all operators of turboprops and jets will file a flight plan, while most smaller aircraft and helicopters will not. The FAA considers the data to be 95 percent accurate in capturing Instrument Flight Rules (IFR) flight plans. Since most turboprop and jet operators file flight plans, the data is considered very reliable for operational counts in those two categories.

Table 2FF presents the fleet mix operation estimate and forecast for CNO. For the current year, jet and turboprop operations were pulled directly from the TFMSC database. Multi-engine piston operations were calculated based on typical utilization rates of 100 operations per based aircraft. Helicopter operations were estimated at approximately 22 percent of total operations based on interviews with the tower manager. The remaining operations by single engine piston aircraft are then divided between local and itinerant. Growth factors have been applied to jet and turboprop operations as these aircraft tend to have high utilization rates. For jets, the current utilization rate is approximately 50 operations per based jet which is projected to increase incrementally to 120 operations per based jet. Turboprops are projected to increase incrementally from a current utilization rate of approximately 30 operations per based turboprop to 60 operations per based turboprop in the long term.

TABLE 2FF | Fleet Mix Operations Forecast

	2022	%	2027	%	2032	%	2042	%
LOCAL OPERATIONS								
Piston	109,547	79.2%	114,103	79.1%	118,799	79.0%	128,580	78.8%
Helicopter	28,805	20.8%	30,100	20.9%	31,500	21.0%	34,500	21.2%
Total Local	***138,352***	***100.0%***	***144,203***	***100.0%***	***150,299***	***100.0%***	***163,080***	***100.0%***
ITINERANT OPERATIONS								
Single Piston	37,116	56.0%	36,901	52.9%	36,744	49.9%	36,558	44.6%
Multi-Piston	8,600	13.0%	8,600	12.3%	8,600	11.7%	8,600	10.5%
Turboprop	1,034	1.6%	1,800	2.6%	2,500	3.4%	4,200	5.1%
Jet	3,280	5.0%	5,600	8.0%	8,100	11.0%	13,200	16.1%
Helicopters	16,200	24.5%	16,900	24.2%	17,700	24.0%	19,400	23.7%
Total Itinerant	***66,230***	***100.0%***	***69,801***	***100.0%***	***73,644***	***100.0%***	***81,958***	***100.0%***
Total Operations	**204,582**		**214,005**		**223,943**		**245,038**	

Source: Coffman Associates analysis

ANNUAL INSTRUMENT APPROACHES (AIA)

An AIA is an approach to an airport with the intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan when visibility is less than three miles and or when the ceiling is at or below the minimum initial approach altitude. AIA data provides guidance in determining an airport's need for navigational aids. Most AIAs are conducted utilizing more sophisticated turbine aircraft and most are itinerant operations, as local training operations rarely occur during non-visual conditions.

The FAAs Traffic Flow Management System Count (TFMSC) database captures filed flight plans. However, the TFMSC does not provide an indication if the operation occurred in IFR conditions, thus qualifying as an AIA. The TFMSC indicated that there were 6,704 instrument operations in 2022 which represented 10.1 percent of itinerant operations. This ratio was carried forward to the plan years as shown in **Table 2GG**.

Not all instrument operations occur in IFR condition. General aviation airports can typically see up to 10 percent of itinerant operations occur in IFR conditions. Therefore, the estimate of actual AIA operations is 10 percent of forecast itinerant operations as outlined in **Table 2GG**.

TABLE 2GG | Estimate of Annual Instrument Approaches (AIAs)

	2022	2027	2032	2042
Itinerant Operations	66,230	69,801	73,644	81,958
Total TFMSC Flight Plans – IFR Operations	6,704	7,065	7,454	8,296
AIA (10%)	**670**	**707**	**745**	**830**
IFR – Instrument Flight Rules				

Source: Coffman Associates analysis

FORECAST SUMMARY

This study has outlined the various activity levels that might reasonably be anticipated over the planning period. **Exhibit 2J** presents a summary of the aviation forecasts prepared in this study. The base year for these forecasts is 2022, with a 20-year planning horizon to 2042. The primary aviation demand indicators are based aircraft and operations.

Several forecasts for each aviation demand indicator were developed to create a range of reasonable forecasts. A single forecast was then selected from those developed. Based aircraft are forecast to increase from 698 in 2022 to 823 by 2042, for an annual growth rate of 0.83 percent. Total operations are forecast to increase from 204,582 in 2022 to 245,038 by 2042, which is an annual growth rate of 0.91 percent.

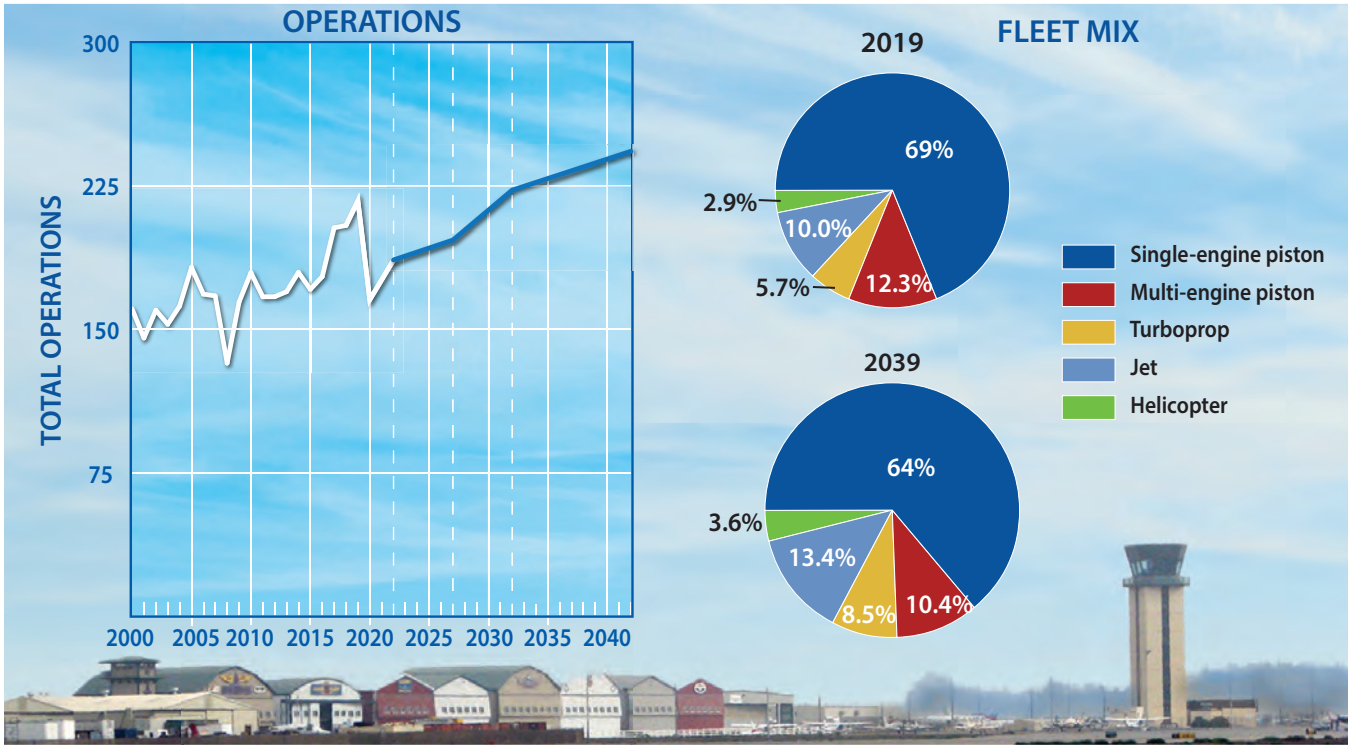
Projections of aviation demand will be influenced by unforeseen factors and events in the future. Therefore, it is not reasonable to assume that future demand will follow the exact projection line, but over time, forecasts of aviation demand tend to fall within the planning envelope. The forecasts developed for this airport planning effort are considered reasonable for planning purposes. The need for additional facilities will be based upon these forecasts; however, if demand does not materialize as projected, then implementation of facility construction can be slowed. Likewise, if demand exceeds these forecasts, then implementation of facility construction can be accelerated.

FORECAST COMPARISON TO THE TAF

The FAA reviews the aviation demand forecasts developed in aviation planning studies and compares them to the *Terminal Area Forecast* (TAF). The forecasts are considered consistent with the TAF if they meet the following criteria:

	BASE YEAR 2022	FORECAST 2027	FORECAST 2032	FORECAST 2042	CAGR* 2022-42
ANNUAL OPERATIONS					
Commercial Operations (Itinerant)					
Air Carrier	77	70	70	70	-0.48%
Air Taxi	502	688	801	1,026	3.64%
Total Commercial Operations	579	758	871	1,096	3.24
General Aviation Operations					
Itinerant	64,065	67,600	71,330	79,419	1.08%
Local	137,247	142,949	149,045	161,826	0.83%
Total General Aviation Operations	201,312	210,549	220,375	241,245	0.91%
Military Operations					
Itinerant Military Operations	1,586	1,443	1,443	1,443	-0.47%
Local Military Operations	1,105	1,254	1,254	1,254	0.63%
Total Local Operations	138,352	144,203	150,299	163,080	0.83%
Total Itinerant Operations	66,230	69,801	73,644	81,958	1.07%
TOTAL ANNUAL OPERATIONS	**204,582**	**214,005**	**223,943**	**245,038**	**0.91%**
BASED AIRCRAFT					
Single-engine piston	482	494	507	527	
Multi-engine piston	86	86	86	86	
Turboprop	40	45	50	70	
Jet	70	80	90	110	
Helicopter	20	22	25	30	
TOTAL BASED AIRCRAFT	**698**	**727**	**758**	**823**	**0.83%**
PEAKING CHARACTERISTICS					
Peak Month (9.8%)	20,043	20,972	21,946	24,014	
Design Day (31)	647	677	708	775	
Design Hour (11.4%)	74	77	81	88	

* Compound Annual Growth Rate



- Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period, or
- Forecasts do not affect the timing or scale of an airport project, or
- Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems* (NPIAS) *and Airports Capital Improvement Plan* (ACIP).

If the forecasts exceed these parameters, they may be sent to FAA headquarters in Washington, D.C. for further review. **Table 2HH** presents the direct comparison of the planning forecast with the TAF published in February 2023.

Total operations are within the FAA range for consistency with the TAF. The based aircraft forecasts are not within the FAA parameters because the TAF shows 522 based aircraft for 2022 while the official FAA source (www.basedaircraft.com) shows there are 698 validated based aircraft. The FAA should update the TAF to reflect the actual number of based aircraft.

TABLE 2HH | Forecast Comparison to the Terminal Area Forecast

	BASE YEAR	FORECAST			CAGR
	2022	2027	2032	2042	2022-2042
TOTAL OPERATIONS					
ALP Update Forecast	204,582	214,005	223,943	245,038	0.91%
2022 FAA TAF	201,378	217,944	222,118	230,753	0.68%
% Difference	1.58%	-1.82%	0.82%	6.00%	
BASED AIRCRAFT					
ALP Update Forecast	698	727	758	823	0.83%
2022 FAA TAF	522	557	592	682	1.35%
% Difference	28.85%	26.48%	24.59%	18.74%	

CAGR: Average annual growth rate
TAF: Terminal Area Forecast (published March 2022)

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed in landing configuration) and design characteristics (wingspan and landing gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements, such as runways, taxiways, taxilanes, and aprons.

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, an airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft type or a composite aircraft representing a collection of aircraft

with similar characteristics. The design aircraft is classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2K.**

Aircraft Approach Category (AAC): A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} if not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristics). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

Airplane Design Group (ADG): The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft which relates to aircraft wingspan or tail height (physical characteristics). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG): A classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. The TDG relates to the undercarriage dimensions of the design aircraft. The TDG is classified by an alphanumeric system: 1A, 1B, 2A, 2B, 3, 4, 5, and 6. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements, such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

Exhibit 2L summarizes the classification of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft will fall in AAC “A” and “B”, and ADG “I” and “II”. Business jets typically fall in ACC “B” and “C”, while the larger commercial aircraft will fall in AAC “C” and “D”.

AIRPORT AND RUNWAY CLASSIFICATIONS

Airport and runway classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

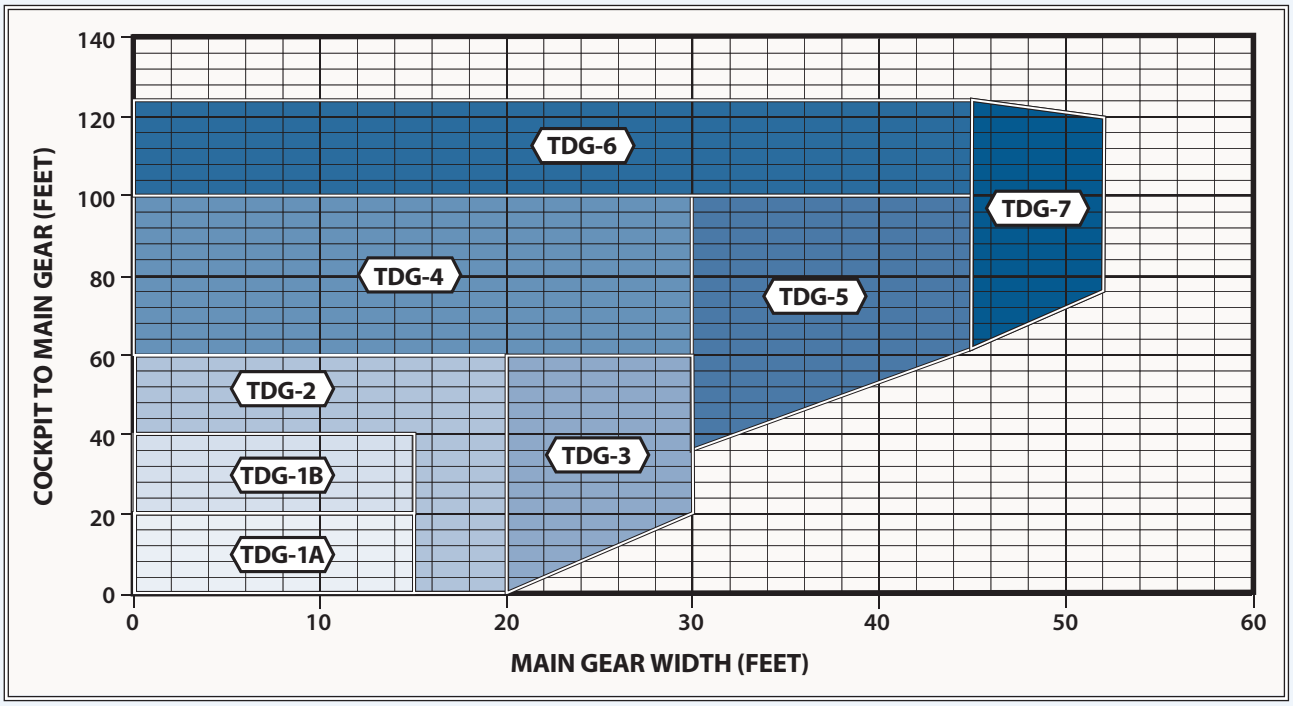
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20-<30	49-<79
III	30-<45	70-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

VISIBILITY MINIMUMS	
RVR* (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13A, Airport Design

A-I

Aircraft	TDG
• Beech Baron 55	1A
• **Beech Bonanza**	**1A**
• Cessna 150, 172	1A
• Eclipse 500	1A
• Piper Archer, Seneca	1A

B-I

Aircraft	TDG
• **Beech Baron 58**	**1A**
• Beech King Air 90	1A
• Cessna 421	1A
• Cessna Citation CJ1 (525)	1A
• Cessna Citation 1(500)	2
• Piper Cheyenne III	2

A/B-II *12,500 lbs. or less*

Aircraft	TDG
• Cessna Caravan 208 (A-II)	1A
• Pilates PC-12 (A-II)	1A
• Cessna 441 Conquest	1A
• **Beech Super King Air 200**	**2**
• Cessna Citation CJ2 (525A)	2

B-II *over 12,500 lbs.*

Aircraft	TDG
• Falcon 10, 20, 50	1B
• Hawker 800, 800XP, 850XP, 4000	1B
• **Cessna Citation CJ4 (525C)**	**1B**
• Beech Super King Air 350	2
• Beech 1900	2
• Falcon 900, 2000	2
• Cessna Citation CJ3(525B), Bravo (550), V (560)	2

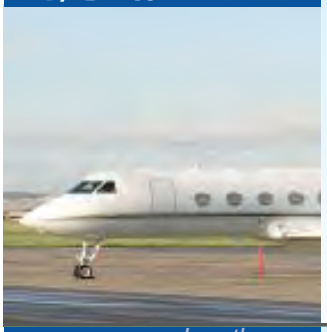
A/B-III

Aircraft	TDG
• Bombardier Dash 7 (A-III)	3
• Bombardier Dash 8	3
• **Bombardier Global 5000**, 6000, 7000, 8000	**2**
• Falcon 6X, 7X, 8X	2
• ATR 72	2

C/D-I

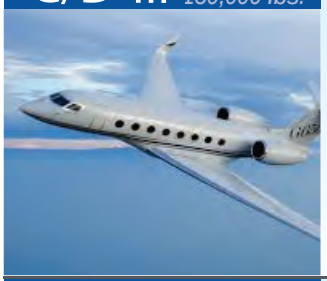
Aircraft	TDG
• **Lear** 25, 31, 45, 55, **60**	**1B**
• Israeli Westwind	1B
• Learjet 35, 36 (D-I)	1B
• Piaggio Avanti II	2

C/D-II



Aircraft	TDG
• Cessna Citation VII, X+	1B
• Lear 70, 75	1B
• Gulfstream II	1B
• CRJ-200	1B
• Gulfstream III	2
• ERJ-135, 140, 145	2
• CRJ-700	2
• **Gulfstream IV**, 350, 450 (D-II)	2

C/D-III *less than 150,000 lbs.*



Aircraft	TDG
• Gulfstream V	2
• CRJ-900, 1000	2
• Boeing 737-700, BBJ	3
• ERJ-170, 175, 190, 195	3
• **Gulfstream** G500, 550, 600, **650 (D-III)**	**2**
• MD-81, 82, 87 (D-III)	4

C/D-III *over 150,000 lbs.*

Aircraft	TDG
• Airbus A319-100, 200	3
• **Boeing 737 -800**, 900, BBJ2 (D-III)	**3**
• MD-83, 88 (D-III)	4

C/D-IV

Aircraft	TDG
• Airbus A300-100, 200, 600	5
• Boeing 757-200	4
• **Boeing 767**-300, **400**	**5**
• MD-11	6

D-V

Aircraft	TDG
• Airbus A330-200, 300	5
• **Boeing 787-8**, 9	**5**
• Airbus A340-500, 600	6
• Boeing 747-100 - 400	5
• Boeing 777-300	6

Note: Aircraft pictured is identified in bold type.

Runway Design Code (RDC): A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the available instrument approach visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component reads "VIS" for runways designed for visual approach use only.

Approach Reference Code (APRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway regarding landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under meteorological conditions where no special operating procedures are necessary, as opposed to the RDC, which is based upon planned development with no operational component. The APRC for a runway is established based upon the minimum runway-to-taxiway centerline separation.

Departure Reference Code (DPRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway regarding takeoff operations. The DPRC represents those aircraft that can takeoff from a runway while any aircraft are present on adjacent taxiways, under meteorological conditions with no special operating conditions. The DPRC is like the APRC, but is composed of two components, AAC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

***Airport Reference Code (ARC)*:** An airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. The current ARC is D-III.

CRITICAL AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft or a composite aircraft representing a collection of aircraft classified by three parameters: AAC, ADG, and TDG.

The first consideration is the safe operation of aircraft likely to use an airport. Any operation of an aircraft that exceeds the design criteria of an airport may result in a lesser safety margin; however, it is not the usual practice to base the airport design on an aircraft that uses the airport infrequently.

The critical aircraft is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, excluding touch-and-go operations. Planning for future aircraft use is of importance since the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short-term development does not preclude the reasonable long-range potential needs of the airport.

According to FAA AC 150/5300-13B, *Airport Design*, "Airport designs based only on existing aircraft can severely limit the ability to expand the airport to meet future requirements for larger, more demanding aircraft. Airport designs that are based on large aircraft never likely to be served by the airport are not economical." Selection of the current and future critical aircraft must be realistic in nature and supported by current data and realistic projections.

AIRPORT CRITICAL AIRCRAFT

There are three elements for classifying the airport critical aircraft. The three elements are the AAC, ADG, and the TDG. The AAC and ADG are examined first followed by the TDG.

The FAA's Traffic Flow Management System Count (TFMSC) database captures an operation when a pilot files a flight plan and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to factors such as incomplete flight plans, limited radar coverage, and VFR operations, TFMSC data does not account for all aircraft activity at an airport by a given aircraft type. However, the TFMSC does provide an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate. **Exhibit 2M** shows the TFMSC data for turboprops and business jets for the last 10 years at CNO.

As can be seen from the exhibit, AAC "C" operations have exceeded the 500 operations threshold every year for the last five years. There is also a significant level of operations by AAC "D" aircraft. In fact, in 2021, there were 744 operations by AAC "D" aircraft, however in 2022, there were 490. Activity by aircraft in ADG "II" has exceeded the 500 operations threshold for each of the last ten years. Activity by ADG "III" has averaged 238 over the last five years.

The TDG is the third component of the airport critical aircraft determination. The TDG is based on MGW and CMG. Medium and large business jets, as well as turboprops, tend to have the widest wheel widths. Based on analysis of the TFMSC data, TDG 2A is the current category that exceeds the 500 operations threshold. Over the last five years, combined operations in TDG "2B, 3, and 4" have averaged 279 annually.

Current Critical Aircraft

The current aircraft approach category is "C", as this is the group that exceeds 500 annual operations. The current airplane design group is "II." The current taxiway design group is "2A." **Therefore, the current airport critical aircraft is classified as C-II-2A**. This category is best represented by a medium-sized business jet such as the Gulfstream III/G300.

The current critical aircraft is C-II-2A. The future critical aircraft is D-III-2B.

Future Critical Aircraft

Activity by business jets is significant at CNO and is projected to continue to increase. Over the last five years, the airport has averaged 506 annual operations in ACC "D", however in only one of those years, were there more than 500 (744 in 2021). Considering this trend, it is likely that the airport will transition to ACC "D" in the near future.

There is increasing activity at the airport by larger business jets with wider wingspans. Over the last five years the airport has averaged 243 operations by ADG "III" and larger aircraft, with 2022 representing the high-level mark with 274. It is anticipated that operations by ADG "III" aircraft will exceed the 500 operations in the near term because activity by large business jets is increasing at CNO.

There are very few TDG 3 aircraft in the general aviation fleet. Over the last five years the airport has averaged 152 operations by aircraft in TDG 3 and larger. However, a transition to TDG 2B is considered reasonable. The Gulfstream 500, 550, 600, 650, and larger are all TDG 2B aircraft. If one or more large Gulfstream aircraft were to base at the airport, then the transition to TDG 2A would occur. **Therefore, the future airport critical aircraft is planned to be D-III-2B**. A representative aircraft would be the Gulfstream 550.

RUNWAY DESIGN CODE

The RDC dictates the specific FAA design standards that should be met in relation to a runway. The RDC takes into consideration the AAC, ADG, and the RVR. In most cases, the critical aircraft will also be the RDC for the primary runway.

Runway 8R-26L is 7,000 feet long, 150 feet wide, and there are no instrument approach procedures to this runway. Based on current activity, the current RDC is **C-II-VIS**. An instrument approach with not lower than 1-mile visibility minimums is considered for this runway. **Therefore, the ultimate RDC for Runway 8R-26L is D-III-5000**.

Runway 3-21 is 4,919 feet long and 150 feet wide, and there are no instrument approaches. This runway primarily serves as a secondary runway typically employed when winds favor its use. This runway is currently designed to C-II design standards which is planned to be maintained. Therefore, the current and ultimate RDC is **C-II-VIS**.

Runway 8L-26R is 4,858 feet long and 150 feet wide and has a precision instrument landing system (ILS) approach with visibility minimums as low as ¾-mile (Runway 26R). Because of the presence of the ILS, this runway is designed to accommodate the critical aircraft. Therefore, the appropriate current **RDC is C-II-4000**. Since the critical aircraft may transition to an aircraft with a wider wingspan, the ultimate RDC for this runway is **D-III-4000**.

ARC	Aircraft	TDG	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A-I	B36T - Allison 36 Turbine Bonanza	1A	0	6	8	16	20	20	2	0	2	10
	B60T - Beechcraft 60 Royal Turbine Duke	tbd	0	0	0	0	0	0	0	0	0	2
	C10T - Cessna P210 (Turbo)	tbd	0	0	24	22	4	4	2	0	2	2
	EA50 - Eclipse 500	1A	132	96	148	114	96	90	104	92	108	102
	EPIC - Dynasty	tbd	0	4	0	0	8	0	0	0	16	4
	EVOT - Lancair Evolution Turbine	ND	0	0	20	14	14	8	2	4	4	0
	KODI - Quest Kodiak	1A	0	0	0	0	0	0	0	0	0	6
	LNP4 - Lancair Propjet four-seat	tbd	0	0	0	10	4	0	0	0	0	0
	P46T - Piper Malibu Meridian	1A	64	66	72	42	40	60	72	78	72	98
	P750 - PAL P-750 XSTOL	tbd	0	0	0	0	0	0	0	0	4	0
	PC7 - Pilatus PC-7	tbd	0	2	2	0	0	0	2	2	2	0
	SF50 - Cirrus Vision SF50	1A	0	0	0	0	0	0	16	24	26	18
	TBM7 - Socata TBM-7	tbd	64	70	92	130	102	122	102	50	64	64
	TBM8 - Socata TBM-850	tbd	60	78	78	68	54	50	32	6	22	20
	TBM9 - Socata TBM	tbd	0	0	0	0	10	2	18	12	14	8
	Total		320	322	444	416	352	356	352	268	336	334
A-II	C12 - CS2 C212 CASA/IPTN 212 Aviocar	tbd	2	0	0	0	0	2	0	0	0	0
	C208 - Cessna 208 Caravan	1A	22	10	4	14	14	10	6	8	10	4
	DH6 - De Havilland Canada DHC-6 Twin Otter	1A	2	0	0	0	0	0	0	0	0	0
	DHC6 - DeHavilland Twin Otter	1A	0	2	0	0	0	0	0	0	0	0
	PC12 - Pilatus PC-12	1A	82	128	162	108	72	194	158	92	374	186
	Total		108	140	166	122	86	206	164	100	384	190
A-III	DHC7 - De Havilland DHC-7	3	2	0	0	0	0	0	0	0	0	0
	Total		2	0	0	0	0	0	0	0	0	0
B-I	AC80 - Aero Commander Turbo 680	2A	2	4	0	4	0	0	0	0	0	0
	BE10 - Beech King Air 100 A/B	tbd	0	0	2	0	2	14	52	72	56	42
	BE40 - Raytheon/Beech Beechjet 400/T-1	1A	118	80	100	114	44	56	62	46	42	20
	BE9 - Beechcraft C99 Airliner; Beech Aircraft	1A	0	2	0	0	0	0	0	0	0	0
	BE90 - Beech King Air 90	1A	8	8	0	0	0	0	0	0	0	0
	BE9L - Beech King Air 90	1A	74	54	68	34	50	28	38	22	36	50
	C25M - Cessna Citation M2	1A	0	0	0	0	2	2	22	24	34	20
	C425 - Cessna 425 Corsair	1A	174	140	196	144	138	98	68	44	46	38
	C500 - Cessna 500/Citation I	2A	16	8	2	2	10	2	2	0	4	6
	C501 - Cessna I/SP	2A	42	48	44	40	30	28	28	18	48	48
	C510 - Cessna Citation Mustang	1A	186	192	180	174	218	112	96	64	102	84
	C525 - Cessna CitationJet/CJ1	1A	56	84	62	88	96	190	228	174	212	340
	E50P - Embraer Phenom 100	1B	32	28	14	18	16	28	12	6	10	16
	F1 - Farnborough F1	ND	0	0	2	0	0	0	0	0	0	0
	FA10 - Dassault Falcon/Mystère 10	1B	12	14	14	50	4	8	2	2	6	0
	H25C - BAe/Raytheon HS 125-1000/Hawker 1000	1B	16	0	0	0	0	0	0	2	4	0
	HDJT - HONDA HA-420 HondaJet	tbd	0	0	0	12	64	106	84	92	100	102
	L29 - Aero L-29 Delfin	1B	2	0	0	0	0	0	0	0	0	0
	L39 - Aero L-139 Albatross	1B	2	0	2	0	0	0	0	0	2	0
	MU2 - Mitsubishi Marquise/Solitaire	1A	10	10	8	0	4	2	2	26	20	4
	MU30 - Mitsubishi MU300/ Diamond I	1A	0	6	4	0	2	0	2	4	8	0
	P180 - Piaggio P-180 Avanti	2A	4	0	4	24	16	16	34	38	36	72
	PAY1 - Piper Cheyenne 1	2A	2	2	4	2	2	6	4	0	12	4
	PAY2 - Piper Cheyenne 2	2A	20	32	22	28	30	28	16	4	18	2
	PAY3 - Piper PA-42-720 Cheyenne 3	2A	0	2	0	0	4	0	0	2	4	4
	PAY4 - Piper Cheyenne 400	2A	8	2	4	0	0	0	2	0	0	0
	PAYE - Cheyenne	2A	2	0	0	0	0	0	0	0	0	0
	PRM1 - Raytheon Premier 1/390 Premier 1	1A	10	22	8	16	10	26	40	10	28	40

ARC	Aircraft	TDG	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
B-I Cont.	SBR1 - North American Rockwell Sabre 40/60	tbd	14	8	8	0	0	0	2	0	0	0
	T33 - Canadair CL-30 Silver Star	tbd	4	0	2	2	2	4	0	0	0	0
	TEX2 - Raytheon Texan 2	1A	0	0	0	0	0	0	0	2	0	0
	Total		814	746	750	752	744	754	796	652	828	892
B-II	AC69 - Jet Prop /Gulfstream	2A	4	0	2	0	0	0	0	0	0	0
	AC90 - Gulfstream Commander	2A	54	48	102	90	68	56	32	56	38	28
	B190 - Beech 1900/C-12J	2A	8	2	2	2	0	2	4	0	136	2
	B350 - Beech Super King Air 350	2A	170	204	288	274	394	376	312	186	334	366
	B39L - Raytheon 300 Super King Air	2A	0	0	0	0	2	0	0	0	0	0
	BE20 - Beech 200 Super King	2A	212	250	262	298	284	276	352	254	372	416
	BE30 - Raytheon 300 Super King Air	2A	36	40	68	60	44	34	20	56	126	206
	BE9T - Beech F90 King Air	1A	16	10	16	12	12	4	2	36	46	6
	C25A - Cessna Citation CJ2	2A	82	76	260	266	168	138	196	94	172	134
	C25B - Cessna Citation CJ3	2A	258	226	266	182	372	412	520	422	556	238
	C25C - Cessna Citation CJ4	1B	58	74	80	70	58	98	100	92	66	60
	C441 - Cessna Conquest	1A	232	178	176	152	148	168	68	24	20	20
	C550 - Cessna Citation II/Bravo	2A	152	150	162	176	128	106	108	66	70	54
	C551 - Cessna Citation II/SP	2A	0	0	0	0	0	0	2	4	2	8
	C55B - Cessna Citation Bravo	2A	0	0	0	0	0	0	6	10	12	22
	C560 - Cessna Citation V/Ultra/Encore	2A	108	178	192	170	170	116	112	112	148	142
	C56X - Cessna Excel/XLS	1B	158	194	270	246	350	358	274	226	388	398
	C680 - Cessna Citation Sovereign	1B	86	112	128	108	94	110	112	112	162	92
	C68A - Cessna Citation Latitude	1B	0	0	0	0	42	72	168	242	322	344
	C700 - Cessna Citation Longitude	1B	0	0	0	0	0	0	0	4	66	174
	C750 - Cessna Citation X	1B	484	544	492	308	238	272	280	248	292	312
	CITA - 525A Citation CJ2	2A	2	0	0	0	0	0	0	0	0	0
	CL30 - Bombardier (Canadair) Challenger 300	1B	92	72	110	150	184	170	206	126	176	230
	CL35 - Bombardier Challenger 300	1B	0	0	2	96	142	276	296	358	556	628
	D328 - Dornier 328 Series	1B	0	0	0	0	2	0	0	0	0	0
	E120 - Embraer Brasilia EMB 120	3	0	0	0	0	2	2	4	0	0	0
	E55P - Embraer Phenom 300	1B	28	54	134	114	166	286	232	232	478	394
	F2TH - Dassault Falcon 2000	2A	88	68	80	106	198	192	210	132	144	110
	F900 - Dassault Falcon 900	2A	32	18	66	42	50	100	120	96	116	156
	FA20 - Dassault Falcon/Mystère 20	1B	12	4	10	2	2	6	10	4	4	0
	FA50 - Dassault Falcon/Mystère 50	1B	38	22	24	42	92	28	82	138	124	116
	HA4T - Hawker 4000	1B	6	4	0	0	2	4	6	6	4	0
	J328 - Fairchild Dornier 328 Jet	1B	0	0	0	0	2	2	0	0	4	0
	PC24 - Pilatus PC-24	1B	0	0	0	0	0	0	4	34	66	128
	SH33 - Shorts 330	1B	4	0	0	0	0	0	0	0	0	0
	SW3 - Fairchild Swearingen SA-226T/TB Merlin 3	1B	2	0	0	2	0	0	0	2	28	84
	SW4 - Swearingen Merlin 4/4A Metro2	1B	14	2	2	0	2	8	2	2	6	2
	Total		1072	1060	1054	1068	912	1084	982	1178	1570	1376
B-III	C2 - Grumman C-2 Greyhound	tbd	2	0	0	0	0	0	0	0	0	0
	CVLT - Convair CV-540/580/600/640, VC-131H	tbd	0	2	2	0	0	0	0	0	0	0
	E2 - Grumman TE-2 Hawkeye	tbd	0	0	0	0	0	0	0	0	0	2
	F27 - Fokker Friendship F27	3	0	0	2	0	0	0	0	0	0	0
	FA7X - Dassault Falcon F7X	2A	2	0	6	0	0	2	0	4	6	4
	FA8X - Dassault Falcon 8X	tbd	0	0	0	0	0	0	0	0	0	2
	GL5T - Bombardier BD-700 Global 5000	2B	2	0	2	0	0	2	0	0	0	4
	GLEX - Bombardier BD-700 Global Express	2B	0	0	2	0	2	16	4	6	10	28
	LEZ - ATR 42-320	3	0	2	0	0	0	0	0	0	0	0
	Total		6	4	14	0	2	20	4	10	16	40

ARC	Aircraft	TDG	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
C-I	A4 - Skyhawk	tbd	0	4	0	0	0	0	0	0	0	0
	F86 - North American F-86 Sabre	tbd	4	2	4	0	0	0	0	0	2	0
	H25A - BAe HS 125-1/2/3/400/600	tbd	0	0	0	0	0	0	0	2	2	2
	LJ24 - Bombardier Learjet 24	1B	2	2	0	0	0	0	0	0	0	0
	LJ25 - Bombardier Learjet 25	1B	2	4	0	0	0	0	0	0	0	0
	LJ31 - Bombardier Learjet 31/A/B	1B	16	10	2	2	12	8	84	110	156	150
	LJ40 - Learjet 40; Gates Learjet	1B	4	6	2	0	2	0	0	6	0	6
	LJ45 - Bombardier Learjet 45	1B	4	2	4	16	12	22	14	22	22	26
	LJ55 - Bombardier Learjet 55	1B	0	0	2	8	6	6	8	10	6	10
	LJ60 - Bombardier Learjet 60	1B	30	56	60	46	102	120	82	98	94	74
	LR60 - Bombardier Learjet 60	1B	0	0	0	0	2	0	0	0	0	0
	T1 - Fuji T1	tbd	0	0	2	0	0	0	0	0	0	0
	WW24 - IAI 1124 Westwind	1B	10	2	10	34	6	54	70	14	22	12
	Total		72	88	86	106	142	210	258	262	304	280
C-II	ASTR - IAI Astra 1125	1B	12	0	6	10	2	0	48	50	94	48
	C650 - Cessna III/VI/VII	1B	6	40	30	46	28	6	4	12	52	34
	CL30 - Bombardier (Canadair) Challenger 300	1B	34	12	18	12	8	8	10	8	26	20
	CL35 - Bombardier Challenger 300	1B	0	0	0	8	2	2	10	2	6	22
	CL60 - Bombardier Challenger 600/601/604	1B	88	70	92	74	84	102	156	140	156	130
	CRJ2 - Bombardier CRJ-200	1B	0	2	0	0	0	0	2	14	16	6
	E135 - Embraer ERJ 135/140/Legacy	2B	2	4	0	4	0	0	0	0	2	0
	E145 - Embraer ERJ-145	2B	0	0	0	0	0	0	0	0	2	0
	E35L - Embraer 135 LR	2B	0	0	0	2	0	0	0	0	2	4
	E545 - Embraer EMB-545 Legacy 450	1B	0	0	0	4	0	0	2	0	4	4
	E550 - Embraer Legacy 500	1B	0	6	0	0	0	0	4	2	0	0
	G100 - Gulfstream G100	1B	0	0	2	0	0	0	0	0	0	0
	G150 - Gulfstream G150	1B	10	10	4	4	8	6	0	0	6	6
	G280 - Gulfstream G280	1B	0	32	6	0	2	4	0	0	4	2
	GLF3 - Gulfstream III/G300	2A	34	12	10	12	58	128	122	76	68	30
	H25B - BAe HS 125/700-800/Hawker 800	1B	34	24	36	28	20	124	152	184	402	282
	LJ70 - Learjet 70	1B	0	0	0	0	0	2	0	0	0	0
	LJ75 - Learjet 75	1B	0	0	0	2	2	4	2	0	8	2
	STAR - Beech 2000 Starship	tbd	8	14	8	10	0	0	0	0	0	2
	Total		228	226	212	216	214	386	512	488	848	592
C-III	A320 - Airbus A320 All Series	3	0	0	0	0	0	0	0	6	2	6
	A321 - Airbus A321 All Series	3	0	0	0	0	0	0	0	6	0	10
	B721 - Boeing 727-100 (C-22)	3	4	2	34	32	18	10	24	2	0	0
	B722 - Boeing 727-200	4	2	2	10	24	22	34	26	38	18	22
	B727 - Boeing 727	3	0	0	2	4	0	0	0	0	0	0
	B732 - Boeing 737-200/VC96	3	0	0	0	0	0	0	2	2	14	6
	B733 - Boeing 737-300	3	0	0	0	2	0	0	0	12	8	26
	B734 - Boeing 737-400	3	0	0	2	0	0	2	6	10	0	2
	B735 - Boeing 737-500	3	0	0	2	0	0	0	0	0	0	0
	B737 - Boeing 737-700	3	0	2	4	0	0	0	0	0	2	0
	DC91 - Boeing (Douglas) DC 9-10	3	6	24	26	26	6	2	8	32	14	38
	DC93 - Boeing (Douglas) DC 9-30	3	4	8	4	6	8	14	8	8	18	2
	E190 - Embraer 190	3	0	0	0	0	0	0	4	2	0	0
	MD80 - Boeing (Douglas) MD 80 Series	4	0	0	2	0	0	0	0	0	0	0
	MD82 - Boeing (Douglas) MD 82	4	0	0	2	6	0	0	2	6	6	0
	MD87 - Boeing (Douglas) MD 87	4	10	2	0	0	0	0	0	0	8	0
	P3 - Lockheed P-3C Orion	tbd	0	0	2	0	0	0	0	0	0	2
	Total		26	40	90	100	54	62	80	124	90	114
C-IV	C130 - Lockheed 130 Hercules	3	0	4	2	0	0	0	2	0	4	6
	C17 - Boeing Globemaster 3	tbd	0	2	2	10	12	4	10	0	0	0
	C17A - Boeing Globemaster 3	tbd	0	2	2	0	0	0	0	0	0	0
	C30J - C-130J Hercules ; Lockheed	3	0	0	0	0	0	2	0	0	0	0
	Total		0	8	6	10	14	4	12	0	4	6
C-V	A36 - Airbus 360	tbd	0	0	2	0	0	0	0	0	0	0
	Total		0	0	2	0	0	0	0	0	0	0
D-I	C21 - Learjet 35; Gates Learjet	1B	0	2	0	0	0	0	0	0	0	0
	F18 - Boeing FA-18 Hornet	1A	0	0	2	0	0	0	0	0	0	0
	F22 - Boeing Raptor F22	1A	0	0	2	0	0	0	0	0	0	0
	L35 - Learjet 35	1B	0	0	0	2	0	0	0	0	0	0
	LJ35 - Bombardier Learjet 35/36	1B	22	28	22	62	50	30	26	68	82	46
	LR35 - Learjet 35	1B	0	0	2	0	0	0	0	0	0	0
	T38 - Northrop T-38 Talon	1A	0	0	0	0	0	0	2	0	0	0
	Total		22	30	28	64	50	30	28	68	82	46
D-II	G200 - Gulfstream	1B	0	0	0	0	0	0	2	0	2	0
	GALX - IAI 1126 Galaxy/Gulfstream G200	1B	14	4	0	92	8	8	74	96	120	64
	GLF2 - Gulfstream II/G200	1B	72	46	34	10	18	18	6	0	12	4
	GLF4 - Gulfstream IV/G400	2A	114	130	140	154	86	180	206	202	392	262
	Total		200	180	174	256	112	206	288	298	526	330
D-III	G550 - Gulfstream G550	2B	0	0	0	0	0	0	2	0	0	0
	GA5C - G-7 Gulfstream G500	2B	0	0	0	0	0	0	0	0	2	6
	GA6C - G-7 Gulfstream G600	2B	0	0	0	0	0	0	0	0	0	4
	GLF5 - Gulfstream V/G500	2B	168	26	4	14	134	130	128	70	98	74
	GLF6 - Gulfstream	2B	0	0	4	6	12	2	8	2	8	20
	MD83 - Boeing (Douglas) MD 83	4	0	6	0	2	6	8	8	22	28	4
	MD88 - Boeing (Douglas) MD 88	4	0	0	0	0	0	0	0	0	0	6
	Total		168	32	8	22	152	140	146	94	136	114
E-I	AJET - Dassault-Bréguet/Dornier Alpha Jet	tbd	2	0	0	0	0	0	0	0	0	0
	F16 - Lockheed F-16 Fighting Falcon	tbd	0	0	0	2	0	0	2	0	2	0
	Total		2	0	0	2	0	0	2	0	2	0

ARC - Airport Reference Code
ND - No Data
Source: Traffic Flow Management Systems Count (TFMSC) 2013-2022. Data normalized annually.

Airport Reference Code (ARC) Summary

ARC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A-I	320	322	444	416	352	356	352	268	336	334
A-II	108	140	166	122	86	206	164	100	384	190
A-III	2	0	0	0	0	0	0	0	0	0
B-I	814	746	750	752	744	754	796	652	828	892
B-II	1,072	1,060	1,054	1,068	912	1,084	982	1,178	1,570	1,376
B-III	6	4	14	0	2	20	4	10	16	40
C-I	72	88	86	106	142	210	258	262	304	280
C-II	228	226	212	216	214	386	512	488	848	592
C-III	26	40	90	100	54	62	80	124	90	114
C-IV	0	8	6	10	14	4	12	0	4	6
C-V	0	0	2	0	0	0	0	0	0	0
D-I	22	30	28	64	50	30	28	68	82	46
D-II	200	180	174	256	112	206	288	298	526	330
D-III	168	32	8	22	152	140	146	94	136	114
E-I	2	0	0	2	0	0	2	0	2	0
TOTAL	3,040	2,876	3,034	3,134	2,834	3,458	3,624	3,542	5,126	4,314

Aircraft Approach Category (ACC)

AAC	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A	430	462	610	538	438	562	516	368	720	524
B	1,892	1,810	1,818	1,820	1,658	1,858	1,782	1,840	2,414	2,308
C	326	362	396	432	424	662	862	874	1,246	992
D	390	242	210	342	314	376	462	460	744	490
E	2	0	0	2	0	0	2	0	2	0
TOTAL	3,040	2,876	3,034	3,134	2,834	3,458	3,624	3,542	5,126	4,314

Airplane Design Group (ADG)

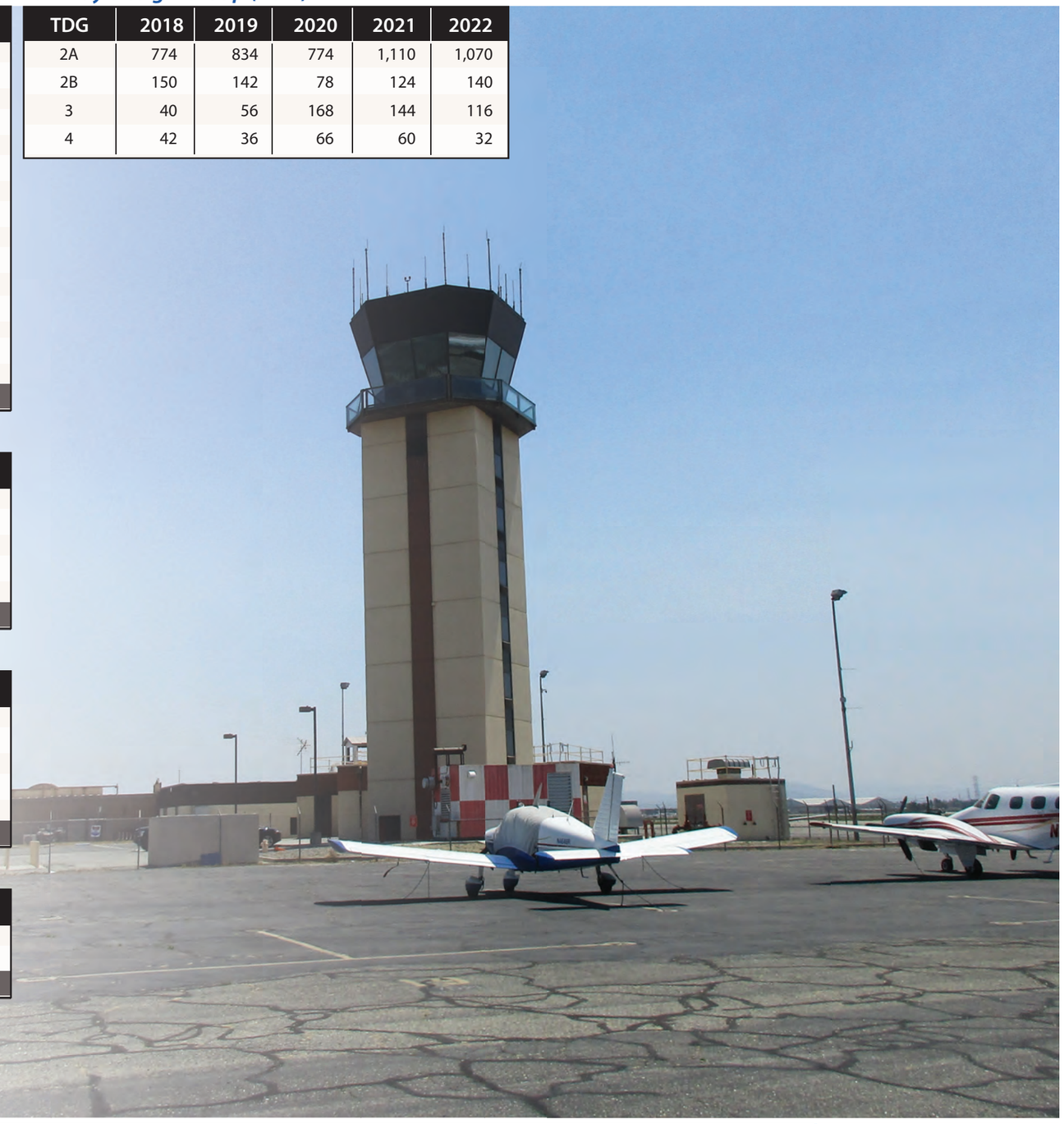
ADG	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
I	1,230	1,186	1,308	1,340	1,288	1,350	1,436	1,250	1,552	1,552
II	1,608	1,606	1,606	1,662	1,324	1,882	1,946	2,064	3,328	2,488
III	202	76	112	122	208	222	230	228	242	268
IV	0	8	6	10	14	4	12	0	4	6
V	0	0	2	0	0	0	0	0	0	0
TOTAL	3,040	2,876	3,034	3,134	2,834	3,458	3,624	3,542	5,126	4,314

Jets and Turboprops

Engine	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jets	2,080	1,966	1,976	2,250	2,010	2,396	2,680	2,668	3,742	3,280
TP	960	910	1,058	884	824	1,062	944	874	1,384	1,034
TOTAL	3,040	2,876	3,034	3,134	2,834	3,458	3,624	3,542	5,126	4,314

Taxiway Design Group (TDG)

TDG	2018	2019	2020	2021	2022
2A	774	834	774	1,110	1,070
2B	150	142	78	124	140
3	40	56	168	144	116
4	42	36	66	60	32



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APPROACH AND DEPARTURE REFERENCE CODES

The approach and departure reference codes (APRC and DPRC) describe the current operational capabilities of each runway and the adjacent parallel taxiways, where no special operating procedures are necessary. Essentially, the APRC and DPRC describe the current conditions at an airport in runway classification terms when considering the parallel taxiway. All three runways have parallel taxiways at 400 feet of separation. The runway/taxiway system meets the standards associated with the current and future APRC and DPRC.

CRITICAL AIRCRAFT SUMMARY

Table 2JJ summarizes the airport and runway classification for CNO. The critical aircraft is defined by those aircraft in C-II-2A, and the future critical aircraft is D-III-2B. The current RDC for Runway 8R-26L is C-II-VIS, and it is planned for 1-mile visibility minimums in the future. The current and future RDC for Runway 3-21 is C-II-VIS. The current RDC for parallel Runway 8L-26R is C-II-4000, and the future RDC is D-III-4000.

TABLE 2JJ | Airport and Runway Classifications

	CURRENT	ULTIMATE
Airport Reference Code (ARC)	C-II	D-III
Airport Design Aircraft	C-II-2A	D-III-2B
Example Aircraft	Gulfstream III/G300	Gulfstream 550
Runway Design Code (RDC)		
Runway 8R-26L	C-II-VIS	D-III-5000
Runway 3-21	C-II-VIS	Same
Runway 8L-26R	C-II-4000	D-III-4000
Approach Reference Code (APRC)		
Runway 8R-26L	D-IV-4000/D-V-4000	Same
Runway 3-21	D-IV-VIS/D-V-VIS	Same
Runway 8L-26R	D-IV-VIS/D-V-VIS	Same
Departure Reference Code (DPRC)		
Runway 8R-26L	D-IV/D-V	Same
Runway 3-21	D-IV/D-V	Same
Runway 8L-26R	D-IV/D-V	Same

Source: FAA AC 150/5300-13B, Airport Design

OPERATIONS FORECAST BY AIRCRAFT CLASSIFICATION

Many airport planning elements are a function of the characteristics of the critical aircraft and the frequency of activity by that group of aircraft comprising the critical aircraft. This includes runway length, safety area dimensions, separation standards, and pavement strength. In addition, certain environmental considerations, such as noise impacts, consider operations by aircraft type. **Table 2KK** presents the operations forecast for business jets and turboprops as classified by AAC and ADG.

TABLE 2KK | Jet and Turboprop Operations Forecast by Design Category

	HISTORICAL JET & TURBOPROP OPERATIONS[1]		FORECAST JET & TURBOPROP OPERATIONS			FORECAST MIX PERCENT		
Design Categories	2022	Percent	2027	2032	2042	2027 %	2032 %	2042 %
AAC A	524	12%	962	1,272	1,914	13%	12%	11%
AAC B	2,308	54%	3,774	5,088	7,656	51%	48%	44%
AAC C	992	23%	1,776	2,650	4,350	24%	25%	25%
AAC D	490	11%	888	1,590	3,480	12%	15%	20%
Total	**4,314**	**100%**	**7,400**	**10,600**	**17,400**	**100%**	**100%**	**100%**
ADG I	1,552	36%	2,960	4,240	6,960	33%	36%	40%
ADG II	2,488	58%	3,848	5,512	9,048	61%	57%	52%
ADG III	274	6%	592	848	1,392	6%	7%	8%
Total	**4,314**	**100%**	**7,400**	**10,600**	**17,400**	**100%**	**100%**	**100%**

AAC: Aircraft Approach Category; ADG: Airplane Design Group
[1]*Traffic Flow Management System Count (TFMSC) - FAA activity database.*

As can be seen in the table, operations by turboprops and jets in AAC D and ADG III are anticipated to exceed the 500 operations threshold within the next five years. This reflects the future critical aircraft and RDC determination presented previously.

SUMMARY

This study has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical aircraft for the airport. Based aircraft are forecast to increase from 698 in 2022 to 823 by 2042, for an annual growth rate of 0.83 percent. Total operations are forecast to increase from 204,582 in 2022 to 245,038 by 2042, which is an annual growth rate of 0.91 percent.

The critical aircraft for the airport was determined by examining the FAA TFMSC database of flight plans. The current critical aircraft is described as C-II-2A and is best represented by the Gulfstream III/G300 business jet. The future critical aircraft is described as D-III-2B and is best represented by a Gulfstream 550 business jet.

CHAPTER THREE

FACILITY REQUIREMENTS

SAN BERNARDINO COUNTY

CHAPTER THREE

FACILITY REQUIREMENTS

The objective of this section is to identify, in general terms, the adequacy of the existing airport facilities and outline what facilities may be needed to accommodate future demands. Airport facilities include both airside and landside components. Airside components include the runway system (runways and taxiways), navigational aids, lighting, and markings. Landside components include terminal facilities, storage and maintenance hangars, auto parking, access, and support facilities. There are four primary sources from which to examine and determine facility requirements:

- ***Aviation Demand Forecasts:*** The forecasts of aviation demand developed in the previous chapter serve as data inputs to various models, which have been constructed following Federal Aviation Administration (FAA) guidance, to generate facility needs.
- ***Design Standards Review:*** Various design standards that apply to the airport are reviewed as they can change based on modifications to FAA guidance or activity changes at the airport. Design standards primarily relate to the numerous imaginary safety-related surfaces and separation distances.
- ***Facility Maintenance:*** Airports are required to maintain their pavement surfaces for the useful life of those pavements. The pavements require routine maintenance and occasionally must be rehabilitated or reconstructed. This category includes maintenance of airport structures and landside facilities.
- ***Support Facilities:*** This category includes all airport-related facilities that do not naturally fall into the airside or landside categories, including elements such as fuel facilities, access and circulation, and general on-airport land use.

Recognizing that many facility needs are based upon demand (rather than a point in time), the requirements are expressed in short term (years 1-5), intermediate term (years 6-10), and long term (years 11-20). This chapter will examine several components of the airport and their respective capacities to determine future facility needs over the planning period. The identified facility needs will then be examined in the alternatives evaluation.

The facility requirements are evaluated using guidance contained in Federal Aviation Administration (FAA) publications, including:

- Advisory Circular (AC) 150/5300-13B (as amended), *Airport Design*
- AC 150/5060-5, *Airport Capacity and Delay*
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- 14 Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*
- FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems* (NPIAS) *and the Airports Capital Improvement Plan (ACIP)*

AIRFIELD CAPACITY

An airport's airfield capacity is expressed in terms of its Annual Service Volume (ASV), which is an estimate of the maximum number of operations that can be accommodated in a year without excessive delay. The airport's ASV was examined utilizing FAA AC 150/5060-5, *Airport Capacity and Delay*.

FACTORS AFFECTING ANNUAL SERVICE VOLUME (ASV)

Many factors are included in the calculation of an airport's ASV. These include airfield characteristics, meteorological conditions, aircraft mix, and demand characteristics (aircraft operations). These factors are shown on **Exhibit 3A** and described in the following paragraphs.

Airfield Characteristics

The layout of the runways and taxiways directly affects an airfield's capacity. This not only includes the location and orientation of the runways, but the percentage of time that a runway, or combination of runways, is in use. Additional airfield characteristics include the length, width, load bearing strength, and instrument approach capability of each runway at the airport, all of which determine the type of aircraft that may operate on the runway and if operations can occur during poor weather conditions.

- **Runway Configuration |** The existing runway configuration at Chino Airport (CNO) consists of primary Runway 8R-26L, parallel Runway 8L-26R, and intersecting Runway 3-21. Precision and non-precision instrument approaches are available to Runway 26R. Runway 8R-26L is 7,000 feet in length, and parallel Runway 8L-26R is 4,858 feet long. The parallel runways are separated by 800 feet centerline to centerline. Runway 3-21 intersects both parallel runways and is 4,919 feet long.

- **Runway Use |** Runway use is normally dictated by wind conditions. The direction of takeoffs and landings is generally determined by the speed and direction of wind. It is safest for aircraft to depart and land into the wind, avoiding a crosswind or tailwind component during these operations. In addition, due to the congested airspace associated with the greater Los Angeles metropolitan area that surrounds Chino Airport, aircraft flow is often dictated by air traffic control when wind conditions are calm. Based upon information received from the airport traffic control tower (ATCT),

AIRFIELD LAYOUT

Runway Configuration

Runway Use

Number of Exits

WEATHER CONDITIONS

VMC
Visual Meteorological Conditions

IMC
Instrument Meteorological Conditions

PVC
Poor Visibility Conditions

AIRCRAFT MIX

Category A & B Aircraft

Category C Aircraft

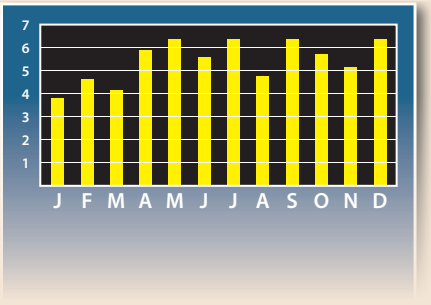
Category D Aircraft

OPERATIONS

Arrivals

Departures

Total Annual Operations



Touch-and-Go Operations

Runways 26L and 26R combined are utilized approximately 90 percent of the time, with Runways 8L and 8R being utilized approximately seven percent of the time. Runway 3-21 is estimated to be in use the remaining three percent of the time. The availability of instrument approaches is also considered. Runway 26R is the only runway served by straight-in instrument approach procedures, one of which is a precision instrument landing system (ILS) approach.

- **Exit Taxiways |** Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determines the occupancy time of an aircraft on the runway. The airfield capacity analysis gives credit to exits located within a prescribed range from a runway's threshold. This range is based upon the mix index of the aircraft that use the runway. For Chino Airport, those exit taxiways located between 2,000 and 4,000 feet from the landing threshold count in the capacity determination. The exits must be at least 750 feet apart to count as separate exits. Under these criteria, all runways receive the maximum exit taxiway credit.

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

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

  Instrument Flight Rule (IFR) conditions exist when the reported cloud ceiling is less than 1,000 feet above ground level and/or visibility is less than three statute miles. Under IFR conditions, pilots must rely on instruments for navigation and guidance to the runway. Safe separations between aircraft must be assured by following air traffic control rules and procedures. This leads to increased distances between aircraft, which diminishes airfield capacity.

  Poor Visibility Conditions (PVC) exist when cloud ceilings are less than 500 feet above ground level and visibility is less than one mile.

  Meteorological data was collected for a recent continuous 10-year period from the on-airport automated surface observing system (ASOS). According to data summarized in **Table 3A**, VFR conditions exist 87.5 percent of the time, IFR conditions (down to a 500-foot cloud ceiling) 8.87 percent of the time, and PVC conditions (below a 500-foot cloud ceiling) 3.63 percent of the time. In addition, 3.03 percent of the time, visibility and/or cloud ceilings are below the current instrument approach minimums, which means pilots cannot complete the landing approach at that time.

TABLE 3A | Meteorological Observations

Condition	Cloud Ceiling	Clarifier	Visibility	Observations	Percent
Visual (VFR)	≥1,000'	*And*	≥3 mi. ≥1 mi.	85,816	87.50%
Instrument (IFR)	<1,000' and ≥500'	*And/Or*	<3 mi. and Vis ≥1 mi.	8,697	8.87%
Poor Visibility (PVC)	<500'	*And/Or*	<1 mi.	3,562	3.63%
			TOTAL	**98,075**	**100.00%**

Note: # of observations when visibility is below current instrument approach minimums (visibility is ≤0.8 mi. and/or ceilings are ≤300').

Source: National Oceanic and Atmospheric Administration (NOAA). Ten years of data from the on-airport ASOS from January 1, 2010-December 31, 2019.

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

  Aircraft mix for the capacity analysis is defined by the FAA in terms of four aircraft classes. Classes A and B consist of single and multi-engine aircraft weighing less than 12,500 pounds. Aircraft within these classifications are primarily associated with general aviation operations, but this classification also includes some air taxi aircraft. Class C consists of multi-engine aircraft weighing over 12,500 pounds (but not exceeding 300,000 pounds). Class D consists of aircraft weighing more than 300,000 pounds; however, these aircraft do not operate at CNO.

  For the capacity analysis, the percentage of Class C aircraft operating at the airport is critical in determining the annual service volume, as these classes include the larger and faster aircraft in the operational mix. The FAA Traffic Flow Management System Count (TFMSC) database was utilized to determine the general operating mix of C class aircraft operating at the airport. The existing and projected operational fleet mix for CNO is summarized in **Table 3B**. Consistent with projections prepared in the forecast chapter, the percentage of operations by Class C is expected to be maintained over the planning horizon. The percentage of Class C aircraft is higher during IFR conditions, as many smaller general aviation aircraft and pilots are not equipped for operations during poor weather conditions.

TABLE 3B | Aircraft Operational Mix - Capacity Analysis

Weather	Planning Horizon	A & B[1]	C[2]
VFR (Visual)	Existing	98.2%	1.8%
	Short Term	98.8%	2.2%
	Inter. Term	97.2%	2.8%
	Long Term	96.3%	3.7%
IFR (Instrument)	Existing / Future	50%	50%

[1] Aircraft 12,500 lbs. or less.
[2] Aircraft between 12,500-300,000 lbs.

Source: Coffman Associates analysis using FAA AC 150/5060-5, Airport Capacity and Delay.

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

- **Nighttime Operations |** For capacity analysis, it is important to include operations that occur when the ATCT is closed. The control tower at CNO is open from 7:00 a.m. to 9:00 p.m. daily. It is estimated that approximately three percent of general aviation and air taxi operations occur when the tower is closed. **Table 3C** summarizes the operations adjustment used in the capacity analysis to account for operations when the control tower is closed.

TABLE 3C | Nighttime Operations Adjustment - Capacity Analysis

Planning Horizon	Forecast Annual Operations	Estimated Nighttime Operations	Total Capacity Operations
2022	204,582	6,054	210,636
Short Term	214,005	6,337	220,342
Intermediate Term	223,943	6,635	230,578
Long Term	245,038	7,268	252,306

Source: Coffman Associates analysis

- **Peak Period Operations |** For the airfield capacity analysis, average daily operations during the peak month are calculated based upon ATCT data. These peak operational levels were previously calculated for existing and forecast levels of operations. Typical operational activity is important in the calculation of an airport's annual service level, as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times through the year. Peak demand was also adjusted modestly to account for operations when the tower is closed.

- **Touch-and-Go Operations |** A touch-and-go operation involves an aircraft making a landing and an immediate takeoff without coming to a full stop or exiting the runway. These operations are normally associated with general aviation training operations and are included in local operations data.

  Touch-and-go activity is counted as two operations, as there is an arrival and a departure involved. A high percentage of touch-and-go traffic normally results in a higher operational capacity because one landing and one takeoff occurs within a shorter time than individual operations. Training operations at the airport (primarily touch-and-go operations) were calculated to account for approximately 58 percent of annual operations throughout the forecast period.

- **Percent Arrivals |** Under most circumstances, the lower the percentage of arrivals, the higher the hourly capacity. Except in unique circumstances, the aircraft arrival-departure split is typically 50-50. Traffic information at CNO indicated no major deviations from this pattern.

CALCULATION OF ANNUAL SERVICE VOLUME

The preceding information was used in conjunction with the airfield capacity methodology developed by the FAA to determine airfield capacity for CNO.

Hourly Runway Capacity

The first step in determining ASV involves the computation of the hourly capacity of each runway configuration in use. The percentage of use of each runway configuration in VFR and IFR weather, the amount of touch-and-go training activity, and the number and location of runway exits become important factors in determining the hourly capacity.

As the mix of aircraft operating at an airport change to include an increasing number of Class C aircraft, the hourly capacity of the runway system is reduced because larger aircraft require longer utilization of the runway for takeoffs and landings, and because the greater approach speeds of the aircraft require increased separation. The weighted hourly capacity also accounts for runway usage and metrological conditions. For CNO, the weighted hourly capacity is currently estimated at 132 hourly operations, which decreases slightly over time to 130 hourly operations.

Annual Service Volume

Table 3D shows the calculation of the Annual Service Volume, which is C x D x H. Following this formula, the existing ASV is estimated at 371,000 annual operations, and the future ASV has been estimated at 364,000 operations.

TABLE 3D | Annual Service Volume Calculation

ASV Calculation Input	2022	Short Term	Intermediate Term	Long Term
C = Weighted hourly capacity	132	132	131	130
D = Ratio of annual demand to average daily demand during the peak month	210,636 annual* operations/660 design day operations = 319	220,341 annual* operations/690 design day operations = 319	223,943 annua*l operations/722 design day operations = 319	245,038 annual* operations/ 790 design day operations = 319
H = Ratio of average daily demand to peak hour demand during the peak month	660 design day operations/75 design hour operations = 8.77	690 design day operations/79 design hour operations = 8.77	722 design day operations/82 design hour operations = 8.77	790 design day operations/90 design hour operations = 8.77
Annual Service Volume = C x D x H	**371,000**	**369,000**	**366,000**	**364,000**

Note: ASV is rounded to nearest 1,000 and C/D/H ratios have fractions. *Includes 3% additional nighttime operations.

Delay

As the number of aircraft operations approaches the airfield's capacity, increasing amounts of delay to aircraft operations begin to occur to arriving and departing aircraft in all-weather conditions. Arriving aircraft delays result in aircraft holding outside the airport traffic area, while departing aircraft delays result in aircraft holding at the runway end until they can safely take off.

Currently, total annual delay at the airport is estimated at 1,053 hours (18 seconds per aircraft) (reference Figure 2.2, FAA AC 150/5060-5). If no capacity improvements are made, total annual delay can be expected to reach 4,626 hours (66 seconds per aircraft) by the long-term planning horizon. Delays five to ten times the average could be experienced by individual aircraft (two to four minutes) at very busy times.

Delay of this magnitude will be imperceptible, in most cases, to pilots and passengers. Typically, delay manifests its-self as a wider circling pattern, greater separation distances between aircraft, or holding at a hold line for a few additional seconds. Delay is primarily managed by the control tower personnel.

Conclusion

Table 3E provides a comparison of the ASV at existing and forecast operational levels for the airport. Current operations represent approximately 57 percent of the ASV. By the long-term planning period, operations are projected to represent 69 percent of ASV.

According to FAA Order 5090.5, *Formulation of the NPIAS and ACIP,* use of the ASV metric (presented above) is an initial threshold indicating when the demand-to-capacity ratio warrants consideration of capacity enhancement projects. By itself, the ASV metric can be of limited value for defining the operational benefits of proposed capacity projects. This is particularly true at capacity-constrained airports with complex operations. More detailed follow-up analysis may be required to validate the need (or justification) for a proposed capacity project.

TABLE 3E | Airfield Demand/Capacity Summary

	PLANNING HORIZON			
	2022	Short Term	Intermediate Term	Long Term
Operational Demand				
Annual*	210,636	220,341	230,578	252,306
Design Hour	75	79	82	90
Capacity				
Annual Service Volume	371,000	369,000	366,000	364,000
Percent Capacity	56.8%	59.7%	62.9%	69.3%
Weighted Hourly Capacity	132	132	131	130
Delay				
Per Operation (Seconds)	18	21	25	66
Total Annual (Hours)	1,053	1,285	1,614	4,626
*Includes 3% nighttime increase for itinerant general aviation and air taxi operations.				

Source: FAA AC 150/5060-5, Airport Capacity and Delay

FAA Order 5090.5, *Formulation of the NPIAS and ACIP*, lists the triggers for various capacity improvement projects. When capacity reaches 50 percent of ASV, planning for additional taxiway exits should be considered with implementation at 80 percent of ASV. At 60 percent ASV, the airport may consider additional runways, with implementation beginning at 80 percent ASV. Runway extensions, hold aprons, terminal aprons, and additional navigations aids have capacity related triggers.

AIRSIDE REQUIREMENTS

The following section examines the projected airside requirements, including runway orientation, runway length, runway width, pavement strength, line-of-sight, and gradient. The taxiway system will be examined with respect to current design standards for safety, including separation and wingtip clearances.

RUNWAY CONFIGURATION

The airport's airfield system has three runways. Primary Runway 8R-26L and parallel Runway 8L-26R are oriented in an east/west configuration. Runway 3-21 is oriented in a southwest/northeast manner, intersecting both parallel runways. As noted previously, Runways 26L and 26R combined are utilized approximately 90 percent of the time, with Runways 8L and 8R being utilized approximately seven percent of the time. Runway 3-21 is estimated to be in use the remaining three percent of the time.

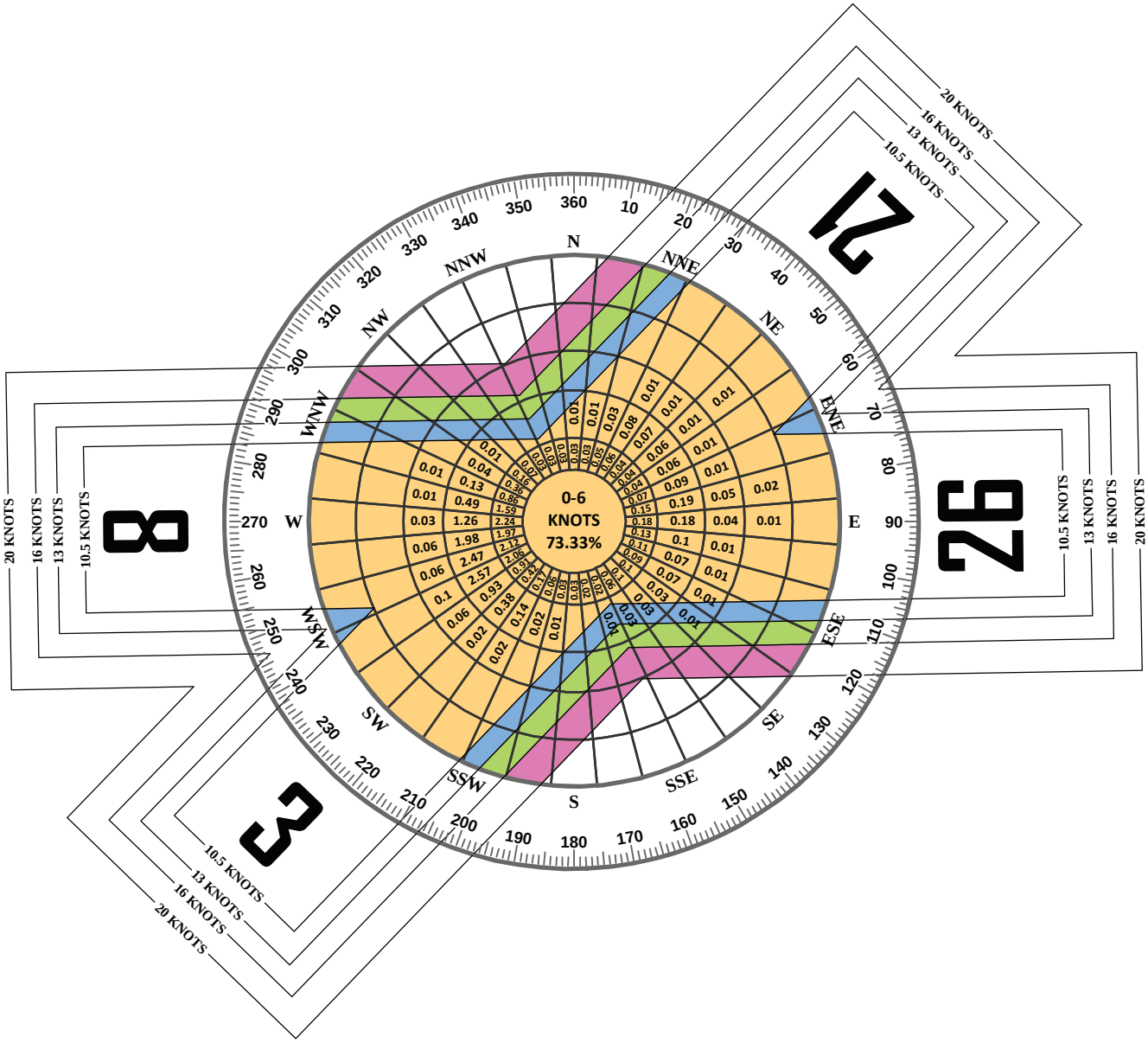
A crosswind runway configuration is common in locations with variable wind patterns and is recommended to meet local wind conditions, if needed. For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing winds, which reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

FAA AC 150/5300-13B, *Airport Design,* recommends a crosswind runway when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed based on wind not exceeding a 10.5-knot (12 mph) component for runway design code (RDC) A-I and B-I; 13-knot (15 mph) component for RDC A-II and B-II; 16-knot (18 mph) component for RDC A-III, B-III, C-I through C-III and D-I through D-III; and 20 knots for larger wingspans.

Exhibit 3B presents both the all-weather and IFR wind rose for CNO. A wind rose is a graphic tool that gives a succinct view of how wind speed and direction are historically distributed at a location. The table at the top of the wind rose indicates the percent of wind coverage for each runway at a specific wind intensity. The wind rose is constructed based on the most recent 10 years of data from the on-airport weather sensor (e.g., the ASOS). As can be seen on the exhibit, the Runway 8-26 orientation provides greater than 95 percent wind coverage. Therefore, the parallel runways are oriented in the proper direction and should be maintained.

According to FAA Order 5100.38D, *Airport Improvement Handbook*, only one runway at any NPIAS airport is eligible for on-going maintenance and rehabilitation funding unless the FAA Airport District Office (ADO) has made a specific determination that a crosswind or secondary runway is justified. A runway that is not a primary runway, crosswind runway, or secondary runway is an *additional* runway, which is not eligible for FAA funding. It is not unusual for an airport with multiple runways to have a primary runway and one or more additional runways, and no crosswind or secondary runway. **Table 3F** presents the eligibility requirements for runway types.

ALL WEATHER WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8-26	99.23%	99.76%	99.94%	99.99%
Runway 3-21	98.41%	99.53%	99.91%	99.98%
All Runways	99.91%	99.97%	99.99%	100.00%



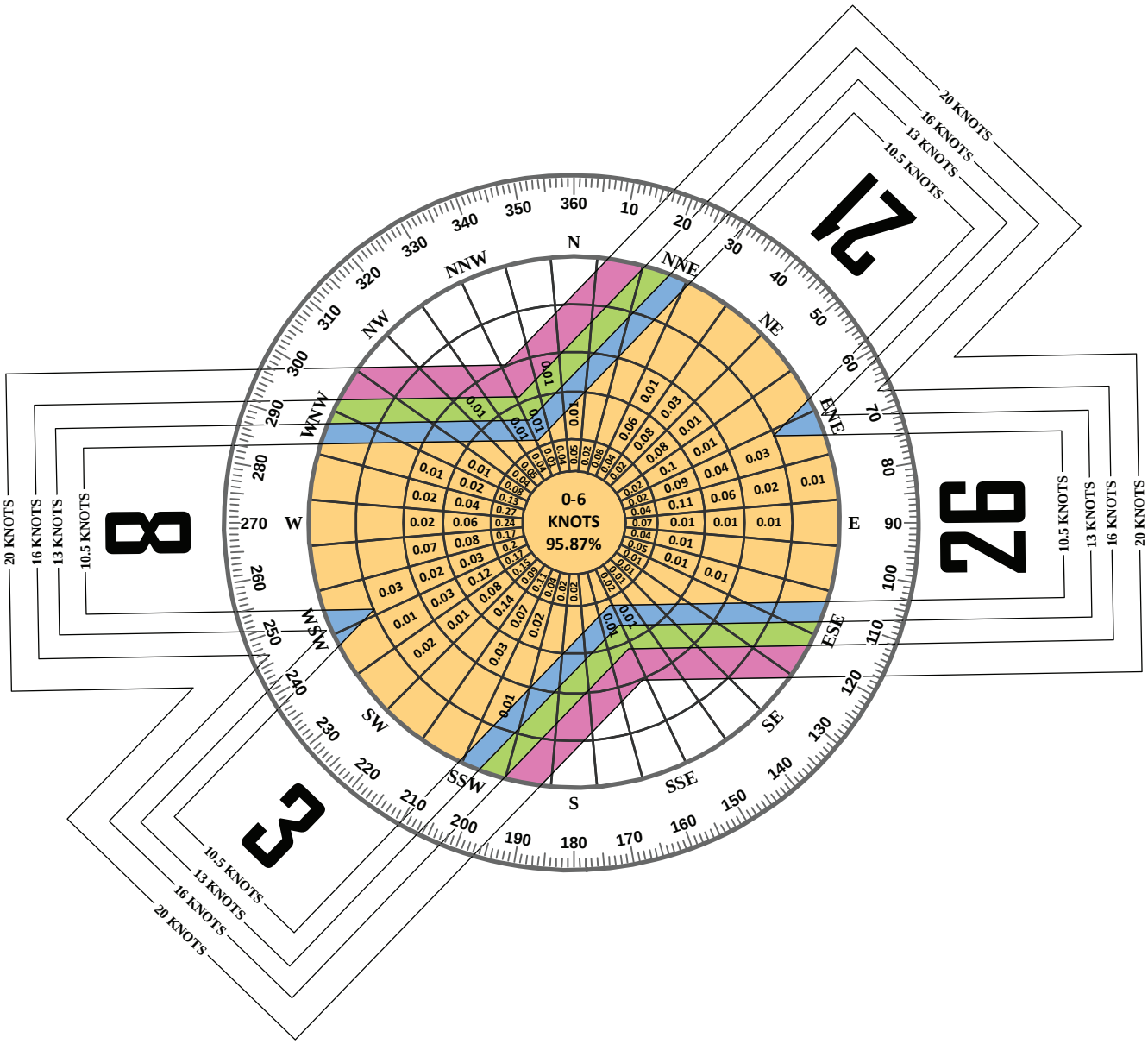
NORTH

Magnetic Declination
11° 42' 00" East (April 2020)
Annual Rate of Change
00° 5' 00" West (April 2020)

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Chino Airport
Chino, California

OBSERVATIONS:
98,075 All Weather Observations
Jan. 1, 2010 - Dec, 31 2019

IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8-26	99.59%	99.82%	99.95%	99.99%
Runway 3-21	99.62%	99.83%	99.93%	99.98%
All Runways	99.95%	99.97%	100.00%	100.00%



Magnetic Declination
11° 42' 00" East (April 2020)
Annual Rate of Change
00° 5' 00" West (April 2020)

NORTH

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Chino Airport
Chino, California

OBSERVATIONS:
12,259 IFR Weather Observations
Jan. 1, 2010 - Dec, 31 2019

TABLE 3F | Runway Eligibility

For the following runway type…	Must meet all of the following criteria…	And is…
Primary Runway	1. A single runway at an airport is eligible for development consistent with FAA design and engineering standards.	Eligible
Crosswind Runway	1. The wind coverage on the primary runway is less than 95%	Eligible if justified
Secondary Runway	1. There is more than one runway at the airport. 2. The non-primary runway is not a crosswind runway. 3. Either of the following: a) The primary runway is operating at 60% or more of its annual capacity. b) FAA has made a specific determination that the runway is required.	Eligible if justified
Additional Runway	1. There is more than one runway at the airport. 2. The non-primary runway is not a crosswind runway. 3. The non-primary runway is not a secondary runway.	Ineligible

Source: FAA Order 5100.38D, AIP Handbook

Runway 8R-26L is considered the primary runway and is, therefore, eligible for FAA funding. Runway 8L-26R is a parallel runway that meets the criteria for a secondary runway as:

- There is more than one runway at CNO;
- The runway system is currently operating at 57 percent of capacity and is projected to exceed 60 percent of capacity in the future; and
- The FAA has determined that the parallel runway is a secondary runway as evidenced by the use of federal grant aid for maintenance of the runway.

Since the wind coverage on the parallel runways exceeds the 95 percent threshold, Runway 3-21 is not eligible for federal funding as a crosswind runway. For Runway 3-21 to be eligible, the FAA must make a specific determination that the runway is a secondary runway. It is unknown if the FAA has made this determination; however, such a determination is supported because Runway 3-21 also meets the criteria as a secondary runway. Therefore, all three runways should remain eligible for on-going FAA grant-in-aid programs.

RUNWAY DESIGN STANDARDS

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

The entire RSA, ROFA, OFZ, and RPZ should be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. It is not required that the RPZ be under airport ownership, but it is strongly recommended by the FAA. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having appropriate land use control measures in place to ensure the RPZ remains free of incompatible development. In unusual circumstances, the airport may not be required to own the ROFA; however, the unowned ROFA area must still meet the design standards by there being no object penetrations higher than the lateral elevation of the RSA.

Dimensional standards for the various safety areas associated with the runways are a function of the type of aircraft expected to use the runways, as well as the instrument approach visibility minimums. **Exhibit 3C** presents the current and future design standards applied to the runways, and where the standard is different, it is noted with bold print. The following subsections describe any design standard deficiencies.

Runway Safety Area (RSA)

The RSA is defined in FAA AC 150/5300-13B, *Airport Design,* as a "surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of undershoot, overshoot, or excursion from the runway." The RSA is centered on the runway and dimensioned in accordance with the approach speed of the critical aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose. Only those features considered fixed by function to facilitate air navigation are permissible within the RSA, and only when mounted on frangible bases. Acceptable fixtures include runway lights and other navigation aids.

The dimensions of the RSA for all three runways, currently and in the future, are 500 feet wide as centered on the runway extending 1,000 feet beyond the runway ends. As depicted on **Exhibit 3C**, there are two areas on the airfield that do not conform to existing and ultimate RSA standards that are associated with Runway 8L-26R. The localizer antenna for the precision ILS approach serving Runway 26R is located approximately 900 feet west of the Runway 8L threshold. Localizer antennas are not considered fixed by function. On the opposite side of the runway, there is a small, fenced area enclosing above-ground natural gas valves located approximately 900 feet east of the Runway 26R threshold. The other two runways meet the RSA design requirements.

Runway Object Free Area (ROFA)

The ROFA is "a two-dimensional ground area, surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrate the lateral elevation of the RSA. Certain elements associated with air navigation are permissible in the ROFA provided they are fixed by function and installed on frangible bases. These elements include runway/taxiway lighting and airfield signs.

The dimensions of the ROFA for all three runways, currently and in the future, are 800 feet wide as centered on the runway extending 1,000 feet beyond the runway ends as shown on **Exhibit 3C**. The southeastern portion of the ROFA associated with Runway 8R-26L is obstructed by fencing that surrounds two separate holding ponds that provide water storage for fire suppression. The localizer antenna and the natural gas valves that are RSA penetrations are also ROFA penetrations. Other facilities located within the ROFA include the segmented circle, wind cone, and the glide slope antenna which are fixed by function and mounted on frangible bases; therefore, they are permissible.

Obstacle Free Zone (OFZ)

The OFZ is an imaginary surface that precludes object penetrations, including taxiing and parked aircraft. The only allowance for OFZ obstructions is navigational aids mounted on frangible bases, which are fixed in their location by function, such as airfield signs. The OFZ is established to ensure the safety of aircraft operations. If the OFZ is obstructed, the airport's approaches could be removed, or approach minimums could be increased. The OFZ dimensions for all three runways are 400 feet wide extending 200 feet beyond the runway ends. The OFZ for all runways meet the standard.

For runways providing a vertically guided approach, a precision obstacle free zone (POFZ) is required. The POFZ is defined as "a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet long by 800 feet wide." The POFZ is only in effect when the following conditions are met:

- Vertically guided approach.
- Reported ceiling below 250 feet and/or visibility less than ¾-mile.
- An aircraft on final approach within two miles of the runway threshold.

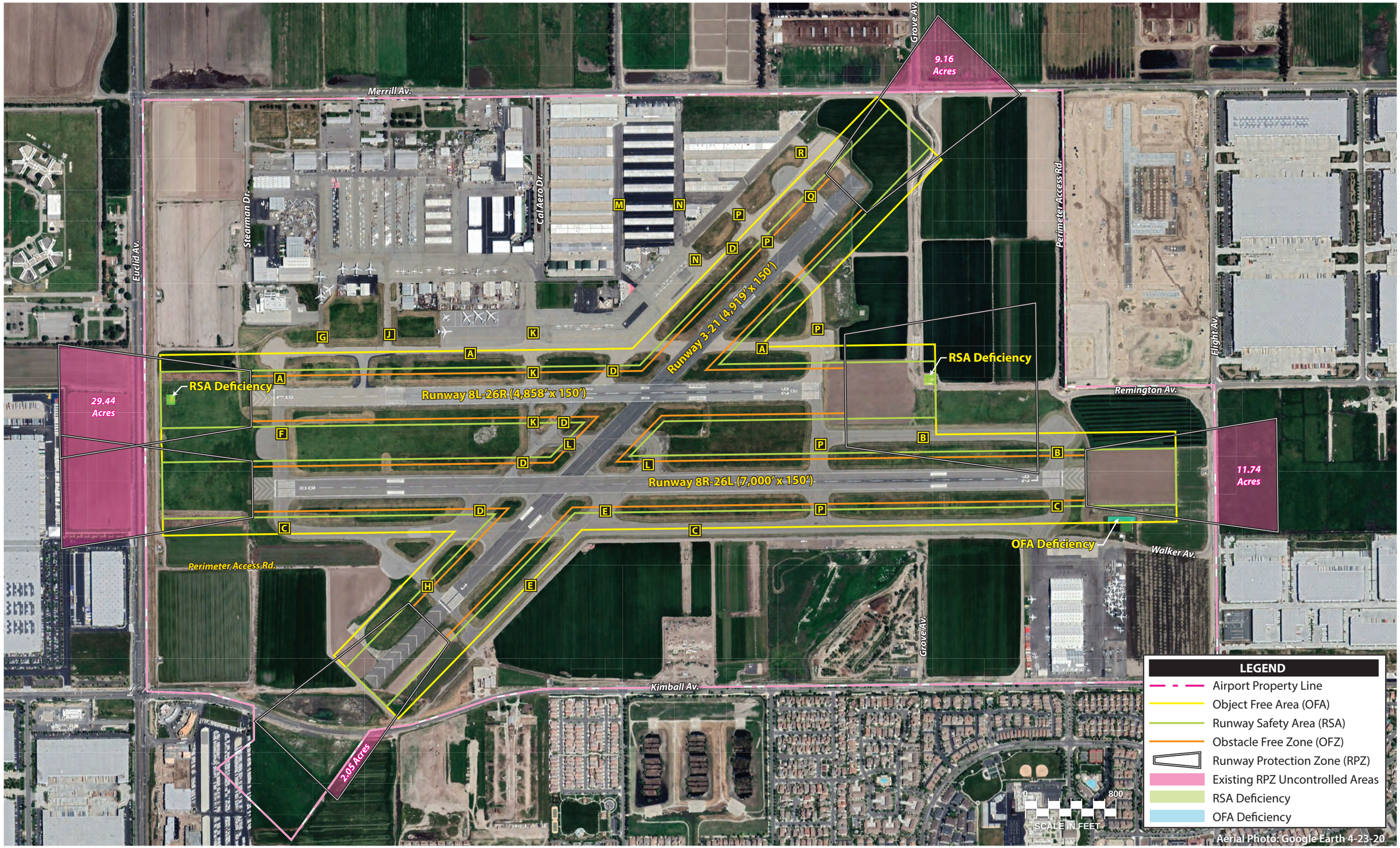
Currently at Chino Airport, the precision ILS approach serving Runway 26R provides minimum cloud ceilings down to 250 feet and/or visibility of ¾-mile, but not lower. As a result, when reported ceilings are less than these minimums, utilization of the ILS approach is not allowed; therefore, a POFZ would not apply. Since there are no plans to have lower visibility minimums, the POFZ is not applicable at CNO.

Runway Protection Zone (RPZ)

The RPZ is a trapezoidal area centered on the runway, typically beginning 200 ft beyond the runway end. When an RPZ begins at a location other than 200 ft beyond the end of a runway, two RPZs are required (i.e., a departure RPZ and an approach RPZ). The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses to enhance the protection of people and property on the ground.

On September 16, 2022, the FAA published AC 150/5190-4B, *Airport Land Use Compatibility Planning*. This AC represented a significant effort to address RPZ land use compatibility. Airport-compatible land uses are those that can coexist with a nearby airport without constraining the safe and efficient operations of the airport. Assuring compatible land uses within the RPZ is best achieved through:

1. Airport ownership of the RPZ property;
2. Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.;
3. Possessing sufficient land use control authority to regulate land use in the jurisdiction containing the RPZ;
4. Possessing and exercising the power of eminent domain over the RPZ property; or
5. Possessing and exercising permitting authority over proponents of development within the RPZ.


Merrill Av.
Grove Av.
9.16 Acres
Euclid Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Flight Av.
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150')
Runway 8R-26L (7,000' x 150')
RSA Deficiency
RSA Deficiency
29.44 Acres
Remington Av.
11.74 Acres
OFA Deficiency
Walker Av.
Perimeter Access Rd.
Grove Av.
Kimball Av.
2.05 Acres
LEGEND
Airport Property Line
Object Free Area (OFA)
Runway Safety Area (RSA)
Obstacle Free Zone (OFZ)
Runway Protection Zone (RPZ)
Existing RPZ Uncontrolled Areas
RSA Deficiency
OFA Deficiency
0
800
SCALE IN FEET
Aerial Photo: Google Earth 4-23-20

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Expectations of Airport Sponsors

The FAA requires all federally obligated airport sponsors to comply with FAA Grant Assurances. These include, but are not limited to, Assurance 21, *Compatible Land Use*. Sponsors should take appropriate measures to protect against, remove, or mitigate land uses that introduce incompatible development within RPZs. For projects proposed by the sponsor (such as runway extensions or new runways) that would result in moving the RPZ into an area that has incompatible land uses, the FAA expects the sponsor to have or secure sufficient control of the RPZ, ideally through fee simple ownership, including any off-airport property within the RPZ.

Existing Incompatible Land Uses

The FAA expects airport sponsors to seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses. Examples may include land acquisition, land exchanges, right-of-first-refusal to purchase, agreements with property owners on land uses, easements, or other such measures. The FAA also expects sponsors to actively consider and evaluate available options any time there is an ALP update or master plan update, and to be vigilant for any other opportunities that may arise from time to time—especially opportunities to purchase land—to eliminate or minimize existing incompatibilities. The FAA expects airport sponsors to document their efforts to demonstrate that they are complying with relevant FAA Grant Assurances. **Table 3G** summarizes FAA expectations regarding existing incompatible land uses within an RPZ.

TABLE 3G | Expectations of Airport Sponsors - Existing Incompatible Land Uses

Type of Land Use Control	Expectations of Airport Sponsors
If the airport sponsor owns the land	Because the sponsor has total land use control, the FAA considers it a reasonable expectation that the sponsor will establish and enforce the necessary zoning controls or lease terms to enable it to address existing incompatible land uses when the opportunity arises.
Property is off-airport, but the sponsor has land use authority or the local jurisdiction and land use regulatory authority is owned by the same governing body	Because the sponsor has at least some influence over land use control, the FAA considers it a reasonable expectation that the sponsor will seek to establish the necessary zoning controls to enable it to address existing incompatible land uses when the opportunity arises.
If the sponsor has no land use control (i.e., RPZ land falls in another jurisdiction)	Even though the sponsor has no land use control, the FAA still considers it a reasonable expectation that the sponsor will actively seek opportunities to establish the necessary zoning controls to enable it to address existing incompatible land uses when the opportunity arises. The FAA will consider financial assistance to public-sector airport sponsors for land acquisition even if the airport sponsor has no land use control, but only if the sponsor demonstrates that the airport sponsor is taking all appropriate steps available to enhance control and mitigate existing risks.

Source: FAA AC 150/5190-4B, Airport Land Use Compatibility Planning

Proposed Incompatible Land Uses

The FAA expects the airport sponsor to take active steps to prevent or mitigate proposed incompatible land uses. The FAA expects the airport sponsor to actively seek opportunities to prevent or mitigate risks associated with proposed incompatible land uses within the RPZ. The FAA expects the airport sponsor to secure control of land within the RPZ if a sponsor-initiated project results in incompatible land use within the newly defined RPZ. This is expected, regardless of the funding source(s) involved. Sponsors should actively monitor conditions and publicly object to proposed incompatible land uses, and should make it a high priority (financially or otherwise) to acquire land or otherwise establish land use controls that prevent incompatible uses. The FAA expects airport sponsors to document their efforts so that they can demonstrate that the airport is complying with its grant assurances. **Table 3H** summarizes FAA expectations regarding proposals for introducing new incompatible land uses within an RPZ.

TABLE 3H | Expectations of Airport Sponsors - New Incompatible Land Uses

Type of Land Use Control	Expectations of Airport Sponsors
If the airport sponsor owns the land	Because the sponsor has total land use control, the FAA expects that the sponsor will establish all necessary protections to prevent new incompatible land uses.
Property is off-airport, but the sponsor has land use authority or the local jurisdiction and land use regulatory authority is owned by the same governing body	The FAA expects the sponsor to take all appropriate steps available to establish and exercise zoning controls necessary to prevent any new incompatible land uses. The FAA recognizes that the standard of "appropriate action, to the extent reasonable" does not mean, in this case, that the sponsor can always prevail. Rather, the FAA expects the sponsor to demonstrate and document a reasonable effort.
If the sponsor has no land use control (i.e., RPZ land falls within another jurisdiction)	Even though the sponsor has no land use control, the FAA still expects the sponsor to actively pursue and consider all possible steps to secure land necessary to prevent any new incompatible land uses. The FAA recognizes that the standard of "appropriate action, to the extent reasonable" may not succeed. Even so, the FAA expects the sponsor to demonstrate and document a reasonable effort. The FAA expects the airport sponsor to adopt a strong public stance to oppose incompatible land uses and to communicate the purpose of the RPZ and associated risks to the proponent, and to actively consider measures such as land acquisition, land exchanges, right-of-first-refusal to purchase, agreements with property owners regarding land uses, or other such measures.

Source: FAA AC 150/5190-4B, Airport Land Use Compatibility Planning

Potential new incompatible land uses within an RPZ might be caused by one or more circumstances. Some of these circumstances may result from airport sponsor-proposed projects, including (but not limited to):

- An airfield project (e.g., runway extension, runway shift);
- A change in the critical design aircraft that increases the RPZ dimensions;
- A new or revised instrument approach procedure that increases the size of the RPZ; or
- A local development proposal in the RPZ (either new or reconfigured), which can include roadway construction, relocation, or improvements.

The FAA has higher expectations for the airport sponsor to mitigate potential incompatible land uses within the RPZs when the introduction of the incompatible land use is the result of an airport sponsor-initiated project (regardless of funding source). The sponsor should submit an alternatives evaluation to the FAA unless the land use is permissible. These are the permissible land uses requiring no further evaluation:

- Farming that meets airport design clearance standards in FAA AC 150/5300-13 and guidance as outlined in AC 150/5200-33;
- Irrigation channels meeting the standards of AC 150/5200-33 and FAA/USDA manual, *Wildlife Hazard Management at Airports*;
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator;
- Underground facilities, as long as they meet other design criteria (such as RSA standards), as applicable;
- NAVAIDs and aviation facilities, such as equipment for airport facilities considered fixed-by-function in regard to the RPZ; or
- Above-ground fuel tanks associated with backup generators for unstaffed NAVAIDs.

At CNO, there are some existing incompatible land uses within the RPZs as outlined in **Table 3J**. All of the incompatible land uses are surrounding roads. The alternatives chapter of this ALP update will detail any opportunities to reduce or eliminate incompatible land uses within the RPZ.

TABLE 3J | Runway Protection Zone Detail

Runway	RPZ Dimensions (ft.)		RPZ Size (ac.)	Owned in Fee (ac.)/ % Owned	Existing Incompatible Land Uses	% Incompatible
8R	Inner Width: Outer Width: Length:	500 1,010 1,700	29.465	13.2 ac/44.7%	Euclid Ave.	7.36%
26L	Inner Width: Outer Width: Length:	500 1,010 1,700	29.465	18.47 ac/62.7%	Walker Ave.	6.31%
8L	Inner Width: Outer Width: Length:	500 1,010 1,700	29.465	13.2 ac/44.7%	Euclid Ave.	7.36%
26R	Inner Width: Outer Width: Length:	1,000 1,510 1,700	48.98	48.98 ac/100%	None	0.00%
3	Inner Width: Outer Width: Length:	500 1,010 1,700	29.465	24.9 ac/84.51%	Kimball Ave.	9.23%
21	Inner Width: Outer Width: Length:	500 1,010 1,700	29.465	21.9 ac/74.3%	Merrill Ave. Grove Ave.	3.67%

Source: Coffman Associates analysis.

Runway/Taxiway Separation

The design standard for the separation between runways and parallel taxiways is determined by the critical aircraft (C-II) and the lowest instrument approach visibility minimum (¾-mile). The minimum runway to taxiway separation for Runway 8L-26R is 300 feet. The existing separation between Runway 8L-26R and parallel Taxiway A is 400 feet. Partial parallel Taxiway L is also 400 feet from the Runway 8L-26R centerline. Both parallel taxiways exceed the design standard by 100 feet; however, both are the proper distance should the runway ever be eligible for visibility minimums of below ¾-mile. Therefore, this separation distance should be maintained through the planning period.

Parallel Runway 8R-26L also serves C-II aircraft as the critical aircraft, and it is a visual runway. The minimum runway to taxiway separation distance is 300 feet. Parallel Taxiway C and partial Parallel Taxiway L are both 400 feet from the runway centerline. To preserve the possibility of straight-in instrument approaches with lower than ¾-mile visibility minimums, it is recommended that the existing separation distance be preserved through the long-term planning period.

Intersecting Runway 3-21 is served by parallel Taxiway D and partial parallel Taxiways E and L. Runway 3-21 is a visual runway designed to accommodate the critical aircraft (C-II); therefore, the parallel taxiways should be at least 300 feet from the runway. The parallel taxiways to Runway 3-21 are 400 feet from the runway, thus exceeding standard. To maintain the uniform nature of the parallel taxiways and to preserve the potential for instrument approach procedures, the separation distance for the taxiways serving Runway 3-21 should be maintained.

Hold Line Separation

The hold lines on all taxiways connecting to a runway are 250 feet from the runway centerline, which meets the design standard except for the hold lines on Taxiway A at the threshold to Runway 8L. Here, the hold line is 235 feet from the runway centerline. The location of all hold lines should be uniform at 250 feet from the associated runway centerline. When the airport transitions to ARC D, FAA guidance indicates that the hold line separation is to be increased one foot for every 100 feet in elevation of the airport. With an elevation of 650 feet above mean sea level, the future hold lines should be at 257 feet from the runway centerline.

Aircraft Parking Area Separation

Based on current conditions, the aircraft parking areas should be no closer than 400 feet from the centerline of any runway. All aircraft parking areas at CNO meet this standard and should be maintained.

RUNWAY LENGTH REQUIREMENTS

Aircraft operate on a wide variety of available runway lengths. Many factors will govern the suitability of those runway lengths for aircraft, such as elevation, temperature, wind velocity, aircraft operating weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures.

FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*, provides a five-step process for determining runway length needs.

1. Identify the list of critical design airplanes or airplane group.
2. Identify the airplanes or airplane group that will require the longest runway length at maximum certificated takeoff weight (MTOW).
3. Determine which of the three methods, described in the AC, will be used for establishing the runway length.
4. Select the recommended runway length from the appropriate methodology.
5. Apply any necessary adjustments to the obtained runway length.

The three methodologies for determining runway length requirements are based on the MTOW of the critical design aircraft or the airplane group. The airplane group consists of multiple aircraft with similar design characteristics. The three weight classifications are those with an MTOW of 12,500 pounds or less, those airplanes weighing over 12,500 pounds but less than 60,000 pounds, and those weighing 60,000 pounds or more. **Table 3K** shows these classifications and the appropriate methodology to use in runway length determination.

TABLE 3K | Airplane Weight Classification for Runway Length Requirements

Airplane Weight Category (MTOW)		Design Approach	Methodology
12,500 pounds or less	Approach speeds of less than 30 knots	Family grouping of small airplanes	Chapter 2: para. 203
	Approach speeds of at least 30 knots but less than 50 knots	Family grouping of small airplanes	Chapter 2: para. 204
	Approach speeds of 50 knots or more with fewer than 10 passenger seats	Family grouping of small airplanes	Chapter 2: para. 205, Figure 2-1
	Approach speeds of 50 knots or more with 10 or more passenger seats	Family grouping of small airplanes	Chapter 2: para. 205, Figure 2-1
Over 12,500 pounds but less than 60,000 pounds[1]		Family grouping of large airplanes	Chapter 3: Figures 3-1 or 3-2 and Tables 3-1 or 3-2
60,000 pounds or more or Regional Jets		Individual large airplanes	Chapter 4: Airplane performance manuals

[1]Applicable methodology for determining Primary Runway 8R-26L length requirements.

Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design

Primary Runway 8R-26L Length Requirement

Utilizing FAA AC 150/5325-B, *Runway Length Requirements for Airport Design*, the following presents the five-step process for determining the recommended runway length for primary Runway 8R-26L.

Step 1: Identify the critical design airplanes or airplane group.

The first step in determining the recommended runway length for an airport is to identify the critical design aircraft or family grouping of aircraft with similar design characteristics. The critical design aircraft or airplane group is that accounting for at least 500 annual operations. The FAA's Traffic Flow Management System Count (TFMSC) database documents those aircraft that fly IFR and/or file a flight plan to or from the airport. Local operations are not captured. **Table 3L** summarizes the TFMSC data by weight class.

TABLE 3L | Jet and Turboprop Operations by Weight Class

	OPERATIONS					
Weight Class	**2018**	**2019**	**2020**	**2021**	**2022**	**CAGR**
12,500 lbs. or less	1,432	1,378	1,108	1,598	1,524	1.25%
Over 12,500 lbs. but less than 60,000 lbs.	1,620	1,798	2,004	2,890	2,254	6.83%
60,000 lbs. or more	406	452	432	638	536	5.71%
Total Jets and Turboprops	**3,458**	**3,624**	**3,542**	**5,126**	**4,314**	**4.52%**
Total Jets	2,396	2,680	2,668	3,742	3,280	6.48%
Total Turboprops	1,062	944	874	1,384	1,034	-0.53%
CAGR: Compound annual growth rate						

Source: Traffic Flow Management System Count (Normalized annually by aircraft)

As can be seen in **Table 3L**, in 2022 there were 2,254 operations by aircraft with a MTOW over 12,500 but less than 60,000 pounds. There were 536 operations by aircraft with an MTOW greater than 60,000 pounds. Therefore, the appropriate runway length methodology is to examine the general runway length tables from Chapter 3 of AC 150/5325-4B.

Step 2: Identify the airplanes or airplane group that require the longest runway length at maximum certificated takeoff weight (MTOW).

Table 3K distinguishes between operations by jets and turboprops. Jet and turboprop operations have increased by an average annual growth rate of 12.59 percent over the past five years. Jet aircraft typically require the longest runway lengths; therefore, the runway length curves in Chapter 3 of AC 150/5325-4B will be utilized.

Step 3: Determine which of the three methods, described in the AC, will be used for establishing the runway length.

The third step in the runway length recommendation process is to select the specific methodology to use. Chapter 3 of the AC groups business jets weighing over 12,500 pounds but less than 60,000 pounds into the following two categories:

- 75 percent of the fleet; and
- 100 percent of the fleet.

The AC states that the airplanes in the 75 percent of the fleet category generally need 5,000 feet or less of runway at mean sea level and standard day temperature (59° F), while those in the 100 percent of the fleet category need more than 5,000 feet of runway under the same conditions.

The AC indicates that the airport designer must determine which category to use for runway length determination. According to the AC, if relatively few airplanes under evaluation are in the 100 percent of the fleet category, then this category should be used for runway length determination. The distinction is that there is not a threshold of 500 operations that determines which category to use. **Table 3M** presents the TFMSC operations data for the 100 percent of the fleet category. Over the past five years, the airport has seen a steady increase in activity by jet aircraft in 100 percent of the fleet category. In fact, there have been more than 1,000 annual operations by this class of business jet in each of the last four years. Therefore, the 100 percent of the fleet category is used to determine runway length for CNO.

TABLE 3M | Jet Operations in the 100 Percent of the Fleet Category

Aircraft Type	MTOW	ARC	OPERATIONS[1] 2018	2019	2020	2021	2022
Challenger 600/601/604 Series	48,200	C-II	102	156	140	156	130
Citation II/SP/Latitude Series	30,800	B-II	188	140	162	234	202
Citation CJ3/CJ4	17,110	B-II	24	100	120	128	154
Citation X	36,100	B-II	10	12	10	26	24
Falcon 900	49,000	B-II	14	6	18	14	12
Falcon 2000	42,800	B-II	8	2	10	22	72
Learjet 40 XR Series	21,000	C-I	22	14	22	22	26
Lear 50 Series	19,500	C-I	6	8	10	6	10
Learjet 60 Series	22,750	C-I	120	82	98	94	74
Gulfstream 100/150*	26,100	C-II	6	0	0	6	6
Gulfstream 200/450/500/600*	69,700	D-II/D-III	338	426	370	634	434
Hawker 800	28,000	C-II	124	152	184	402	282
		TOTAL	962	1,098	1,144	1,744	1,426

[1] Traffic Flow Management System Count
MTOW: Maximum Take Off Weight
ARC: Airport Reference Code
*Note: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design, identifies the listed aircraft as being in the 75-100% category. Those with an * are identified by the planner as being in this category.*

There are two runway length curves presented in the AC under the 100 percent of the fleet category:

- 60 percent useful load; and
- 90 percent useful load.

The useful load is the difference between the maximum allowable structural weight and the operating empty weight (OEW). The useful load consists of passengers, cargo, and usable fuel. The determination of which useful load category to use will have a significant impact on the recommended runway length; however, it is inherently difficult to determine because of the variable needs of each aircraft operator. For shorter flights, pilots may take on less fuel; however, pilots may prefer to ferry fuel so that they don't have to refuel frequently. Because of the variability in aircraft weights and haul lengths, the 60 percent useful load category is considered the default, unless there are specific known operations that would suggest using the 90 percent useful load category. Examples of a need to use the 90 percent useful load include regular air cargo flights, long haul flights (i.e., cross-country), or known fuel-ferrying needs. For this analysis, the default 60 percent useful load category will be used.

Step 4: Select the recommended runway length from the appropriate methodology.

The next step is to examine the 100 percent of the fleet at 60 percent useful load performance chart in Figure 3-2 of the AC (**Figure 3-1**). This chart requires the following knowledge:

- The mean maximum daily temperature of the hottest month: August at 94.1°(F).
- The airport elevation: 650 feet above mean sea level (MSL).

By locating the appropriate temperature and airport elevation on the performance chart, the recommended runway length, without any adjustments, is 5,792 feet.

Step 5: Apply any necessary adjustments to the obtained runway length.

The recommended runway length determined in Step #4 is based on zero effective runway gradient and dry runways. Step #5 applies adjustments to the raw runway length for these factors. The adjustments are not cumulative, and the higher of the two adjustments is the recommended runway length. With a 0.2 effective runway gradient (17 feet of elevation difference for Runway 8R-26L), the runway length obtained from Step #4 is increased at the rate of 10 feet for each foot of elevation difference between the high and low points of the runway centerline. At CNO, this equates to an additional 170 feet of required runway length. For business jet landing length, the runway length obtained in Step #4 is increased 15 percent, up to 5,500 feet for the 60 percent useful load category, and 7,000 feet for the 90 percent useful load category. **Table 3N** summarizes the data inputs and the final minimum recommended runway length of 6,000 feet to accommodate 100 percent of the business jet fleet at 60 percent useful load.

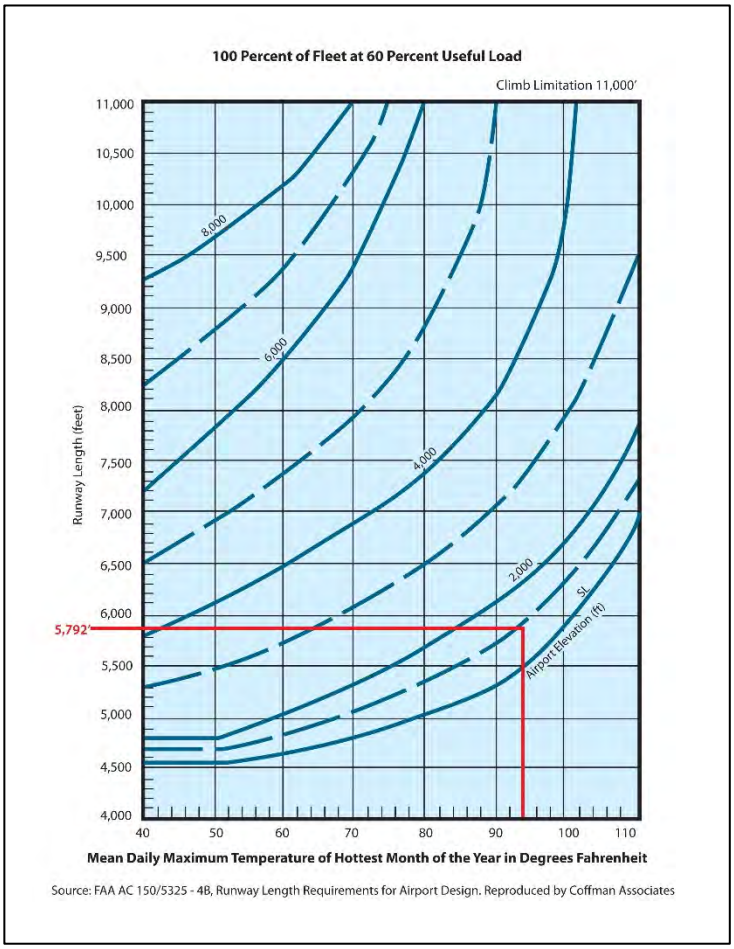


Figure 3-1: Business Jet Runway Length Chart

TABLE 3N | Business Jet Runway Length Requirements

Airport Elevation	650' above mean sea level			
Average High Monthly Temp.	94.1 degrees (July)			
Runway Gradient	.2% (17')			
Fleet Mix Category	**Raw Runway Length from FAA AC**	**Runway Length with Gradient Adjustment**	**Wet Surface Landing Length for Jets (+15%)[1]**	**Final Runway Length[2]**
75% of fleet at 60% useful load	4,817	4,987	5,500	5,500
100% of fleet at 60% useful load	***5,792***	***5,962***	***5,500***	***6,000***
75% of fleet at 90% useful load	7,022	7,192	7,000	7,200
100% of fleet at 90% useful load	9,127	9,297	7,000	9,300

[1]Max 5,500' for 60% useful load and max 7,000' for 90% useful load in wet conditions
[2]Figures above 30 rounded up to nearest 100.

Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design.

The minimum runway length requirement for the other categories is also included in **Table 3N**. The 90 percent useful load categories would require more runway length, up to 9,300 feet to accommodate 100 percent of the fleet.

Primary Runway 8R-26L is 7,000 feet long, which is 1,000 feet longer than the minimum recommended length. The additional runway pavement is beneficial to the airport because it allows for longer haul lengths and higher loading rates. It is not uncommon for certain operators to fly to the East Coast, and the additional runway length available facilitates these operators. In addition, Chino Airport is highly utilized by charter and fractional aircraft that operate under Federal Aviation Regulations (FAR) Part 135 (commercial operations). Under these regulations and under certain conditions, charter and fractional operators must have an additional safety buffer of up to 60 percent of the runway length for landing operations. The additional 1,000 feet of runway length available makes the airport more attractive to the charter and fractional operators.

Primary Runway 8R-26L should be maintained at its current length of 7,000 feet through the planning period.

Supplemental Runway Length Analysis for Specific Business Jets Operating at CNO

The required takeoff and landing lengths for maximum load and range (adjusted for temperature and elevation) for many of the turbine aircraft utilizing the airport are presented in **Table 3P**, for both dry and wet pavement conditions. The takeoff distance requirements reflect maximum gross weight for the aircraft; however, the percentage of useful load has also been calculated for the existing 7,000-foot runway length. When the runway length requirement exceeds the available runway length at the given design temperature, aircraft operators may be required to reduce payload. Runway length requirements that exceed the current length of Runway 8R-26L are noted in red type.

Business jets may operate under different regulations depending on the type of flight being conducted. These regulations may impact the calculated runway available for landing. CFR Part 91k refers to operations conducted via fractional ownership, and Part 135 refers to commuter/on-demand (charter) operations. Fractional operators must be capable of landing within 80 percent of the landing distance available (LDA), and commuter/on-demand operators must be capable of landing within 60 percent of LDA. Operations conducted under CFR Part 25 are general aviation operations conducted by private owners.

As can be seen in the table, there are only a few business jets that currently operate at the airport that may be weight-restricted under certain operating conditions. The vast majority of business jets are able to operate at the airport unrestricted on the 7,000-foot-long runway, including the current critical aircraft family.

TABLE 3P | Runway Length Requirements for Business Jets

Airfield Parameters	Elevation: 650' MSL Temp: 94.1°F +/-0.2% Runway 8R-26L									
Runway Parameters	Takeoff Length Required at MTOW		% Useful Load for Takeoff on 7,000' Runway		LANDING LENGTH REQUIREMENTS					
					C.F.R. Part 25 (Unfactored)		C.F.R. Part 135 (60% factored)		C.F.R. Part 91k (80% factored)	
Runway Condition	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Lear 60	7,539	8,065	92%	84%	3,651	4,915	6,085	8,192	4,564	6,144
Gulfstream V	7,538	8,272	95%	86%	2,825	3,249	4,708	5,415	3,531	4,061
Citation X	6,709	7,509	100%	91%	3,905	5,574	6,508	9,290	4,881	6,968
Falcon 50EX	6,424	6,854	100%	100%	2,965	3,410	4,942	5,683	3,706	4,263
Gulfstream IV	6,361	7,251	100%	100%	3,367	7,029	5,612	11,715	4,209	8,786
Challenger 300	6,337	6,644	100%	100%	2,639	5,058	4,398	8,430	3,299	6,323
Lear 45XR	5,657	5,698	100%	100%	2,868	3,646	4,780	6,077	3,585	4,558
Citation (525) CJ1	5,557	NA	100%	100%	2,933	3,966	4,888	6,610	3,666	4,958
Beechjet 400A	5,398	6,733	100%	100%	3,760	5,581	6,267	9,302	4,700	6,976
Citation Bravo	4,946	5,302	100%	100%	3,659	5,746	6,098	9,577	4,574	7,183
Citation 560 XLS	4,633	4,752	100%	100%	3,496	5,506	5,827	9,177	4,370	6,883
Citation Encore	4,561	4,962	100%	100%	3,105	4,660	5,175	7,767	3,881	5,825
Citation (525A) CJ2	4,239	4,548	100%	100%	3,262	4,728	5,437	7,880	4,078	5,910
Citation Sovereign	4,230	4,664	100%	100%	2,937	3,750	4,895	6,250	3,671	4,688
Citation CJ3	3,961	4,408	100%	100%	3,088	4,204	5,147	7,007	3,860	5,255
Citation I/SP	3,910	4,496	100%	100%	2,421	2,784	4,035	4,640	3,026	3,480

KEY: MSL - Mean Sea Level; MTOW - Maximum takeoff weight; CFR - Code of Federal Regulations.
CFR Part 25: Standard unfactored landing lengths.
CFR Part 135: 60% factored landing length as required by commuter/on-demand operators.
CFR Part 91k: 80% factored as required by fractional operators.
O/L: Weight limited due to climb performance
N/A: No wet data available
Figures in red exceed the available runway length.

Source: Aircraft operating manuals from UltraNav software.

The future critical aircraft may be represented by the larger Gulfstream type aircraft (G-V, G550, G650) which are ARC C/D-III aircraft. Under certain conditions (MTOW, hot days, wet conditions), these aircraft may be weight-restricted on takeoff. If in the future it can be documented that there is regular (500 annual operations) activity by aircraft that are weight restricted due to the available runway length, then a longer runway could be justified. However, the reality is that Runway 8R-26L, at 7,000 feet in length, already provides the maximum feasible runway length due to roads and development beyond the runway ends. Therefore, because the existing primary runway length of 7,000 feet is adequate for nearly all business jet operators, an extension of the runway is not considered going forward in this study.

Parallel Runway 8L-26R Length Requirements

Runway 8L-26R is 4,858 feet long and 150 feet wide with a weight-bearing capacity of 12,000 pounds. This runway serves as capacity relief for the primary runway, and it supports mostly piston, turboprop, and small business jets. Runway 8L-26R should be capable of continuing to accommodate this mix of aircraft and has long been designed to ARC C-II standards, which most closely relates to business jets.
The existing length of Runway 8L-26R will limit use by medium and large business jets. For planning purposes, this runway should be able to accommodate at least 75 percent of business jets at 60 percent useful load. As shown previously in **Table 3M**, a minimum recommended runway length is 5,500 feet. This length would allow a larger portion of the jet aircraft fleet mix to utilize the runway when needed

and could enhance airfield capacity by allowing simultaneous approaches and departures on the parallel runway system for a large majority of aircraft using the airport. Analysis in the next chapter will examine potential runway extensions that could be achieved on Runway 8L-26R.

Crossing Runway 3-21 Length Requirements

Runway 3-21 is 4,919 feet long and 150 feet wide. It has a pavement strength rating of 21,000 pounds (S), 130,000 pounds (D), and 50,000 (DD). This runway has long been designed to ARC C-II design standards.

While not technically a crosswind runway (because the parallel runways meet the 95 percent threshold for wind coverage), it provides needed landing and departure capability for those aircraft that are more severely impacted when winds are not oriented with the parallel runways. The presence of this runway adds to airfield capacity, and it provides another option for times when one or both other runways is unavailable (usually for maintenance).

Crossing runways are typically intended for small aircraft that are more susceptible to crosswinds to the primary runway. For Chino, where the wind coverage for the parallel runways exceeds 99 percent, a crossing runway only needs to be designed to accommodate smaller aircraft in ARC A/B-I. In addition, this runway is lightly used, accommodating an estimated three percent of total operations (approximately 5,800 annual operations).

Utilizing FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, the methodology for determining the minimum runway length for Runway 3-21 is based on meeting the needs of small aircraft with an approach speed of 50 knots or more. Use of this methodology will provide crosswind coverage for all small aircraft (<12,500 pounds). Utilizing Figure 2-1 of the referenced AC, a minimum recommended runway length of 4,400 feet is derived.

While Runway 3-21 exceeds the recommended length, it has long been planned and maintained to accommodate most of the aircraft operating at the airport. Unless there is a compelling reason to shorten the runway, such as meeting safety standards, then the runway should be maintained at its current length.

Runway Length Summary

Utilizing FAA guidance, the minimum recommended runway length has been determined for all three runways. Runway 8R-26L is 7,000 feet long and serves as the primary runway. The FAA guidance recommends that this runway be at least 6,000 feet long. In the future, as more and more large business jets utilize the airport, a minimum runway length of 7,000 feet is recommended. Therefore, the airport should maintain the existing 7,000-foot length of Runway 8R-26L through the 20-year planning period.

Runway 8L-26R is the parallel runway, and it is 4,858 feet in length. For this runway to more fully meet the needs of the family of airplanes representing the critical aircraft, a runway length of up to 5,500 feet is recommended.

Crossing Runway 3-21 is 4,919 feet long, and it has long been designed to serve a similar mix of aircraft as the parallel runways (namely ARC C-II airplanes). While this design level does exceed what the FAA guidelines would suggest is needed, it is recommended that this runway be maintained at this level.

RUNWAY WIDTH

The width of each of the existing runways was also examined to determine the need for facility improvements. The design standard for the parallel runways is 100 feet, while both runways are 150 feet wide currently. Consideration will be given to narrowing these two runways in the alternatives chapter. It should be noted that runway-narrowing projects are typically undertaken in conjunction with other runway projects, such as a major rehabilitation. Crossing Runway 3-21 is also 150 feet wide. Since this runway is planned to be maintained as a C-II runway, the width standard is 100 feet. Consideration will also be given to narrowing this runway in the future in conjunction with a major rehabilitation project.

RUNWAY PAVEMENT STRENGTH

An important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. The pavement strength rating is not the maximum weight limit. Aircraft weighing more than the certified strength can operate on the runway on an infrequent basis. However, frequent operations by heavy aircraft can shorten the lifespan of airport pavements.

Table 3Q shows the current strength rating of the runways and the recommendation for the future. Primary Runway 8R-26L and crossing Runway 3-21 are both adequately strength-rated for all current and forecast activity. Parallel Runway 8L-26R at 12,000 pounds for single wheel landing gears is less than what it should be, considering the fleet mix that the runway can accommodate. In the future, the strength rating should be increased to accommodate frequent operations by the critical aircraft.

TABLE 3Q | Pavement Strength Recommendation

	Primary Runway 8R-26L	Parallel Runway 8L-26R	Runway 3-21
EXISTING			
Single Wheel	75,000	12,000	21,000
Dual Wheel	150,000	NA	130,000
Double Dual Wheel	215,000	NA	50,000
RECOMMENDED			
Single Wheel	Same	30,000	Same
Dual Wheel	Same	60,000	Same
Double Dual Wheel	Same	75,000	Same
Note: All figures in pounds.			

RUNWAY LINE-OF-SIGHT AND GRADIENT

FAA has instituted various line-of-sight requirements to facilitate coordination among aircraft and between aircraft and vehicles that are operating on active runways. This allows departing and arriving aircraft to verify the location and actions of other aircraft and vehicles on the ground that could create a conflict.

Line-of-sight standards for an individual runway are based on whether there is a parallel taxiway available. When a full-length parallel taxiway is available (as it is for the runways), facilitating faster runway exit times, then any point five feet above the runway centerline must be mutually visible, with any other point five feet above the runway centerline that is located at less than half the length of the runway. All three runways meet the individual line-of-sight standard.

The runway gradient is the maximum allowable slope for a runway. The standard is no more than 1.5 percent, and not exceeding 0.8 percent in the first and last quarter of the runway length. The parallel runways slope upward from the west to the east at a grade of 0.2 percent, thus meeting the gradient standard. The existing gradient for Runway 3-21 is 0.8 percent, also meeting standard.

RUNWAY BLAST PADS

A runway blast pad is a paved surface extending from the ends of the runways provided to reduce the erosive effect of jet blast and propeller wash. All runway ends at Chino Airport are currently equipped with blast pads except for Runway 26R. All existing blast pads meet or exceed the design standards for length and width according to the runway's ARC. Future planning should consider constructing a blast pad on Runway 26R that is 200 feet long by 140 feet wide.

TAXIWAY/TAXILANE DESIGN STANDARDS

The design standards associated with taxiways are determined by the taxiway design group (TDG) and the airplane design group (ADG) of the critical design aircraft that would potentially use that taxiway. **Table 3R** presents the taxiway design standards to be applied at CNO. The current ADG is II, which is forecast to transition to ADG III in the future. The applicable TDG is forecast to remain "2" into the future.

TABLE 3R | Taxiway Dimensions and Standards

STANDARDS BASED ON WINGSPAN	ADG II (Current)	ADG III (future)
Taxiway Protection		
Taxiway Safety Area (TSA) width	79'	118'
Taxiway Object Free Area (TOFA) width	124'	171'
Taxilane Object Free Area (TLOFA) width	110'	158'
Taxiway Separation		
Taxiway Centerline to:		
Fixed or Movable Object	62'	85.5'
Parallel Taxiway/Taxilane	102'	144'
Taxilane Centerline to:		
Fixed or Movable Object	55'	79'
Parallel Taxilane	94'	138'
Taxiway Centerline to:		
Runway 8R-26L (VIS/1-Mile)	300'	400'
Runway 8L-26R (¾-mile)	300'	400'
Runway 3-21 (VIS)	300'	NA
Wingtip Clearance		
Taxiway Wingtip Clearance	23'	27'
Taxilane Wingtip Clearance	16'	20'
STANDARDS BASED ON TDG	**TDG 2 (A&B)**	
Taxiway Width Standard	35'	
Taxiway Edge Safety Margin	7.5'	
Taxiway Shoulder Width	15'	

ADG: Airplane Design Group
TDG: Taxiway Design Group

Source: FAA AC 150/5300-13B, Airport Design

Taxiway/Taxilane Width Standards

The current and future taxiway design group for the airport is TDG 2, and the width standard is 35 feet. All taxiways that may be accessed by the critical aircraft, including taxilanes, should be planned to this width standard. Taxilanes, by their nature of providing access to hangar areas, may be designed to a different standard when only a smaller aircraft type will be accessing the taxilane.

Because the critical aircraft can utilize all three runways, all taxiways serving the runways, whether as a parallel or a connecting taxiway, should be at least 35 feet wide. All taxiways serving in this capacity are at least 35 feet wide, thus meeting the minimum standard.

Several of the taxiways exceed the 35-foot standard for taxiway width as shown on **Table 3S**. By regulation, the FAA is unable to financially participate in maintenance, rehabilitation, or construction of pavements that exceed the minimum design standard. When those taxiways that exceed the standard width need major rehabilitation or reconstruction, considerations should be given to narrowing them to the standard width.

TABLE 3S | Taxiway Width Standards

Taxiway Designation	TDG 2 Standard Width	Current Width
Taxiway A (Parallel)	35'	50'
Taxiway B (Parallel)	35'	75'
Taxiway B (Rwy 26L Threshold)	35'	100'
Taxiway C (Parallel)	35'	75'
Taxiway C (Thresholds)	35'	100'
Taxiway D (Parallel)	35'	50'
Taxiway E (Partial Parallel)	35'	50'
Taxiway F (Connector)	35'	80'
Taxilane G	35'	40'
Taxiway H (Rwy 3 Threshold)	35'	50'
Taxiway H (Connector)	35'	50'
Taxilane J	35'	40'
Taxiway K (Connector)	35'	85'
Taxiway K (Between Rwys)	35'	35'
Taxilane K	35'	75'
Taxiway L (Parallel)	35'	50'
Taxiway L (Connector)	35'	70'
Taxilane M	25'	40'
Taxilane N	25'	40'
Taxiway P (Connector)	35'	90'
Taxiway Q (Connector)	35'	65'

Other Taxiway Design Considerations

FAA AC 150/5300-13B, *Airport Design*, provides guidance on taxiway design that has a goal of enhancing safety by providing a taxiway geometry that reduces the potential for runway incursions. A runway incursion is defined as, "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation:

1. **Taxi Method**: Taxiways are designed for "cockpit over centerline" taxiing, with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate judgmental over-steering, which is when the pilot must intentionally steer the cockpit outside the marked centerline to assure the aircraft remains on the taxiway pavement.
2. **Steering Angle**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.

3. **Three-Node Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right and left angle turns and a continuation straight ahead.

4. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.

5. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three node" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences and through a reduction in air traffic controller workload.
   - *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
   - *Increase Visibility*: Right-angle intersections, both between taxiways and runways, provide the best visibility. Acute-angle runway exits provide for greater efficiency in runway usage but should not be used as runway entrances or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
   - *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
   - *Indirect Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
   - *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

6. **Runway/Taxiway Intersections**:
   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs, so they are visible to pilots.
   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.
   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

7. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.
   - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout that forces pilots to make a conscious decision to turn.
   - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

FAA AC 150/5300-13B, *Airport Design,* states that, "existing taxiway geometry should be improved whenever feasible, with emphasis on designated hot spots. To the extent practicable, the removal of existing pavement may be necessary to correct confusing layouts."

There are four FAA designated "Hot Spots" on the airfield, which are shown on **Exhibit 3D** and described as follows:

- **HS 1**: Pilots taxiing south of Taxiway D sometimes fail to turn on to Taxiway A and inadvertently proceed onto Runway 8L-26R.
- **HS 2**: Pilots taxiing west on Taxiway L sometimes turn onto Runway 3-21 by mistake.
- **HS 3**: Pilots taxiing south on Taxiway K sometimes fail to turn onto Taxiway A and proceed onto Runway 8L-26R by mistake.
- **HS 4**: Complex intersection. After Crossing Runway 21 westbound on Taxiway L, pilots sometimes confuse Taxiway D and Taxiway K and cross the Runway 8L-26R holding position markings without authorization.

The alternatives chapter will examine possible taxiway geometry changes that would improve pilot situational awareness and reduce potential pilot confusion.

Taxilane Design Considerations

Taxilanes are distinguished from taxiways in that they do not provide access to or from the runway system directly. Taxilanes typically provide access to hangar areas and thus accommodate a slower movement speed. As a result, taxilanes can be constructed to varying design standards depending on the type of aircraft utilizing the taxilane. For example, a taxilane leading to a T-hangar area only needs to be designed to accommodate those small aircraft typically accessing a T-hangar.

The taxilane object free area for ADG II aircraft is 110 feet as centered on the taxilane. The taxilane object free area for ADG I aircraft is 79 feet, as centered on the taxilane. All hangar areas meet at least the ADG I separation standard, except for four older T-hangar structures (Hangars A-460, A-465, A470, and A-475), where there is only 60 feet of separation. **Exhibit 3E** shows the primary hangar areas at the airport and the surrounding ADG I (79') taxilane object free areas, and it highlights those areas where the TOFA is penetrated by existing hangars.

Years ago, when the hangars were constructed, it was not unusual to plan hangar separation based on the wingspan of the aircraft intended to use the hangars. As a result, it was common to plan hangars only 60 feet apart, for example, because only small aircraft would use those hangars. Often the width of the hangar doors will restrict the wingspan of aircraft that could use the taxilane. Nonetheless, today FAA guidance provides a standard TLOFA width regardless of the hangar door widths. FAA typically does not fund projects to move existing hangars to meet TLOFA standards but are instead asking that if there is ever redevelopment of existing hangars that the replacement hangars are constructed to meet current TLOFA separation standards. Typically, only if the redevelopment is likely within the next 20 years, would it be necessary to show replacement hangars on the airport layout plan.

INSTRUMENT NAVIGATIONAL AIDS

Instrumentation for runways is important when weather conditions are less than visual (greater than three-mile visibility and 1,000-foot cloud ceilings). The airport has a Global Positioning System/Local Performance with Vertical Guidance (GPS/LPV) instrument approach to Runway 26R with visibility minimums of 1¼-mile and cloud ceilings of 394 feet. There is a precision Instrument Landing System (ILS) approach to Runway 26R with visibility minimums of ¾-mile and cloud ceilings down to 250 feet.

Past planning has considered improvements to the instrument approach capability at the airport. Runways 8R and 8L were both planned for one-mile visibility minimums. Runway 26R was planned for ¾-mile visibility minimums. Runway 26L was planned for ½-mile visibility minimums. Both ends of Runway 3-21 were planned to remain a visual approach runway.

To obtain ½-mile visibility minimums to Runway 26L, a medium intensity approach lighting system with runway alignment indicator lights (MALSR) would be required. In addition, private property would need to be acquired. Since the previous planning effort, the need and desire for an approach with ½-mile visibility minimums to Runway 26L has diminished and is no longer considered feasible. Instead, visibility minimums to Runway 26L will be not lower than one mile.

VISUAL APPROACH LIGHTING

To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. Currently, all runway ends are equipped with four-light precision approach path indicators (PAPI-4) set to the standard three-degree approach slope. These systems are appropriate and should be maintained.

Runway end identification lights (REILs) are flashing lights located at each runway end that facilitate identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway ends and distinguish the runway end lighting from other lighting on the airport and in the approach areas. The FAA indicates that REILs should be considered for all runway ends not planned for a more sophisticated approach lighting system. Runway 3-21 is currently the only runway at Chino Airport served by REILs. Future planning should consider REILs for each end of Runway 8R-26L and Runway 8L-26R, unless a more sophisticated approach lighting system is implemented.

ATIS
125.85
CHINO TOWER ★
118.5
GND CON
121.6

20086

AIRPORT DIAGRAM

AL-5599 (FAA)

CHINO (CNO)
CHINO, CALIFORNIA
/61±

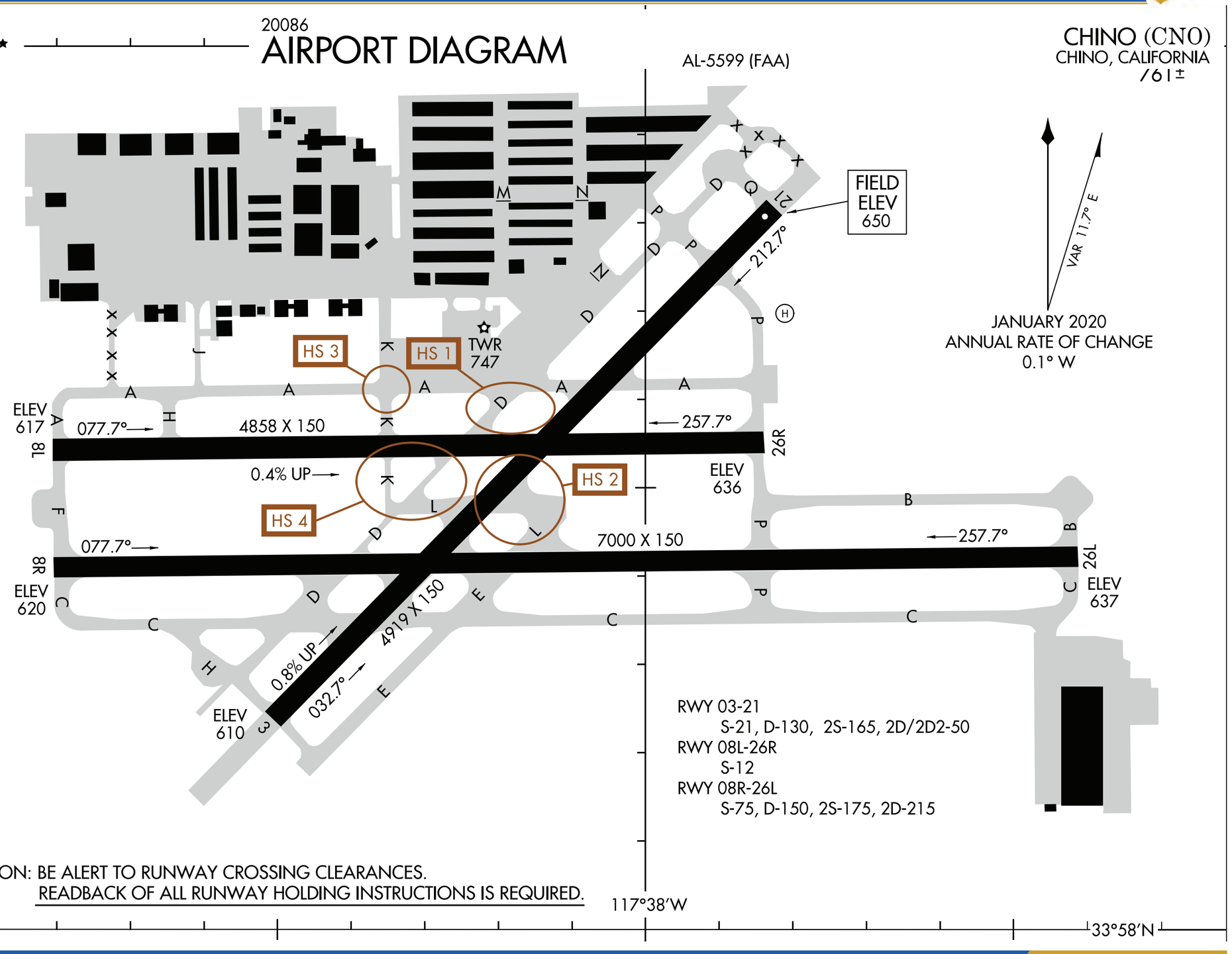
HOT SPOT DESCRIPTIONS

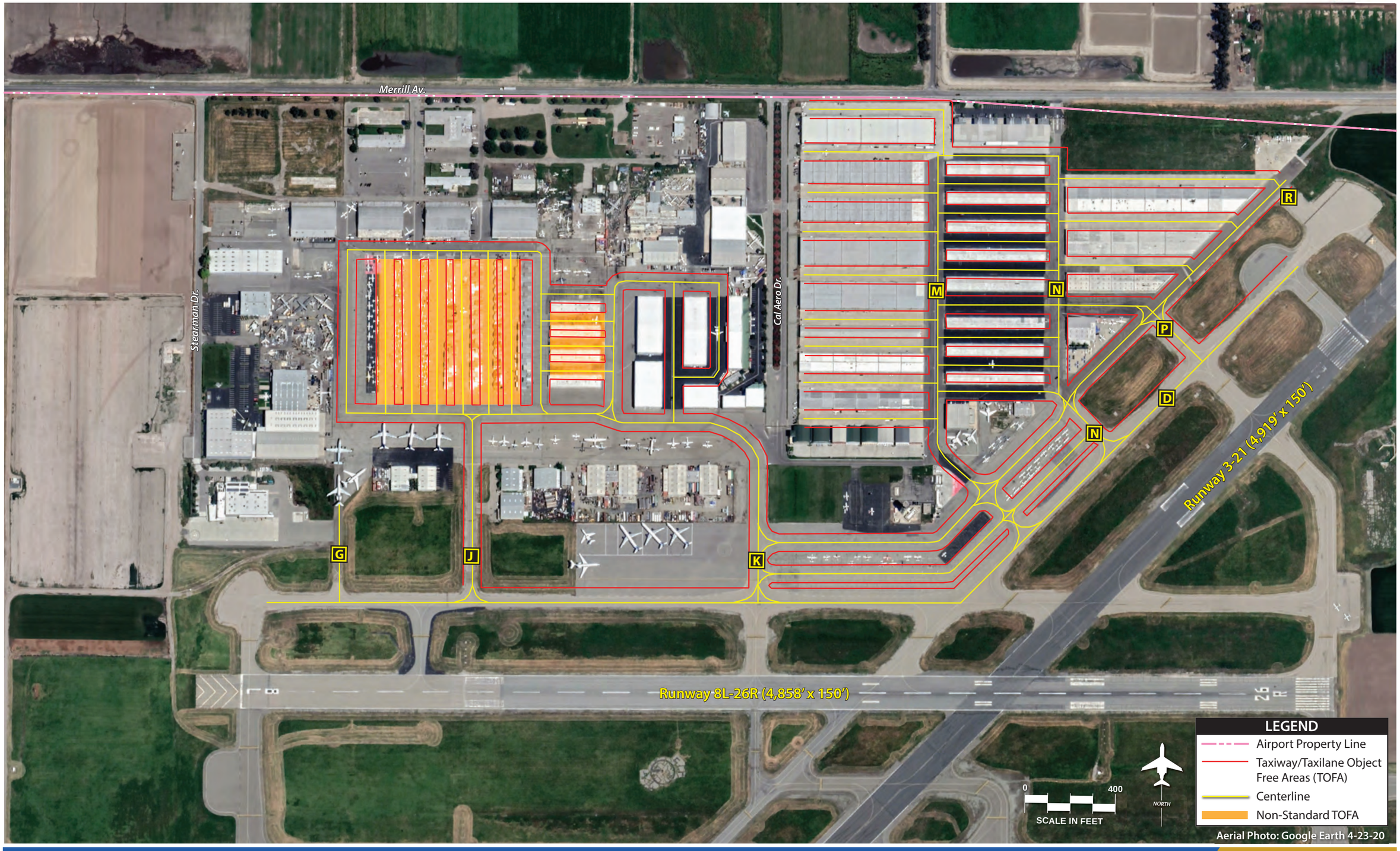
HS 1 Pilots taxiing south on Twy D, sometimes fail to turn on to Twy A and proceed onto Rwy 08L-26R by mistake.

HS 2 Pilots taxiing west on Twy L, sometimes turn onto Rwy 03-21 by mistake.

HS-3 Pilots taxiing south on Twy K sometimes fail to turn onto Twy A and proceed onto Twy 08L-26R by mistake.

HS 4 Complex int - after crossing Rwy 21 westbound on Twy L, pilots sometimes confuse Twy D and Twy K and cross the 08L-26R runway holding position marking without authorization




Merrill Av.
Stearman Dr.
Cal Aero Dr.
M
N
R
P
D
N
G
J
K
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150')
26
LEGEND
Airport Property Line
Taxiway/Taxilane Object Free Areas (TOFA)
Centerline
Non-Standard TOFA
0
400
SCALE IN FEET
NORTH
Aerial Photo: Google Earth 4-23-20

WEATHER REPORTING

Chino Airport has a lighted wind cone and segmented circle, as well as additional supplemental wind cones in various locations on the airfield. The wind cones provide information to pilots regarding wind conditions, such as direction and speed. The segmented circle consists of a system of visual indicators designed to provide traffic pattern information to pilots. These should be maintained throughout the planning period.

The airport is equipped with an ASOS, which provides weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. This information is then transmitted at regular intervals on the automated terminal information service (ATIS), which is broadcast on radio frequency 125.85 MHz. These systems should be maintained through the planning period.

AIRFIELD MARKING, LIGHTING, AND SIGNAGE

Runway markings are designed according to the type of instrument approach available on the runway. Runway 26R has precision marking which should be maintained in support of the ILS instrument approach. Runway 8L has basic markings which should be upgraded to non-precision markings when an instrument approach is approved. Runway 8R has non-precision markings which should be maintained in anticipation of obtaining a non-precision approach. Runway 26L has non-precision markings which should be maintained. Runway 3-21 has basic markings which should be maintained as this runway is planned to remain a visual runway.

Runways 8R-26L and 3-21 have medium intensity runway edge lighting, while Runway 8L-26R has high intensity runway edge lights (HIRL). HIRL is appropriate for Runway 8L-26R because of the availability of the precision approach to Runway 26R. These lighting systems are adequate and should be maintained.

All taxiways have medium intensity taxiway edge lighting. This system is essential for the safe ground movements of aircraft at night and in poor weather conditions. The taxiway edge lighting should be maintained.

All taxiways are marked with a solid yellow centerline to provide pilots with a visual reference as to their location on the taxiway and to guide pilots safely. Hold lines are marked on the taxiways leading to the runway, 250 feet from the runway centerline. These taxiway markings are essential and should be maintained.

Airfield identification signs assist pilots in identifying their location on the airfield and direct them to their desired location. Lighted signs are installed on all runways and taxiways at Chino Airport. All these signs should be maintained throughout the planning period.

AIRCRAFT HOLDING APRONS

Aircraft holding aprons are pavements typically at the end of parallel taxiways near the runway threshold. Hold aprons allow pilots to pull into the hold apron to conduct engine-runups and other preflight checks, while other aircraft can taxi past to the runway threshold.

Design standards for hold aprons have become more formalized in recent years. At a minimum, the depth of a hold apron must allow the holding aircraft to be outside the TOFA of the parallel taxiway. In addition, more recent design standards encourage a hold apron geometry that creates hold bays in which separate aircraft use the hold apron. If there is more than one hold bay, then the separation between hold bays must meet the separation standard for taxilanes.

The hold aprons at Chino are of a design that predates the current design standards. In the alternatives chapter, an analysis will be undertaken to determine the feasibility of reconstructing the hold aprons to current standards when reconstruction is necessary.

AIRPORT TRAFFIC CONTROL TOWER (ATCT)

Chino Airport has an operational ATCT that is located approximately 800 feet northwest of the intersection of Runways 8L-26R and 3-21. The ATCT is staffed with FAA personnel from 7:00 a.m. to 9:00 p.m. daily. The ATCT enhances safety at the airport and should be maintained through the planning period.

When the ATCT is closed, MIRL for Runways 8R-26L and 3-21, and HIRL for Runway 8L-26R are turned on. The PAPI lights serving the runways operate continuously as do the REILs serving Runway 3-21.

AIRSIDE SUMMARY

Chino Airport has a nice complement of airside systems. The available runway length is adequate, although consideration will be given to extending Runway 8L-26R to 5,500 feet. The location of parallel taxiways is adequate, although the width of the taxiways varies greatly and exceeds the design standard in many locations. As these taxiways are rehabilitated/reconstructed as part of a pavement preservation program, consideration should be given to providing a uniform width of 35 feet.

There are four FAA-identified Hot Spots on the airfield. Hot spots are locations with a history of being confusing to pilots or ground transportation vehicles. In the alternatives chapter, potential solutions to the hot spots will be evaluated.

There are penetrations to the RSA and ROFA surrounding runway system. The localizer antenna is in the RSA on the Runway 8L end. Some above-ground gas piping is in the Runway 26R RSA. Fencing surrounding two retention ponds is in the Runway 26L ROFA. These penetrations to the RSA and ROFA should be removed or relocated.

A summary of the airside facility needs is summarized on **Exhibit 3F**.

RUNWAYS

AVAILABLE	POTENTIAL IMPROVEMENT/CHANGE
RUNWAY 8R-26L	
Critical Aircraft: C-II-2	Critical Aircraft: D-III-2
RDC: C-II-VIS	RDC: D-III-5000
Visibility Minimum: VIS	Visibility Minimum: 1-mile
Runway Length/Width: 7,000' x 150'	Maintain
75,000(S); 150,000(D); 215,000(DT)	Maintain
RSA: 500' wide x 1,000' beyond runway end	Maintain
ROFA: 800' wide x 1,000' beyond runway end	Maintain
OFZ: 400' wide x 200' beyond runway end	Maintain
RPZ ownership: partial ownership	Fee simple acquisition or easements,if feasible. Maintain land use control measures.
RPZ Incompatibilities: Euclid Ave. (8R); Walker Ave. (26L)	Remove RPZ incompatibilities if feasible.
Blast Pad: Both ends	Maintain
Nonprecision marking	Maintain
MIRL	Maintain
RUNWAY 8L-26R	
Critical Aircraft: C-II-2	Critical Aircraft: D-III-2
RDC: C-II-4000	RDC: D-III-4000
Visibility Minimum: ¾-mile (26R)/VIS(8L)	Visibility Minimum: ¾-mile (26R)/1-mile(8L)
Runway Length/Width: 4,858' x 150'	Maintain
12,000(S)	20,000 (s); 60,000 (D); 90,000 (DT)
RSA: 500' wide x 1,000' beyond runway end	Maintain
ROFA: 800' wide x 1,000' beyond runway end	Maintain
OFZ: 400' wide x 200' beyond runway end	Maintain
RPZ ownership: partial ownership	Fee simple acquisition or easements, if feasible. Maintain land use control measures.
RPZ Incompatibilities: Euclid Ave. (8L)	Remove RPZ incompatibilities if feasible.
Blast Pad: Both ends	Maintain
Precision marking (26R)/Nonprecision marking (8L)	Maintain
MIRL	Maintain
RUNWAY 3-21	
Critical Aircraft: C-II-2	Same
RDC: C-II-VIS	Same
Visibility Minimum: VIS	Same
Runway Length/Width: 4,858' x 150'	Maintain
21,000(S); 130,000(D); 50,000(DT)	Maintain
RSA: 500' wide x 1,000' beyond runway end	Maintain
ROFA: 800' wide x 1,000' beyond runway end	Maintain
OFZ: 400' wide x 200' beyond runway end	Maintain
RPZ ownership: partial ownership	Fee simple acquisition or easements, if feasible. Maintain land use control measures.
RPZ Incompatibilities: Kimball Ave.(3) / Merrill and Grove Ave. (21)	Remove RPZ incompatibilities if feasible.
Blast Pad: Both ends	Maintain
Nonprecision marking	Maintain
MIRL	Maintain

INSTRUMENT NAVIGATION AND WEATHER AIDS

AVAILABLE	POTENTIAL IMPROVEMENT/CHANGE
RUNWAY 8R-26L	
ASOS, windsocks, beacon, ATCT, ATIS	Maintain
Visual approaches	1-mile approaches
RUNWAY 8L-26R	
Visual approach (8L)	1-mile approach
ILS/Localizer (26R) - ¾-mile approach	Maintain
RUNWAY 3-21	
VIS approaches	Maintain

VISUAL AIDS

RUNWAY 8R-26L	
PAPI-4L	Maintain
REIL - NA	Add REIL
RUNWAY 8L-26R	
PAPI-4L	Maintain
REIL - NA	Add REIL
RUNWAY 3-21	
PAPI-4L	Maintain
REIL	Maintain

RDC - Runway Design Code
RSA - Runway Safety Area
ROFA - Runway Object Free Area
OFZ/POFZ - Obstacle Free Zone/Precision Obstacle Free Zone
RPZ - Runway Protection Zone
TDG - Taxiway Design Code
PAPI - Precision Approach Path Indicator
VASI - Visual Approach Slope Indicator
LPV - GPS with Localizer Performance and Vertical Guidance
REIL - Runway End Identification Lights
MIRL/HIRL - Medium/High Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
ASOS - Automated Surface Observation System
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MALS -Medium Intensity Approach Lighting System
##-S/D/DT - Runway Strength Rating in Thousands of Pounds for Single (S), Dual (D), and Dual Tandem (DT)

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LANDSIDE REQUIREMENTS

Landside facilities provide the essential interface between the airside facilities and ground access to and from the airport. The capacities of existing facilities have been examined against the projected requirements to gauge anticipated timing of needs. Included in the following analysis are general aviation terminal services, automobile parking, fuel storage, aircraft storage, and apron requirements.

AIRCRAFT HANGAR REQUIREMENTS

The demand for aircraft storage hangar area is based upon the forecast number and mix of aircraft expected to be based at Chino Airport in the future. Currently, approximately 30 percent of based aircraft utilize tie-down space on the local ramp. As more hangar space becomes available, it is assumed that a portion of the tie-down aircraft will lease hangar space; therefore, in the long term, approximately 22 percent of based aircraft are considered for tie-down space.

Future requirements are calculated using an average of 2,500 square feet per new based aircraft. Museum hangar space, of which there is currently 244,000 square feet, is not considered in the hangar calculation. Several hangars (461,300 square feet) have been identified as redevelopment sites, and these are also not included in the baseline hangar capacity totals.

Future hangar requirements for the airport are summarized in **Table 3T**. It is estimated that an additional 312,500 square feet of hangar space will be needed within the planning period of this ALP Update. The landside alternatives evaluation will examine the options available for hangar development at the airport and determine the best location for each type of hangar facility.

TABLE 3T | Forecast Hangar Needs

	2022	2027	2032	2042
Based Aircraft	698	727	758	823
New Hangar Area (s.f.)	NA	72,500	150,000	312,500

Source: Coffman Associates analysis.

It should be noted that estimating future hangar requirements is inherently challenging because the use of each hangar can vary greatly, especially box and conventional hangars. For example, a large 10,000-square-foot hangar may be capable of housing several aircraft, but it might be a private hangar that houses only one aircraft. Therefore, airport management should defer to actual user needs when considering hangar development proposals.

AIRCRAFT PARKING APRON REQUIREMENTS

Parking aprons should provide for the locally based aircraft that are not stored in hangars, itinerant, or transient aircraft, as well as for those aircraft used for air taxi and training activity. In total, the airport has been estimated to have 201,000 square yards of paved aircraft apron.

For planning purposes, a planning criterion of 650 square yards per aircraft was used to determine the apron requirements for small single and multi-engine aircraft. A planning criterion of 900 square yards was used for larger aircraft. Apron area needs are divided among the need for local tie-down positions, transient visitors, and maintenance apron used by airport businesses. Total aircraft parking apron requirements are presented in **Table 3U**.

TABLE 3U | Forecast Apron Needs

	2022	2027	2032	2042
LOCAL TIE-DOWN APRON				
Aircraft to Tie Down	209	204	197	181
Local Tie-Down Apron Needed (s.y.)	98,000	111,800	108,500	100,500
ITINERANT APRON				
Annual Itinerant Operations	66,230	69,801	73,644	81,958
Busy Day Itinerant Landings	130	137	144	161
Itinerant Aircraft Needing Parking (35%)	45	48	51	56
Itinerant Aircraft Positions	NA	48	51	56
Apron Area Needed (s.y)	57,000	37,100	39,200	43,600
MAINTENANCE APRON				
Maintenance Apron Need (s.y.)	46,000	91,300	93,600	99,000
TOTAL APRON (S.Y.)	**201,000**	**240,200**	**241,300**	**243,100**

Source: Coffman Associates Analysis

While the total number of tie-down positions and apron area is expected to be sufficient through the planning period, it appears there is an immediate need for more aircraft apron. However, over time, as more aircraft move to a hangar, less apron area will be required. Itinerant apron positions and area are based on projected usage. Potential usage is estimated at 35 percent of peak day itinerant operations, meaning 35 percent of those operations could be on the ground at the same time, thus needing a place to park. Maintenance apron area estimates are based on local needs, knowledge, and projected growth at the airport. In total, approximately 42,100 square feet of new apron area is projected to be needed over the next 20 years.

GENERAL AVIATION TERMINAL SERVICES

General aviation terminal services have several functions: customs, a pilots' lounge, flight planning, concessions, airport management, and storage. Many airports have leasable space in the terminal building for such features as a restaurant, FBO line services, and other needs. These functions have been spread into several buildings at CNO, including the terminal building, FBO facilities, and the airport restaurant.

The methodology used in estimating general aviation terminal facility needs is based on the number of airport users expected to utilize these facilities during the design hour. General aviation space requirements are based upon providing 120 square feet per design hour itinerant passenger. Design hour itinerant passengers are determined by multiplying design hour itinerant operations by the estimated number of passengers on the aircraft (multiplier). An increasing passenger count (from 2.0 to 2.4) is used to account for the likely increase in the number of passengers utilizing general aviation services over time. **Table 3V** outlines the general aviation terminal facility space requirements for the airport.

TABLE 3V | General Aviation Terminal Building Area

	Currently Available	Current Need	Short Term	Intermediate Term	Long Term
Design Hour GA Operations	74	74	77	81	88
Design Hour GA Itinerant Operations	27	27	29	31	34
Multiplier	2.0	2.0	2.1	2.2	2.4
Total Design Hour Itinerant Passengers	55	55	62	69	83
GA Terminal Building Public Space (sf)	6,000*	8,200	9,200	10,400	12,400
*Estimated GA terminal building space available at FBO's.					

Source: Coffman Associates analysis

AUTOMOBILE PARKING

There are several automobile parking lots available for vehicle use at Chino Airport. On the north side of the airport, approximately 680 parking spaces are available. Of this total, 20 are reserved for handicapped persons. On the south side of the airport, an additional 150 parking spaces are available for vehicles utilizing the FBO facilities. In total, there are approximately 830 automobile parking spaces located on Chino Airport that serve a variety of aviation and non-aviation related businesses.

Planning for adequate automobile parking is a necessary element for any airport. Parking needs can effectively be divided between transient airport users and locally based users. Transient users include those employed at the airport and visitors, while locally based users primarily include those attending to their based aircraft. A planning standard of 2.0 times the design hour itinerant passenger count provides the minimum number of vehicle spaces needed for transient users. Locally based parking spaces are calculated as the number of based aircraft. A planning standard of 315 square feet is utilized to determine total vehicle parking space necessary. This includes area needed for circulation and handicap clearances.

The total number of parking spaces appears to be adequate through the long-term planning period. While the total number of spaces appears appropriate, the location of parking spaces should be considered. Parking should be made available near new airport businesses or hangars. Parking requirements for the airport are summarized in **Table 3W**.

Exhibit 3G summarizes the landside and support facility requirements.

TABLE 3W | GA Vehicle Parking Requirements

	Currently Available	Current Need	Short Term	Intermediate Term	Long Term
Design Hour GA Itinerant Passengers	55	55	62	69	83
GA VEHICLE PARKING SPACES					
GA Itinerant Spaces	0	109	123	138	165
GA Local Spaces	0	312	364	379	412
Total GA Spaces	**830**	**421**	**487**	**517**	**577**
[1]Does not include 200 parking spaces at museums.					

Source: Coffman Associates analysis

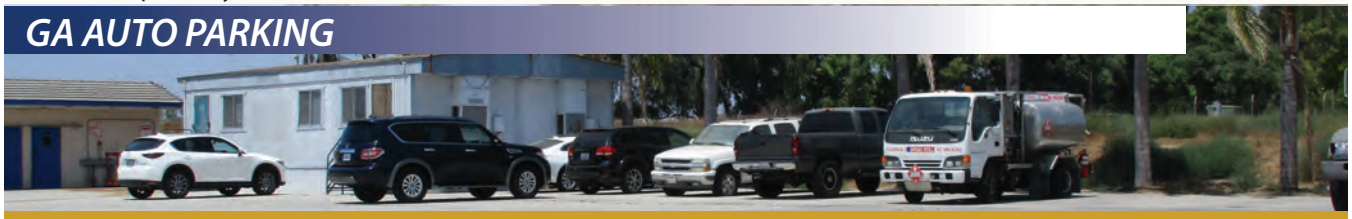
HANGARS

	Available	Short Term	Intermediate Term	Long Term
Based Aircraft	698	727	758	823
Hangar Positions				
T-Hangars	280	244	259	286
Conventional/Box Hangars	300	253	264	354
Hangar Area				
Total Hangar Area (s..f)[1]	1,140,710	1,213,210	1,290,710	1,453,210
Total Hangar Need	NA	72,500	150,000	312,500

AIRCRAFT PARKING

Aircraft Parking Positions				
GA Local Positions	170	224	217	201
GA Transient Piston Positions	64	38	40	45
GA Transient Turboprop/Jet Positions	16	10	10	11
GA Aircraft Parking Apron				
GA Local Apron Area (s.y.)	98,000	111,800	108,500	100,500
GA Transient Apron Area (s.y.)	57,000	37,100	39,200	43,600
Maintenance Area (s.y.)	46,000	91,300	93,600	99,000
GA Total Apron (s.y.)	201,000	240,200	241,300	243,100

GA AUTO PARKING



GA Auto Parking				
GA Parking Spaces	830	421	487	517
GA Parking Area (s.f.)	415,000	210,500	243,250	258,700
GA Terminal Services				
Area (s.f.)	6,000[2]	9,200	10,400	12,400
Fuel Storage (14-Day Reserve)				
AvGas Capacity (gal.)	NA	34,035	37,508	44,454
Jet A Capacity (gal.)	NA	26,159	29,975	37,608
Perimeter Fencing - Linear Feet	~35,000	Maintain and Replace As Needed	Maintain and Replace As Needed	Maintain and Replace As Needed

[1]Does not include 244,000 sf of museum hangar space, and 461,100 sf of planned hangar redevelopment.
[2]Estimated space available in FBO's

SUPPORT FACILITIES

Various facilities that do not logically fall within classifications of airside or landside are identified. These support facilities relate to the overall operations of the airport.

AIRPORT ACCCESS

In airport facility planning, both on- and off-airport vehicle access is important. For the convenience of airport users (and to provide maximum capacity), access to the airport should include (to the extent practical) connections to the major arterial roadways near the airport. Access to Chino Airport is available via Euclid Avenue, which is located adjacent to the west side of the airport. Merrill Avenue, on the north side of the airport, and Kimball Avenue, on the south side of the airport, extend east from Euclid Avenue, providing direct access to landside facilities. Euclid Avenue provides direct access to U.S. Highway 60 to the north and U.S. Highways 71 and 91 to the south. The highways connect to other major roadways serving the greater Los Angeles metropolitan area and points beyond. The existing roadway infrastructure leading to the airport should provide adequate capacity and access to Chino Airport through the long-term planning period.

INTERIOR AIRPORT ACCESS

Service roads are typically used to segregate vehicles from aircraft operational areas. At Chino Airport, vehicles must use taxiways, taxilanes, and apron areas to access certain aircraft storage hangars and specialty aviation operators due to the absence of interior service roads. The segregation of vehicle and aircraft operational areas is supported by FAA AC 50/5210-20A, *Ground Vehicle Operations on Airports*. The AC states that the control of vehicular activity on the airside of an airport is of the highest importance. It goes on to state that an airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport. It should be noted that the airport is served by a perimeter access road extending around the runway system and airport perimeter for airport maintenance vehicles. The alternatives analysis in the next chapter will examine options for interior service roads to serve hangar facilities and other aviation-related businesses, especially on the north side of the airport.

FUEL STORAGE

Additional fuel storage capacity should be planned if CNO is unable to maintain an adequate supply and reserve. It is typical for fuel vendors to try to maintain a 14-day supply and reserve. The fuel storage and delivery functions at the airport are managed by the airport FBOs. Those fuel suppliers then provide a fuel flowage to the airport for the right to sell fuel to the public on the airport.

Table 3Y provides a forecast of the fuel capacity needs at the airport, which includes both static tanks and fuel delivery trucks. Fuel storage capacity needs are based on forecast operations at the airport and an estimate of the fuel consumption per operation. Each turbine operation is estimated to account for

100 gallons of Jet A fuel sold. Piston engine operations are estimated at four (4) gallons per piston operation. By the long-term planning period, the airport should have a combined capacity of approximately 46,000 gallons for Jet A fuel and 27,000 gallons for Avgas fuel.

TABLE 3Y | Fuel Storage Estimate

	PLANNING HORIZON		
	Short Term	Intermediate Term	Long Term
Jet Fuel Requirements			
Annual Usage (gal.)	829,000	950,000	1,192,000
Daily Usage (gal.)	2,271	2,603	3,266
14-Day Storage (gal.)	31,797	36,438	45,721
Avgas Requirements			
Annual Usage (gal.)	618,376	645,921	703,968
Daily Usage (gal.)	1,694	1,770	1,929
14-Day Storage (gal.)	23,719	24,775	27,002

Source: Estimate of 4 gallons of Avgas per piston operation and 100 gallons per turbine operation.

AIRCRAFT WASH RACK

A designated aircraft wash rack is currently located on the southeast side of the airport adjacent to the large conventional hangar complexes. This facility should be maintained through the planning period.

PERIMETER FENCING AND GATES

Perimeter fencing is used at airports primarily to secure the aircraft operational area. The physical barrier of perimeter fencing provides the following functions:

- Gives notice of the legal boundary of the outermost limits of a facility or security-sensitive area.
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary.
- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion-detection equipment and closed-circuit television (CCTV).
- Deters casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter.
- Demonstrates the intent of an intruder by their overt action of gaining entry.
- Causes a delay to obtain access to a facility, thereby increasing the possibility of detection.
- Creates a psychological deterrent.
- Optimizes the use of security personnel, while enhancing the capabilities for detection and apprehension of unauthorized individuals.
- Demonstrates a corporate concern for facility security.
- Limits inadvertent access to the aircraft operations area by wildlife.

Chino Airport's operations areas are completely enclosed by a six-foot chain-link fence topped with three-strand barbed-wire. The fence does not always follow the legal airport boundary due to the layout of physical features and infrastructure development. It is estimated that there are 35,000 linear feet of perimeter fencing. Three functioning automated access gates are also located at the airport, in addition to several manually controlled access gates. The perimeter fencing and gates should be maintained through the planning period.

AIRCRAFT RESCUE AND FIREFIGHTING

Chino Airport is not currently served by a dedicated aircraft rescue and firefighting facility (ARFF); however, the Chino Valley Independent Fire District's Fire Station No. 3 is located on the south side of the airport adjacent to Kimball Avenue. While the station is not ARFF-certified, it operates a variety of equipment that is capable of handling fire and rescue operations specific to aircraft emergencies. The fire station has at least four personnel at the facility 24 hours per day, seven days per week, and provides emergency and rescue services to the surrounding area.

Federal regulations do not require ARFF services to be located on the airport. ARFF services are required only at FAA-certified commercial service airports. Unless federal regulations change, there will not be a regulatory requirement for ARFF facilities on the airport. Emergency services will continue to be met with personnel and equipment stationed at the fire station on the south side of the airport. Therefore, no additional requirements for ARFF services are needed at Chino Airport.

AIRPORT MAINTENANCE BUILDING

Chino Airport has two dedicated airport maintenance buildings located on the north side of the airport adjacent to Merrill Avenue. These facilities are adequate for the storage of equipment that is used for various purposes on the airport.

UTILITIES

Electrical, water, natural gas, sanitary sewer, and telecommunications services are available at the airport. The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport. Utility extensions to new development areas may be needed through the planning period.

AIR TRAFFIC CONTROL

Approaching, departing, and taxiing aircraft at CNO are managed by the Chino ATCT controllers. The CNO ATCT was commissioned in June 1941 (https://skyvector.com/airport/CNO/Chino-Airport) and is located on the north side of the airfield. The tower operates from 7:00am to 9:00pm 365 days per year. The CNO ATCT is an FAA facility staffed with FAA employees. Because of the level of activity at the airport, there should be an ATCT. Due to the age of the tower, consideration should be given to a replacement tower.

SUMMARY

This chapter has outlined facility requirements for CNO for a 20-year planning period.

It is recommended that Chino maintain all three runways, primarily for capacity purposes as the activity levels warrant three runways. In fact, the forecasts of aviation demand indicate that capacity could become a concern in future years. The runways are planned to remain with their current runway design code to permit the critical aircraft to use any available runway.

There are four FAA-identified "Hot Spots" on the airfield that need to be reviewed in the alternatives chapter of this study. Hot Spots are locations that may be confusing to pilots and, therefore, there is an increased possibility of a runway incursion. The design standards analysis showed that there are penetrations to the runway safety area surrounding Runway 8L-26R. There is also a fence penetrating the Runway 8R-26L runway object free area. The alternatives chapter will address these non-standard conditions.

Runway 8R-26L is the primary runway with a length of 7,000 feet. Runway 8L-26R is the parallel runway with a length of 4,858 feet. Runway 3-21 is an additional runway with a length of 4,919 feet. Runway 8R-26L and Runway 3-21 are of adequate length which should be maintained. Runway 8L-25R should be planned for a length of up to 5,500 feet, if feasible. The 150-foot width of all three runways exceeds the FAA standard of 100 feet.

On the landside, approximately 312,000 square feet of new hangar space is anticipated to be needed to accommodate forecast growth over the next 20 years. Approximately 42,100 square yards of additional aircraft parking apron space is projected to be needed as well.

The following chapter will consider various airside and landside alternative layouts.

CHAPTER FOUR

ALTERNATIVES

SAN BERNARDINO COUNTY

CHAPTER FOUR

ALTERNATIVES

In the previous chapter, airside and landside facilities required to satisfy aviation demand through the long-range planning period were identified. The next step in the planning process is to evaluate reasonable ways these facilities can be provided. There are numerous combinations of design alternatives, but the alternatives presented here are those with the perceived greatest potential for implementation.

Any development proposed for an airport is evolved from an analysis of projected needs for a set period of time. Though the facility requirements were determined by utilizing industry-accepted statistical methodologies, unforeseen future events could impact the timing of the needs identified. The ALP Update process attempts to develop a viable concept for meeting the needs generated by projected demands for the next 20 years. However, no plan of action should be developed which may be inconsistent with the future goals and objectives of Chino Airport (CNO).

PLANNING OBJECTIVES

A set of basic planning objectives has been established to guide the alternatives development process. It is the goal of this planning effort to produce a development plan for the Chino Airport that addresses forecast aviation demand. As owner and operator, San Bernardino County provides overall guidance for the operation and development of the airport. It is of primary concern that CNO is marketed, developed, and operated for the betterment of the region and its users. The following basic planning objectives have been defined:

- Conform to Federal Aviation Administration (FAA) design and safety standards for the mix of aircraft that could potentially use the airport during the 20-year planning period of this study.
- To maintain a safe, attractive, and efficient aviation facility in accordance with applicable federal, state, and local regulations.
- To develop a facility that is responsive to the current and long-term needs of all current and potential aviation users.
- To be reflective and supportive of the long-term planning efforts currently applicable to the region.

- To develop a facility with a focus on self-sufficiency in both operational and developmental cost recovery.
- Identify on-airport land use opportunities for compatible non-aeronautical development to expand and diversify the airport's revenue-generating potential.
- To ensure that recommended development is environmentally compatible.
- To preserve and protect public and private investments in existing airport facilities.

The airside considerations relate to those airfield/airspace elements that contribute to the safe and efficient transition of aircraft and passengers from air transportation to the landside facilities at an airport. This includes the established design standard for the airport, the instrument approach capability, the capacity of the airfield, the length and strength of the runways, navigational aids, and the layout of the taxiways and aprons. Each of these elements was introduced in previous chapters, and various facility needs were established.

The landside considerations primarily relate to terminal services, hangars, and fueling. The previous chapter introduced these elements and identified specific needs based on the forecast future aviation demand. The goal now is to identify alternatives for locating these facilities.

Each functional area (airside and landside) interrelates and affects the development potential of the others. Alternatives related to the runway/taxiway system are examined first, with a preferred alternative presented, then potential landside facility layouts are considered. Following review of the alternatives by the project team, airport staff, and the public, a final recommended concept will be presented in the next chapter.

Not all airside or landside elements will require a detailed alternatives analysis. The alternatives analysis is reserved for presenting viable solutions to specific problems or challenges. For those airside or landside elements where only one solution is reasonable or where no alternative is necessary, an explanatory narrative is provided. **Exhibit 4A** summarizes the primary planning considerations for the airside and landside alternatives.

NON-DEVELOPMENT ALTERNATIVE

The non-development alternative essentially considers making no new capital investments at CNO. Limited maintenance and upkeep would continue so that CNO remains safe for aviation activity and continues to meet its grant assurances. No new hangars or apron area would be planned to be built by the airport sponsor; however, this would not and could not include the prohibition of hangar construction by a private entity. The obvious result of the non-development alternative is that CNO would be unable to meet the current and forecast demand for aviation services in the area and existing facilities would deteriorate over time.

The unavoidable consequence of the non-development alternative is that the capability of CNO would diminish over time. Its ability to serve the general aviation and business aviation markets would deteriorate. This would lead to fewer people using CNO and would negatively impact the local economy. Safety

AIRSIDE CONSIDERATIONS

- Evaluate each runways capability to fully meet FAA design standards for RSA, ROFA, OFZ and RPZ.
- Examine each FAA designated "Hot Spot" for mitigation alternatives.
- Examine each FAA identified RIM location for mitigation alternatives.
- Consider addition of runway end identification lights for parallel runways.
- Consider impacts of extending Runway 8L-26R to 5,500 feet.
- Consider RPZ and other property acquisition needs.
- Examine existing taxiway geometry and present alternatives.
- Plan for medium intensity taxiway edge lighting for all taxiways.
- Examine feasibility of aircraft hold/runup aprons at each runway end.
- Identify proper hold line locations.

LAND SIDE CONSIDERATIONS

- Identify location for potential aeronautical development.
- Identify location for potential non-aeronautical development.
- Analyze current and future terminal area needs and locations.
- Examine the interior airport service road for efficiency and safety.
- Present alternatives for south side development.
- Maximize revenue production of land to include non-aeronautical uses.
- Consider addition of 62,000 square yards of aircraft parking apron.
- Consider reconfiguration of existing local tie-down apron to provide standard separation requirements.

concerns would arise, especially if routine maintenance were deferred, and the liability for damage to aircraft or accidents would increase. The long-term consequences of the non-development alternative would be to reduce the quality of the existing facilities over time, producing undesirable results.

The non-development alternative does not align with the goals and objectives of Chino Airport and is, therefore, not carried forward in this planning effort.

PRELIMINARY AIRPORT LAND USE PLAN

The objective of airport land use planning is to coordinate future uses of the airport property in a manner that is both functional with the design of the airport and compatible with the airport environs. There are two primary considerations for on-airport land use planning. The first is to secure those areas essential to the safe and efficient operation of the airport. The second is to determine compatible land uses for the balance of the property which would be most economically advantageous to the airport and the region it serves.

Prior to presenting development alternatives, it is important to have a basic understanding of the land use guidelines. With this understanding, facilities can be located to ensure the highest and best use of airport property. There are also certain design standards that affect facility location options. For example, future structures should be planned so they do not compromise safe and efficient aircraft operations.

Any property, when described as part of an airport in an agreement with the United States or defined by an airport layout plan (ALP) or listed in the Exhibit "A" property map, is considered to be "dedicated" or obligated property for airport purposes. The primary purpose of airport property is for aeronautical use. Land on the ALP designated for aeronautical use may not be used for non-aeronautical purposes, in most cases, without FAA approval.

If it has been determined that obligated land on the airport is no longer needed for aviation because it exceeds the forecasted need or is inaccessible by aircraft, the property may be considered for compatible non-aeronautical use. The revenue from this use can provide supplemental funds to the airport with the goal of making the airport as self-sustaining as possible.

By categorizing the entirety of airport property, airport management can plan and direct any development proposals to the appropriate locations. There are four primary land use categories on an airport: airfield operations, aviation development, airport reserve, and non-aviation revenue support. Often, these categories are further subdivided to provide a better understanding of current or intended uses of airport property. **Exhibit 4B** presents preliminary land use classifications for the airport to guide the alternatives analysis. Once a long-term plan for the airport is established in subsequent chapters, a formal land use plan will be developed and included in the ALP set.

PRELIMINARY ON-AIRPORT LAND USE	ACRES
Aeronautical Revenue Support	
Currently Developed (D)	210
Currently Undeveloped (U)	168
Non-Aeronautical Revenue Support	
Currently Developed (D)	10
Currently Undeveloped (U)	135

~8 acres (D)
~4 acres (U)
~2 acres (D)
~8 acres (U)
~37 acres (U)
~183 acres (D)
~14 acres (U)
~30 acres (U)
~24 acres (U)
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150')
Runway 8R-26L (7,000' x 150')
~37 acres (U)
~100 acres (U)
~28 acres (U)
~27 acres (D)
~16 acres (U)
~5 acres (U)

LEGEND
- Airport Property Line
- A — Taxiway Identifier
- Airfield Operations
- Aeronautical Revenue Support
- Non-Aeronautical Revenue Support

NORTH
0 800
SCALE IN FEET

Aerial Photo: Google Earth 4-23-20

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AIRFIELD OPERATIONS

Airfield operations is that portion of airport property that encompasses the major airside elements, such as the runways, taxiways, runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (OFZ), runway protection zone (RPZ) (on airport property), taxiway safety area, taxiway object free area (TOFA), and navigational aid critical areas. Airfield operations are intended for the safe and efficient movement of aircraft to and from the airfield. This land use designation includes the various object clearing areas, and only elements necessary for aircraft navigation can be located here.

For planning purposes, the airfield operations area has been extended to the end of the property line to accommodate any planned future extension of the runway.

AVIATION DEVELOPMENT

The aviation development land use category includes those areas that should be reserved for development that require access to the airfield operations area, such as aircraft hangars and aviation businesses. Generally, lands adjacent to the runway should be reserved for future aviation development to such a depth that it allows for future taxiways, taxilanes, aprons, hangars, and access roads. This land use category will also include airport support elements that may not require taxiway access, such as drainage infrastructure.

The airport land use plan identifies approximately 168 acres of undeveloped land that should be reserved for future aviation development. While this land likely exceeds what may be needed to support aviation development over the next 20 years, it should nonetheless be reserved for this purpose because of its proximity to the runway and taxiway system and to position the airport to respond to any potential spike in activity that exceeds the forecast.

NON-AVIATION REVENUE SUPPORT

With FAA approval, portions of the airport property may be used for non-aviation revenue support purposes. Typically, it is preferable that development in these areas will complement airport activities to some degree, but that is not required. However, it is required that any non-aviation facilities be compatible with airport operations, so development such as houses would be excluded. Examples of potential uses include research facilities, laboratories, manufacturing and processing facilities, warehouses, and other facilities compatible with an airport environment.

Designating airport land for non-aviation uses is available only to those airports that have enough land to accommodate future aviation development. Land that is inaccessible by aircraft is often considered for a revenue-supporting role. Any airport land considered for non-aviation development must be formally released from obligation as aviation land by the FAA.

Several parcels of airport property have been identified for potential non-aviation revenue support development. In the northwest corner of the airport, there are approximately 37 acres identified for this purpose. This property is adjacent to existing non-aviation development and is more distant to the runway and taxiway system.

On the south side of the airport along Kimball Ave., a buffer to a depth of approximately 300 feet from the road is planned. The buffer is intended to keep aircraft engine noise a little farther away from the residential developments on the south side of Kimball Ave.

In the southwest corner is a 37-acre parcel of undeveloped land. For planning purposes, this is considered for non-aviation development. In the northeast corner, there are approximately 54 acres of undeveloped land, of which approximately 30 acres is planned to be reserved for aviation purposes, with the remaining for non-aviation revenue support uses.

AIRSIDE ALTERNATIVES

The purpose of this section is to identify and evaluate the various viable airside development considerations at Chino Airport to meet the requirements set forth in Chapter Three - Facility Requirements. Airfield facilities are, by nature, the focal point of an airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives.

In particular, the runway system requires the greatest commitment of land area to meet the physical layout of the system, as well as the required FAA safety standards. Moreover, the design of the airfield system defines minimum building set-back distances from the runway and object clearance standards. These criteria should be defined first to ensure that the fundamental needs of the airport are met. Therefore, airside development alternatives will be considered prior to detailing landside development alternatives.

Generally, airside issues relate to those airport elements that contribute to the safe and efficient transition of aircraft and passengers from air transportation to the landside facilities at an airport. This includes runways, taxiways, aprons, hold bays, instrument approaches, and navigational aids. Each of these elements was introduced in previous chapters. This section will examine several airside issues specific to CNO and present several alternatives. **Exhibit 4A** presents a summary of the major airside considerations.

AIRPORT DESIGN STANDARDS

The design standards for a runway and airport are based on the determination of the current and future critical aircraft. The critical aircraft is defined as that aircraft model or family of aircraft with similar characteristics that account for at least 500 annual operations at an airport. In Chapter Two – Forecasts, it was demonstrated that the current critical aircraft is classified as C-II-2, which is best represented by medium-sized business jets, such as the Gulfstream 300. The future critical aircraft is classified as D-III-2, which is best represented by a large business jet, such as the Gulfstream V/500.

Exhibit 4C presents the applicable design standards for the runway system at Chino Airport. The following items of note will be addressed in the ALP Update:

AIRPORT DESIGN CATEGORY	RUNWAY 8R-26L		RUNWAY 8L-26R		RUNWAY 3-21
	Existing	Future	Existing	Future	Existing/Future
Design Aircraft	C-II-2	D-III-2	C-II-2	D-III-2	C-II-2
Runway Design Code	C-II-VIS	D-III-5000	C-II-4000	D-III-4000	C-II-VIS
Visibility Minimums	VIS	1-mile	VIS(8L)/ ¾-mile(26R)	1-mile (8L)/ Same (26R)	VIS
RUNWAY DESIGN					
Runway Width	100' **(150')**	100'	100' **(150')**	100'	100' **(150')**/ 100'
Runway Shoulder Width	20'	20'	20'	20'	10'
RUNWAY PROTECTION					
Runway Safety Area (RSA)					
Width	500'	Same	500'	500'	500'
Length Beyond Departure End	1,000'	Same	1,000' **(920'/8L)**/ 1,000' **(898'/26L)**	1,000'	1,000'
Length Prior to Threshold	600'	Same	600'	600'	600'
Runway Object Free Area (ROFA)					
Width	500'	Same	500'	500'	500'
Length Beyond Departure End	1,000'	Same	1,000' **(920'/8L)**/ 1,000' **(898'/26L)**	1,000'	1,000'
Length Prior to Threshold	600'	Same	600'	600'	600'
Runway Obstacle Free Zone (ROFZ)					
Width	400'	Same	400'	Same	400
Length Beyond End	200'	Same	200'	Same	200
Approach Runway Protection Zone (RPZ)					
Length	1,700'	Same	1,700'(8L)/1,700'(26R)	Same	1,700'
Inner Width	500'	Same	500' (8L)/1,000'(26R)	Same	500'
Outer Width	1,010'	Same	1,010(8L)/1,510'(26R)	Same	1,010'
Departure Runway Protection Zone (RPZ)					
Length	1,700'	Same	1,700	Same	1,700'
Inner Width	500'	Same	500	Same	500'
Outer Width	1,010'	Same	1,010	Same	1,010'
RUNWAY SEPARATION					
Runway Centerline to:					
Holding Position	250' **(257')**	257'	250'	257' **(250')**	250'
Parallel Taxiway	300' **(400')**	400'	300' **(400')**	400'	300' **(400')**
Aircraft Parking Area	400'	500'	400'	500'	400'

Note: All dimensions in feet
BOLD: Existing condition other than the standard.
Source: FAA AC 150/5300-13A, Airport Design

- The existing width of 150 feet for all three runways exceeds the current and future design standard, which is 100 feet.
- The paved runway shoulders for the parallel runways are 20 feet wide, which exceeds the current standard of 10 feet; however, in the future, the applicable standard will be 20 feet.
- The RSA and ROFA standard for length beyond the runway end for all runways is 1,000 feet. The RSA and ROFA beyond the departure end of Runway 8L meets this standard for 920 feet before being penetrated by a low fence surrounding aboveground gas line equipment.
- The RSA and ROFA beyond the Runway 26R end meet this standard for 898 feet before being penetrated by the localizer antenna. The localizer antenna is mounted on a frangible base, which mitigates this issue to some degree; however, it is better if the localizer can be removed from the RSA and ROFA, if feasible, without losing runway utility.
- The ROFA to the east of the Runway 26L threshold is penetrated by a fence surrounding stormwater detention ponds.
- The existing standard for hold position lines is 250 feet from the runway centerline for all runways. In the future, the standard is 257 feet. Some hold lines already meet the future standard and should be maintained. Any hold line that is less than 250 feet from the runway should be relocated to at least 250 feet, if not 257 feet (to avoid moving it twice).
- The existing RPZs, except for Runway 26R, cross over public roads, which are considered an incompatible land use. No action is planned to be taken to mitigate the existing condition (as outlined in FAA Memorandum Interim Guidance on Runway Protection Zones). Any changes to the size or location of the RPZs will require a more detailed alternatives analysis as outlined in the Interim Guidance.

These design standard issues will be addressed in the alternatives to follow.

RUNWAY LENGTH

As presented in Chapter Three – Facility Requirements, Primary Runway 8R-26L should be maintained at 7,000 feet. Parallel Runway 8L-26R, currently measuring 4,858 feet in length, should be considered for extension to 5,500 feet. Runway 3-21 is planned to be maintained at a length of 4,919 feet.

RUNWAY BLAST PADS

A runway blast pad is a surface beyond the ends of the runways provided to reduce the erosive effect of jet blast and propeller wash. At Chino Airport, all runway ends have a blast pad except for Runway 26R. While blast pads are not a required airfield element, there are recommended design standards to apply when they are made available. The current applicable design standard for all three runways (C-II) is 120 feet wide and 150 feet long. All runways meet or exceed this standard.

When the airport transitions to ARC D-III, the blast pad dimensional standard for both parallel runways (but not Runway 3-21) changes to 200 feet long and 140 feet wide. All runway ends meet or exceed the future blast pad dimensional standard.

RUNWAY SAFETY AREA (RSA) MITIGATION FOR RUNWAY 8L-26R

As previously discussed, two RSA deficiencies currently exist on Runway 8L-26R. The localizer antenna is located 898 feet from the Runway 8L threshold and a fenced area enclosing aboveground natural gas valves is located 920 feet from the Runway 26R threshold. FAA design criteria require an area extending 1,000 feet beyond each runway end to be cleared and free of objects to provide the highest level of safety for aircraft operators.

FAA Order 5300.1F, *Modification of Agency Airport Design, Construction, and Equipment Standards*, indicates in Paragraph 6.d the following:

> ". . . Runway safety areas at both certificated and non-certificated airports that do not meet dimensional standards are subject to FAA Order 5200.8, *Runway Safety Area Program*. Modification of Standards is not issued for nonstandard runway safety areas."

Paragraph 6.b of FAA Order 5200.8, *Runway Safety Area Program*, indicates that FAA shall make one of the following determinations for deficient RSAs:

1. The existing RSA meets the current standards contained in AC 150/5300-13, *Airport Design*.
2. The existing RSA does not meet the current standards, but it is practicable to improve the RSA so that it will meet current standards.
3. The existing RSA can be improved to enhance safety, but the RSA will still not meet current standards.
4. The existing RSA does not meet current RSA standards, and it is not practicable to improve the RSA.

The findings of this ALP Update can aid the FAA Western-Pacific Region in making a determination on the existing condition of RSAs at Chino Airport.

Appendix 2 of FAA Order 5200.8 provides guidance for an RSA determination. This includes the alternatives that must be evaluated. Paragraph 3 of Appendix 2 states:

> "The first alternative that must be considered in every case is constructing the traditional graded runway safety area surrounding the runway. Where it is not practicable to obtain the entire safety area in this manner, as much as possible should be obtained. Then the following alternatives shall be addressed in the supporting documentation ...:"
>
> 1. Construction the traditional graded runway safety area surrounding the runway.
> 2. Relocation, shifting, or realignment of the runway.

3. Reduction in runway length where the existing runway length exceeds that which is required for the existing or projected design aircraft.
4. A combination of runway relocation, shifting, grading, realignment, or reduction.
5. Implementation of declared distances.
6. Installation of an Engineered Materials Arresting Systems (EMAS).

The following subsections discuss the application of the FAA-recommended alternatives for mitigating the non-standard RSA for Runway 8L-26R. With an extension to this runway to be considered, two scenarios are presented. The first considers RSA mitigation alternatives for the RSA for the runway as it currently exists (without an extension). The second scenario considers bringing Runway 8L-26R into RSA compliance with the proposed 642-foot extension to the east.

It should be noted that, as previously discussed, the localizer antenna, located 898 feet west of the Runway 8L threshold, meets the frangible mounting requirements set forth by the FAA. As such, another option, although not depicted in the following alternatives, is to allow the localizer to remain in its current location. The FAA can then choose to determine that the RSA to the west of the Runway 8 threshold has been improved to enhance safety, because of the frangible mounts for the localizer antenna, but will not fully meet RSA design standards. The following RSA alternatives analysis presents possible methods to fully meet RSA design requirements.

RSA Option A – Provide Full RSA

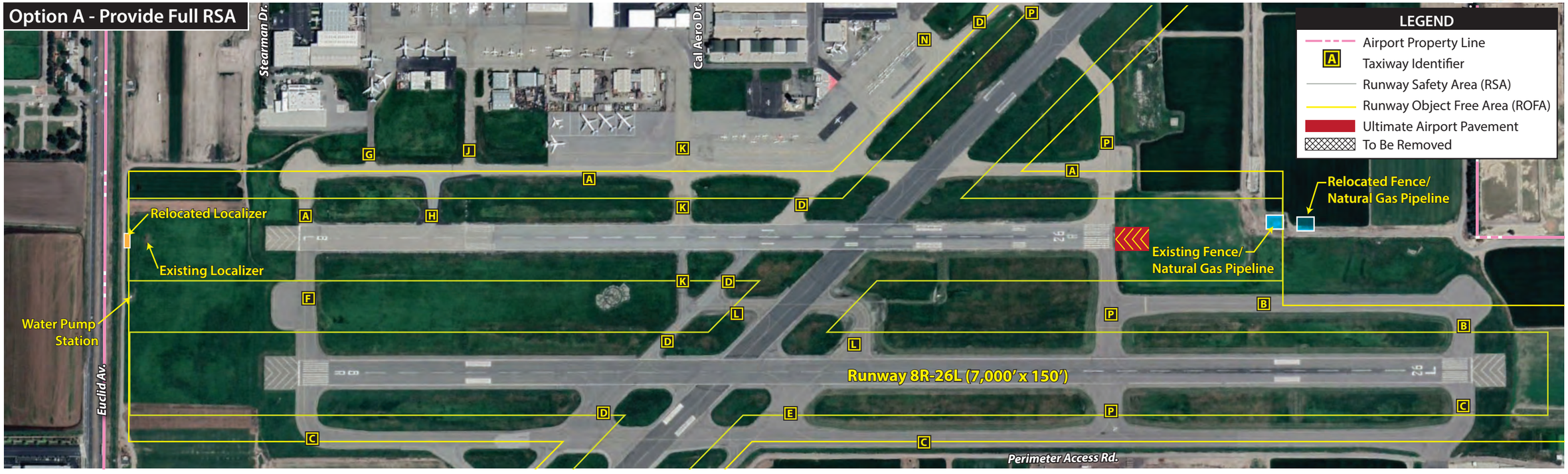
Providing a full RSA would necessitate relocation of the localizer antenna and moving the fencing and natural gas valves. As shown on **Exhibit 4D**, the localizer antenna would be relocated approximately 102 feet west of its current location, which would place it 1,000 feet beyond the Runway 8L threshold and outside the RSA. The aboveground natural gas valves and surrounding fencing would be relocated at least 80 feet to the east to be outside the RSA. Analysis separate from this ALP Update is needed to determine if the valves can be relocated in the manner proposed.

Relocating these facilities would provide full RSA beyond the runway ends. Relocation of the localizer antenna would necessitate recalibration of the ILS. As a result, the localizer portion of the ILS would be deactivated until the re-location and recalibration were completed by FAA. This could have a significant and negative impact as implementation of new instrument approaches is often a multi-year process during which time the existing ILS may be unavailable.

RSA Option B – Shift Runway

Under Option B, as depicted at the bottom of **Exhibit 4D**, a shift of Runway 8L-26R would involve removing 102 feet of usable runway pavement from the west end and adding 102 feet of pavement to the east end. The localizer antenna would remain in its current location and would no longer be an RSA penetration and the existing runway length would be preserved. It would also shift the RSA and associated OFA 102 feet to the east. As a result, the fencing and aboveground valves associated with the natural gas pipeline would need to be relocated farther east, outside the shifted RSA.

Option A - Provide Full RSA



Option B - Shift Runway 102' East

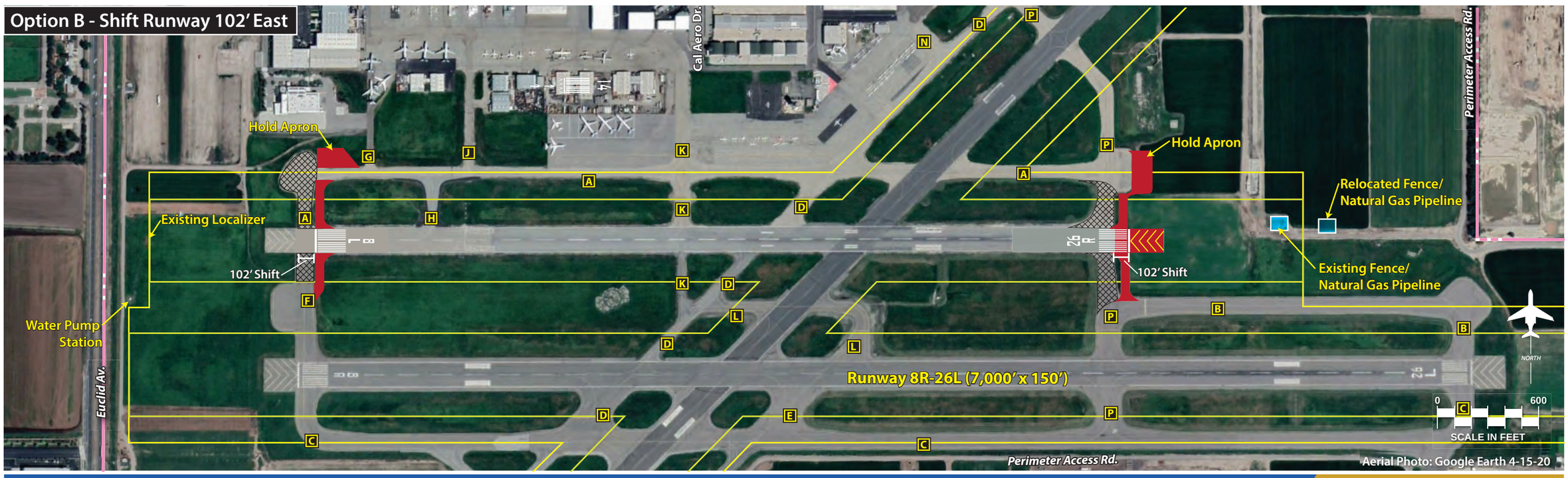


Exhibit 4D RUNWAY 8L-26R RUNWAY SAFETY ALTERNATIVES (OPTIONS A AND B)

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While the localizer antenna could remain in its current location under the runway shift scenario, the ILS equipment to include the glideslope antenna would need to be recalibrated and possibly relocated to account for the new runway ends. It should be noted that the recalibration and potential relocation of a glideslope antenna is much more costly than relocating the localizer antenna. Additional analysis outside this study would be needed to determine if the glideslope antenna could remain in its current location under this option.

For this analysis, Euclid Avenue is considered fixed and re-routing the road is not considered feasible due to cost and because it is unnecessary since the runway could be more easily shifted to the east. Shifting the runway to the west is not considered a viable option because of the location of Euclid Avenue.

RSA Option C – Decrease Runway Length

As presented earlier in this chapter, the existing runway provides adequate length to accommodate the majority of smaller general aviation aircraft traffic but falls short of providing adequate length for most business jet operations. In fact, consideration is being given to a 642-foot extension that would ultimately provide 5,500 feet of runway pavement. Maintaining adequate length for general aviation operators that frequent Chino Airport on a regular basis is especially critical as this activity is forecast to increase through the planning period. In addition, having an adequate secondary runway is crucial to providing support to the primary runway during times when Runway 8R-26L is closed for emergencies or maintenance.

A reduction in runway length, as pictured on the top half of **Exhibit 4E**, would accomplish the goal of removing the localizer and aboveground natural gas valves from within the RSA. However, the runway would then only be 4,678 feet in length. This length could further reduce the utility of operations by business jet aircraft, including the critical aircraft, that need to utilize this runway.

According to FAA AC 150/5220-22B, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*: "The FAA does not require an airport operator to reduce the length of a runway or declare its length to be less than the actual pavement length to meet runway safety area standards if there is an adverse operational impact to the airport."

RSA Option D – Apply Declared Distances

Implementing declared distances is described in FAA AC 150/5300-13B, *Airport Design*. With FAA approval, the runway length can be declared (published) shorter for certain operations to provide the necessary safety areas and/or RPZ land use compatibility. The AC describes declared distances as follows: "Declared distances represent the maximum length available and suitable for meeting takeoff, rejected takeoff, and landing distance performance requirements for turbine-powered aircraft." The declared distances are defined by the FAA as:

- *Takeoff run available (TORA)* - The distance to accelerate from brake release to lift-off, plus safety factors.
- *Takeoff distance available (TODA)* - The distance from brake release past lift-off to start of take-off climb, plus safety factors.
- *Accelerate-stop distance available (ASDA)* - The distance to accelerate from brake release to takeoff decision speed (V_1), and then decelerate to a stop, plus safety factors.
- *Landing distance available (LDA)* - The distance from the threshold to complete the approach, touchdown, and decelerate to a stop, plus safety factors.

Implementation of declared distances, in this case, is designed to provide full RSA (and ROFA) beyond the ends of Runway 8L-26R. The ASDA and LDA account for the availability of the RSA and ROFA. Therefore, by declaring the ASDA and LDA for Runway 8L shorter by 80 feet, the full 1,000-foot RSA and ROFA are made available beyond the Runway 26R threshold. By also declaring the ASDA and LDA for Runway 26R shorter by 102 feet, the full 1,000-foot RSA and ROFA are made available beyond the Runway 8L threshold. The landing threshold to both ends of Runway 8L-26R would remain in the current location because landing operations only require 600 feet of RSA and ROFA leading to the runway. The TORA and TODA are equal to the actual runway length as a clearway is not provided at the airport.

TABLE 4A | Declared Distances for Runway 8L-26R - Chino Airport

Parameters	Runway 8L	Runway 26R
Takeoff Run Available (TORA)[1]	4,858'	4,858'
Takeoff Distance Available (TODA)[2]	4,858'	4,858'
Accelerate Stop Distance Available (ASDA)[3]	4,778'	4,756'
Landing Distance Available (LDA)[3]	4,778'	4,756'

[1] Departure RPZ begins 200 feet from the end of the TORA.
[2] TORA cannot be longer than TODA. Departure surface is set on TODA. TODA can be shortened to mitigate departure surface penetrations; if so, TORA is shortened, too.
[3] Available runway length plus RSA. Approach RPZ begins 200 feet from the landing threshold.

Source: FAA AC 150/5300-13B, Airport Design

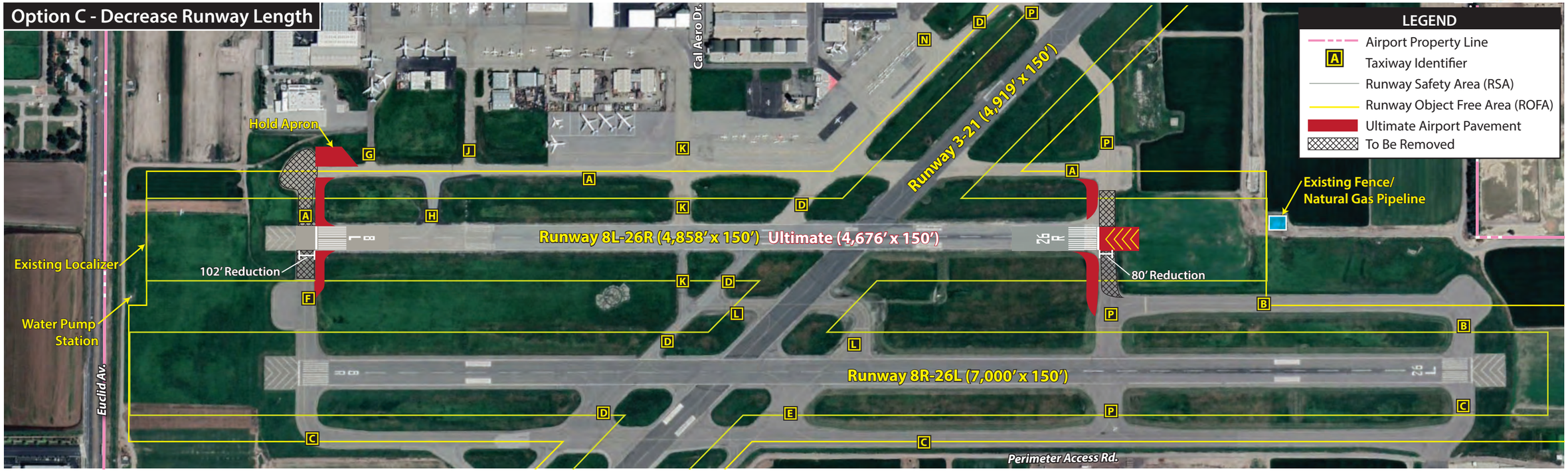
As noted previously, the FAA does not require an airport operator to reduce the length of a runway or declare its length to be less than the actual pavement length to meet runway safety area standards if there is an adverse operational impact to the airport. This option would declare the runway to be shorter for certain operations; therefore, it is not a preferred alternative.

The use of declared distances has traditionally been considered a last resort solution to remedy non-standard RSAs. This is primarily because the implementation may not be readily visible to pilots as it would not involve any change in runway markings. This alternative would, however, be less expensive to implement as compared to the previous options. The declared distances alternative is depicted on the bottom half of **Exhibit 4E.**

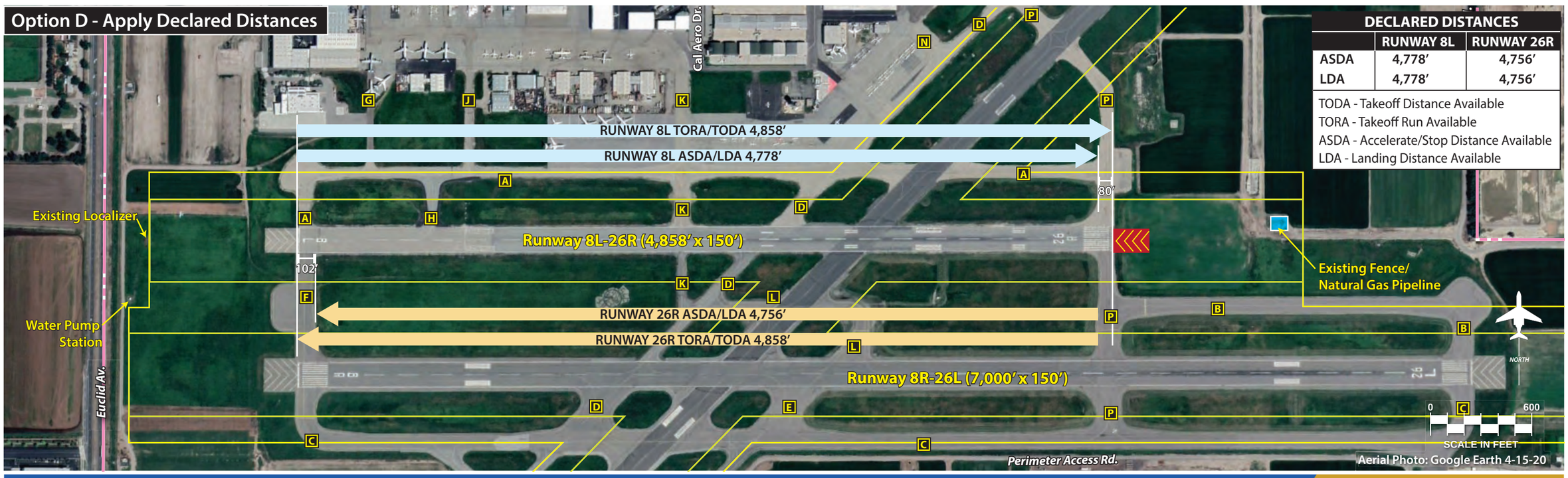
RSA Option E – Provide Full RSA with Runway Extension

The remaining RSA alternatives are associated with a 642-foot easterly extension of Runway 8L-26R. Under this scenario, the existing fence and aboveground natural gas valves east of the runway would be located approximately 278 feet from the extended Runway 26R threshold. Option E, presented on the

Option C - Decrease Runway Length



Option D - Apply Declared Distances



DECLARED DISTANCES

	RUNWAY 8L	RUNWAY 26R
ASDA	4,778'	4,756'
LDA	4,778'	4,756'

TODA - Takeoff Distance Available
TORA - Takeoff Run Available
ASDA - Accelerate/Stop Distance Available
LDA - Landing Distance Available

Exhibit 4E: RUNWAY 8L-26R RUNWAY SAFETY ALTERNATIVES (OPTIONS C AND D)

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top of **Exhibit 4F**, provides the full RSA associated with a 5,500-foot runway. In doing so, the localizer would need to be relocated 100 feet west of its existing location and the natural gas valves and associated fencing would need to be removed and relocated approximately 800 feet farther east. As called out on the exhibit, the RSA and OFA associated with the runway extension would extend farther east and encompass an abandoned irrigation valve station located near the existing ASOS. In the event the runway is extended, this facility would need to be removed, which according to airport staff, could be accomplished.

RSA Option F – Shift Runway with Runway Extension

As depicted in the middle of **Exhibit 4F**, Option F considers the 642-foot runway extension, in addition to shifting the runway an additional 102 feet in order to mitigate the RSA deficiency associated with the localizer antenna west of Runway 8L-26R. As a result, a 744-foot extension is shown which would require the aboveground facilities associated with the natural gas pipeline to be relocated approximately 900 feet east of their current location. Under this alternative, the existing ASOS would be located just outside the associated RSA and OFA.

RSA Option G – Apply Declared Distances with Runway Extension

The use of declared distances is proposed in Option G and depicted at the bottom of **Exhibit 4F**. As previously discussed, the TORA and TODA are equal to the actual runway pavement length, which, in this alternative, is 5,500 feet for each direction. In determining usable portions of the runway length, the ASDA and LDA must consider the 1,000-foot RSA beyond the ends of the runway and the 600-foot RSA prior to the landing threshold.

Due to the existing aboveground natural gas valves and fencing being located 278 feet from the extended Runway 26R threshold, a 322-foot displaced threshold is depicted to obtain the required 600 feet of RSA prior to the landing threshold. Once the landing threshold is displaced, the LDA available on Runway 26R is 5,076 feet, taking into consideration the localizer off the west end of the runway. The displaced threshold does not reduce the takeoff length for Runway 26R as the ASDA calculation is 5,398 feet. The calculations for ASDA and LDA utilizing Runway 8L would decrease to 4,778 feet to allow the 1,000-foot RSA requirement beyond the east end of the runway.

RSA Alternatives Summary

As prescribed earlier in this determination, EMAS is also an alternative to be considered when mitigating RSA deficiencies. EMAS is an engineered compressible concrete material that is located beyond the runway end for the purpose of safely stopping an aircraft overrun. EMAS functions similarly to the sandy, high-speed exits provided on highways in mountainous terrain to safely stop a runaway tractor-trailer. The FAA considers the installation of EMAS as an acceptable substitute to providing full RSA in certain circumstances.

Guidance for evaluating an EMAS alternative and for determining the maximum financially feasible cost for RSA improvements is provided in FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*. The Order states that when the length of the RSA beyond the runway end is more than 90 percent of the RSA standard, the use of EMAS is not applicable. Chino is close enough that EMAS is not considered a financially responsible solution.

Based on the RSA mitigation options, which followed criteria outlined in FAA Order 5200.8, *Runway Safety Area Program*, further coordination should be made between the FAA and airport staff to determine a proposed course of action in dealing with the RSA deficiencies previously outlined. The recommended development concept outlined later in this study will consider mitigating the non-standard RSA that currently exists on Runway 8L-26R.

RUNWAY LIGHTING AND VISUAL APPROACH AIDS

Runway 8L-26R has high intensity runway lighting (HIRL), which is appropriate for this runway given the presence of a precision ILS approach. Runways 8R-26L and 3-21 currently have medium intensity runway lighting (MIRL), which is appropriate.

The landing approach to all runway ends are equipped with precision approach path indicator lights (PAPI), which will be maintained. Runway end identification lights (REILs) should be considered for all runway ends at Chino Airport. Runway 3-21 is already outfitted with REILs; the two parallel runways should be equipped with REILs.

INSTRUMENT APPROACH CAPABILITY

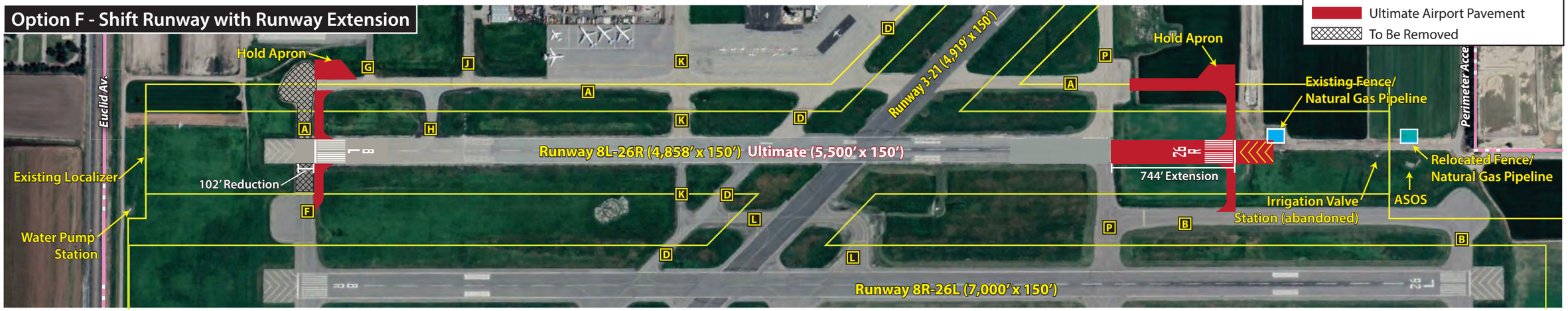
Instrument approach procedures are critical to an airport because they allow the runways to remain open when the weather conditions are less than visual (three-miles visibility). As previously discussed, the airport has three instrument approach procedures, all of which are to Runway 26R. These approach procedures are based on the ILS, the localizer antenna, the VOR, and GPS. The ILS/LOC approach provides the lowest visibility minimums down to ¾-mile and it relies on the combination of the glideslope and localizer antenna or the localizer antenna alone. A separate approach utilizing the VOR provides visibility minimums as low as 1-mile. The GPS approach provides visibility minimums as low as 1-mile.

All other runway ends are planned for instrument approaches with not lower than 1-mile visibility minimums. The RPZ sizes will remain as they are currently with visibility minimums of 1-mile, thus no new incompatible land uses would be introduced to the RPZs. Visibility minimums lower than 1-mile would change the size of the RPZ, thus introducing new incompatible land uses (more of the roads). Therefore, 1-mile minimums are considered for all runway ends not currently served by an instrument approach.

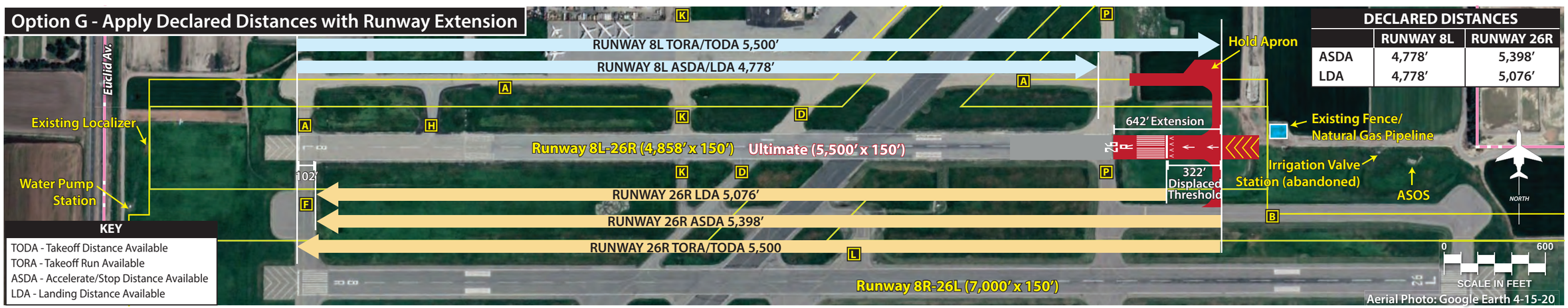
The project team examined the feasibility of relocating the Runway 26R ILS to Runway 26L because it is the longer runway. While the ILS may be used by properly equipped aircraft of all sizes, it is more typical for turboprops and business jets to use the ILS in poor weather conditions. Small piston aircraft operators tend to avoid operating in poor weather conditions because they are more susceptible to changes

Option E - Provide Full RSA with Runway Extension

Option F - Shift Runway with Runway Extension



Option G - Apply Declared Distances with Runway Extension



DECLARED DISTANCES	RUNWAY 8L	RUNWAY 26R
ASDA	4,778'	5,398'
LDA	4,778'	5,076'

Aerial Photo: Google Earth 4-15-20

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in meteorological conditions. While the project team feels the ILS could physically be moved, the primary barrier is cost. It is estimated that the cost to relocate the ILS would be similar to a new ILS installation. In addition, FAA is not installing or providing grant funding for new ILS installations; instead, they are investing in improvements to GPS to ultimately provide ILS-like minimums. Therefore, no further consideration was given to relocating the ILS to Runway 26L.

PAVEMENT MARKINGS

The airport has been working with the FAA Runway Safety Area Team (RSAT) to prevent runway incursions. In 2020, the airport undertook a major pavement re-marking program. A marking scheme usually reserved for commercial service airports has been implemented at the Chino Airport. **Exhibit 4G** shows the marking improvements that have been made. These include application of enhanced centerline markings and surface-painted holding positions.

HOT SPOT AND RUNWAY INCURSION MITIGATION (RIM) ISSUES

In 2020, there were eight reported runway incursions at CNO (down from 25 in 2019), none of which resulted in an accident. The incidents included wrong runway landings, landings to a runway when another aircraft was on the runway, and runway crossings without clearance from the ATC. Incidents such as these have led the FAA to identify several areas on the airfield, called either a "Hot Spot" and/or a "RIM" location. These areas are to receive special attention during airfield planning projects and, in some cases, immediate corrective attention.

Exhibit 3J previously identified the four "Hot Spot" locations and described them as follows:

- **HS 1**: Pilots taxiing south of Taxiway D sometimes fail to turn onto Taxiway A and inadvertently proceed onto Runway 8L-26R.
- **HS 2**: Pilots taxiing west on Taxiway L sometimes turn onto Runway 3-21 by mistake.
- **HS 3**: Pilots taxiing south on Taxiway K sometimes fail to turn onto Taxiway A and proceed onto Runway 8L-26R by mistake.
- **HS 4**: Complex intersection. After Crossing Runway 21 westbound on Taxiway L, pilots sometimes confuse Taxiway D and Taxiway K and cross the Runway 8L-26R holding position markings without authorization.

There are five RIM locations on the airfield at the following locations:

- Taxiway P between Runway 26R approach end and Runway 26L.
- Hold short bar on Taxiway P north of Runway 26R.
- Runway 26L approach end.
- Taxiway L between Runway 3-21 and Runway 8R-26L.
- Intersection of Taxiways D, K, L, and Runway 8L-26R and Runway 3-21.

The recent improvements to the airfield pavement markings with enhanced centerlines and runway designation markings have mitigated these Hot Spots and RIM locations as evidenced by the decrease in runway incidents in 2020.

While the ALP Update provides long term solutions to hot spot and RIM issues, the Airport has, in consultation with and recommendation from FAA, engaged this planning consultant to do a detailed and focused Airfield Geometry Study. The Airfield Geometry Study will inform the recommended concept of this ALP Update. The airside alternatives take into considerations potential taxiway geometry solutions that could further reduce runway incursion incidents.

TAXIWAY GEOMETRY

Now that several runway alternatives have been presented, the taxiway geometry can be examined in more detail. There are four FAA identified Hot Spots and five RIM locations. As noted, the airport has installed enhanced centerline and runway identification markings on the taxiways leading to runways. Runway incidents have been reduced by more than two-thirds as a result. Nonetheless, the goal is to have no runway incursions and certain geometry improvements may provide additional safety measures. In addition, taxiway geometry should be examined for ground movement efficiency and adherence to current design standards.

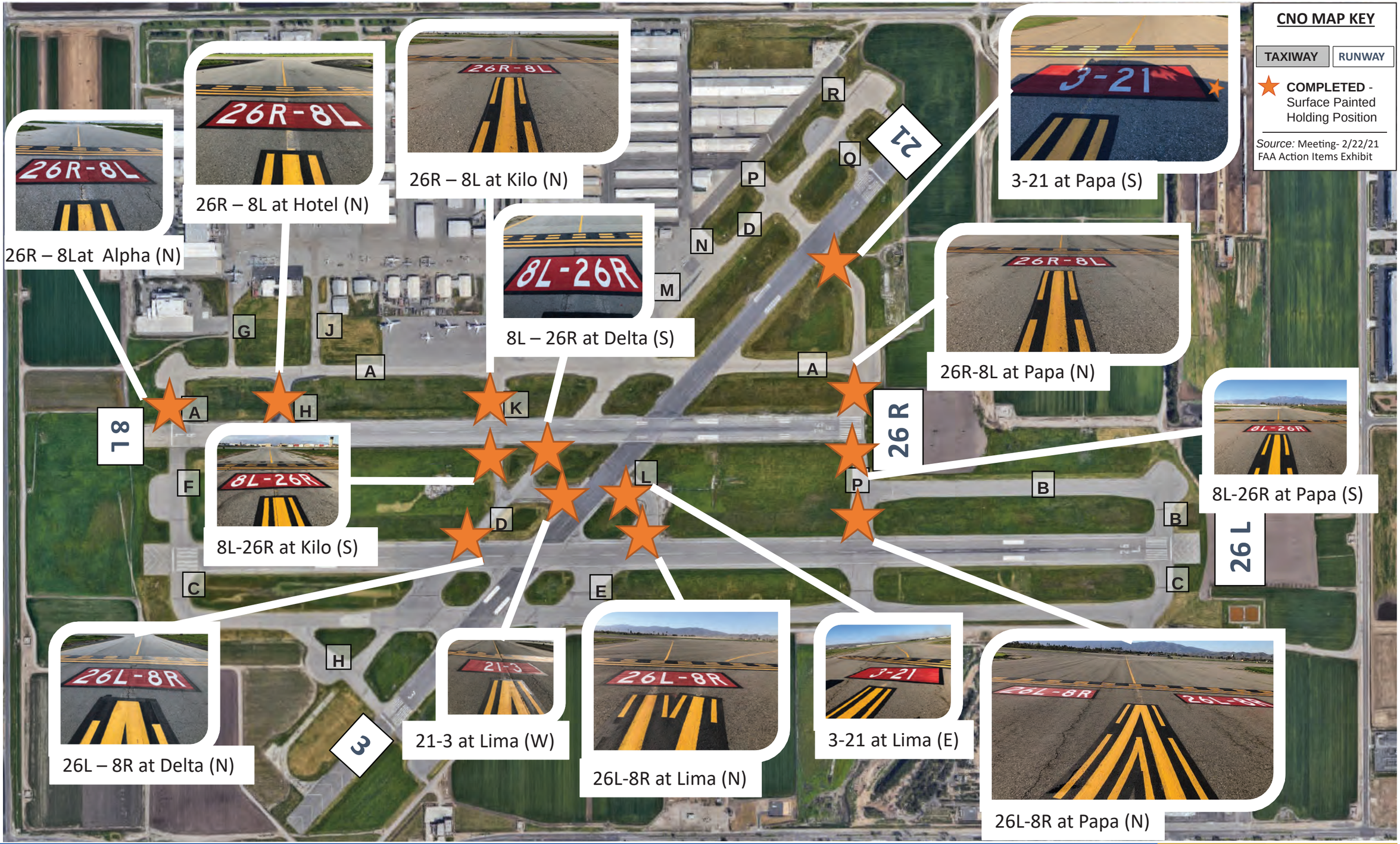
Some airports with a parallel runway have a full-length mid-field parallel taxiway. Current FAA direction is not to automatically assume a mid-field taxiway is necessary because they can create problems, such as inadvertent taxiway landings. In addition, the current glideslope antenna is 350 feet from the Runway 8L-26R centerline, which means a midfield taxiway would require relocation of the glideslope antenna.

The Airfield Geometry Study, being undertaken concurrently with this ALP Update will inform the final recommendations of the airport layout plan. The alternatives presented are a high-level examination intended to meet design standards. The Airfield Geometry Study will examine the issues in more detail.

Taxiway Alternative 1

Exhibit 4H presents the first taxiway geometry alternative. This alternative presents a full-length mid-field parallel taxiway. The taxiway will provide for greater ground movement efficiency as ATCT personnel will have more options to direct taxiing aircraft and can separate those aircraft to avoid conflicts. Taxiways between parallel runways are known to lead to pilot confusion at times with an increased potential for aircraft inadvertently landing on the parallel taxiway.

The exhibit also shows an extension of Taxiway E to the Runway 21 threshold, providing full parallel taxiways on both sides of the runway. A portion of Taxiway P is shown to be closed in this alternative. Taxiway P at the threshold to Runway 26R is listed as one of the more problematic RIM locations as pilots have inadvertently proceeded into the runway environment. By closing Taxiway P between planned parallel Taxiway E and the Runway 26R threshold, pilots will be forced to make a turn onto a parallel taxiway before making the turn toward the runway. Because a more routine taxi method is to utilize a parallel taxiway before turning to enter the runway, this geometry may reduce runway incursions in this location.


CNO MAP KEY
TAXIWAY
RUNWAY
COMPLETED - Surface Painted Holding Position
Source: Meeting- 2/22/21 FAA Action Items Exhibit
26R – 8Lat Alpha (N)
26R – 8L at Hotel (N)
26R – 8L at Kilo (N)
8L – 26R at Delta (S)
3-21 at Papa (S)
26R-8L at Papa (N)
8L-26R at Papa (S)
8L-26R at Kilo (S)
26L – 8R at Delta (N)
21-3 at Lima (W)
26L-8R at Lima (N)
3-21 at Lima (E)
26L-8R at Papa (N)
18
21
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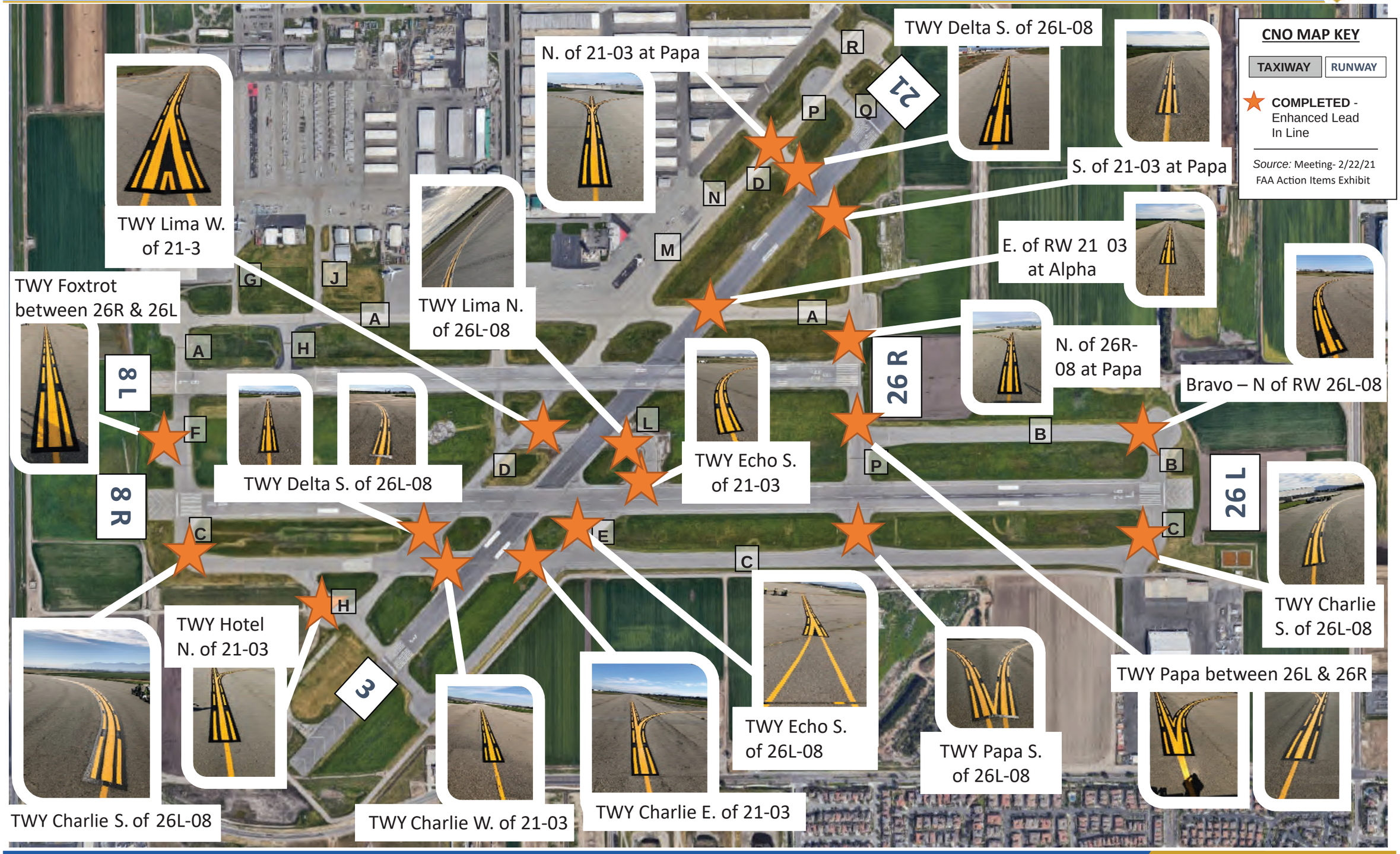
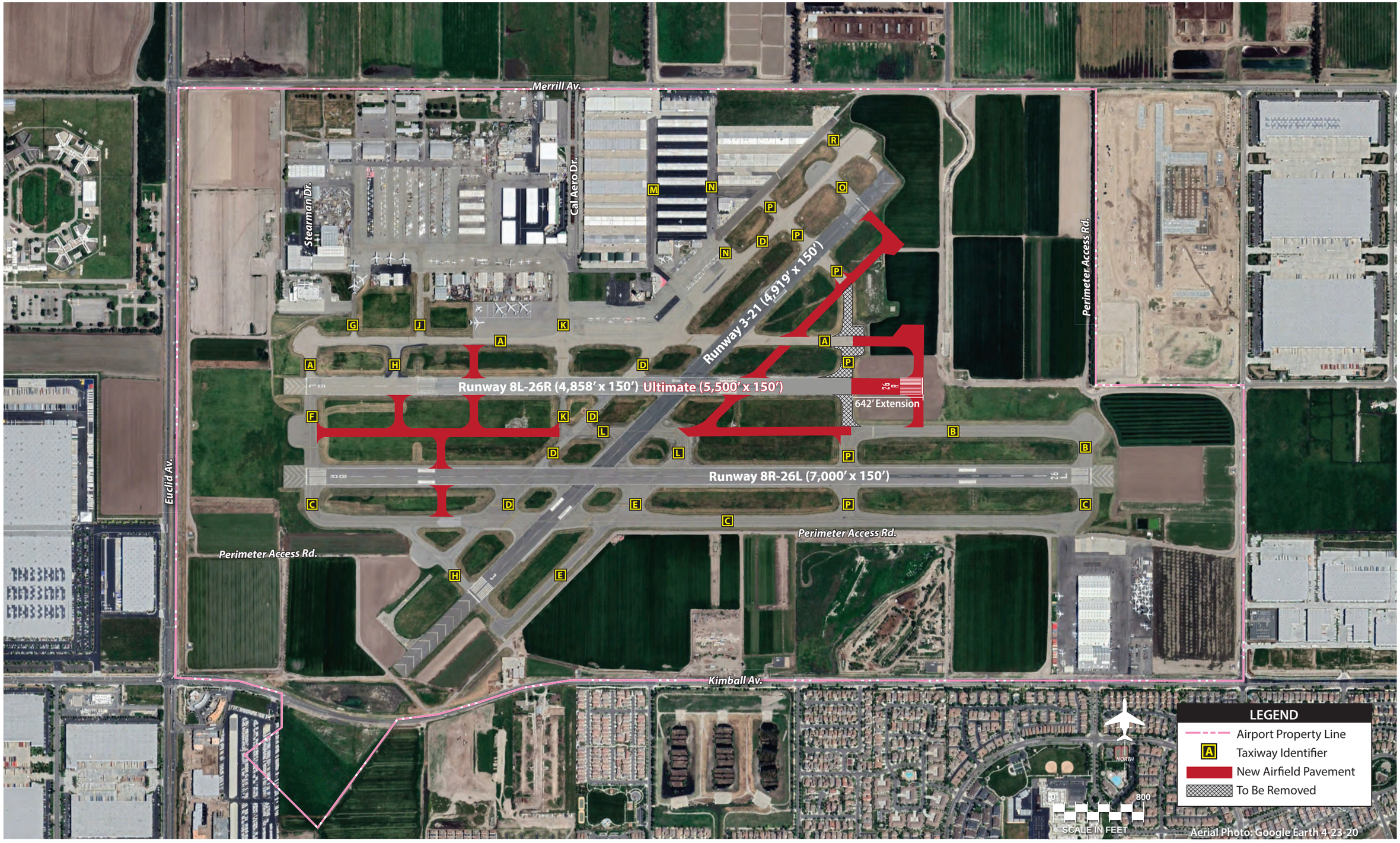

CNO MAP KEY
TAXIWAY
RUNWAY
COMPLETED - Enhanced Lead In Line
Source: Meeting- 2/22/21 FAA Action Items Exhibit
TWY Lima W. of 21-3
N. of 21-03 at Papa
TWY Delta S. of 26L-08
S. of 21-03 at Papa
TWY Foxtrot between 26R & 26L
TWY Lima N. of 26L-08
E. of RW 21 03 at Alpha
N. of 26R-08 at Papa
Bravo – N of RW 26L-08
TWY Delta S. of 26L-08
TWY Echo S. of 21-03
TWY Charlie S. of 26L-08
TWY Hotel N. of 21-03
TWY Echo S. of 26L-08
TWY Papa S. of 26L-08
TWY Papa between 26L & 26R
TWY Charlie S. of 26L-08
TWY Charlie W. of 21-03
TWY Charlie E. of 21-03
21
26 R
8 L
8 R
26 L
3


Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
642' Extension
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier
New Airfield Pavement
To Be Removed
NORTH
0
800
SCALE IN FEET
Aerial Photo: Google Earth 4-23-20

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That portion of Taxiway P between Taxiway A and Runway 8L-26R is shown to be closed. This is considered so that pilots would be forced to proceed to the end of Taxiway A (new end based on runway extension), then make that familiar turn toward the runway in preparation for departure. That portion of Taxiway P between Taxiway B and Runway 8L-26R is also shown closed for the same reason.

Taxiway Alternative 2

Exhibit 4J presents the second taxiway geometry alternative. This alternative focuses on the RIM locations at Taxiways K, L, and D. This centerfield location has proved to lead to pilot confusion and inadvertent runway incursions. In addition, Taxiway K extends from Taxiway D north through the terminal area aircraft apron and into the hangar development area. This direct route from the hangar and apron area to Runway 8L-26R can contribute to runway incursions since pilots will typically expect a turn onto a parallel taxiway prior to turning toward the runway.

As depicted, Taxiway K from Taxiway A to Taxiway D is considered for removal. Taxiway L is also considered for removal. Since Taxiways K and L are primary methods for pilots to traverse from one side of the airfield to the other, closing them would create longer taxi times. Therefore, new taxiways are considered that will allow for more efficient movements across the airfield.

To the west of Taxiway K (considered closed in this alternative), a taxiway is planned between the parallel runways. This taxiway would extend from Taxiway D to Taxiway F. Several connecting taxiways are then shown to provide for efficient movement across the runways. The crossing taxiways are intentionally not lined up to force pilots to make a turn onto the planned taxiway between the runways which improves pilot situational awareness.

On the east end of the airfield, new connecting taxiway exits are planned to extend from Taxiway B to Taxiway C. This crossing taxiway provides an exit to allow aircraft to exit the runway more quickly than having to roll-out to the end of the runway. This taxiway reduces the interval between Taxiway P and the Runway 26L threshold from approximately 2,000 feet to 1,000 feet. This taxiway also improves capacity by getting aircraft off the runway sooner.

This alternative also shows the planned 642-foot extension of Runway 26R and the new threshold taxiways. A taxiway is also planned to extend from Taxiway P to the Runway21 threshold.

Taxiway Alternative 3

The third taxiway alternative is presented on **Exhibit 4K**. This alternative presents modification of the taxiway geometries considered in the first two alternatives.

Because the intersection of Taxiways K, L, and D is a RIM location, this alternative considers closing Taxiways L and K (between Taxiways A and D). A portion of Taxiway L would become an extension of Taxiway E and would extend to the northeast, parallel to Runway 3-21, ultimately connecting at the Runway 21 threshold. This makes Taxiway E a full-length parallel taxiway to Runway 3-21.

On the west end of the airfield, a partial parallel taxiway between the runways is considered. The partial parallel does not connect to Taxiway K (or Taxiway D) to avoid adding to the complexity of the intersection and potentially exacerbating the RIM location. Taxiway K is shifted to the west to provide runway crossing access along with Taxiway H.

This alternative shows portions of Taxiway P being closed in the area where there have, in the past, been several runway incursions. By closing these portions of Taxiway P, pilots will be forced to use the parallel taxiway system which provides more typical ground movements and may reduce the possibility of a pilot inadvertently entering the runway system without clearance.

This alternative deliberately does not include a full-length parallel taxiway between the runways. As previously noted, such a mid-field taxiway can lead to inadvertent landings to the taxiway. If the mid-field taxiway is visually broken up, the pilots are not likely to land on it.

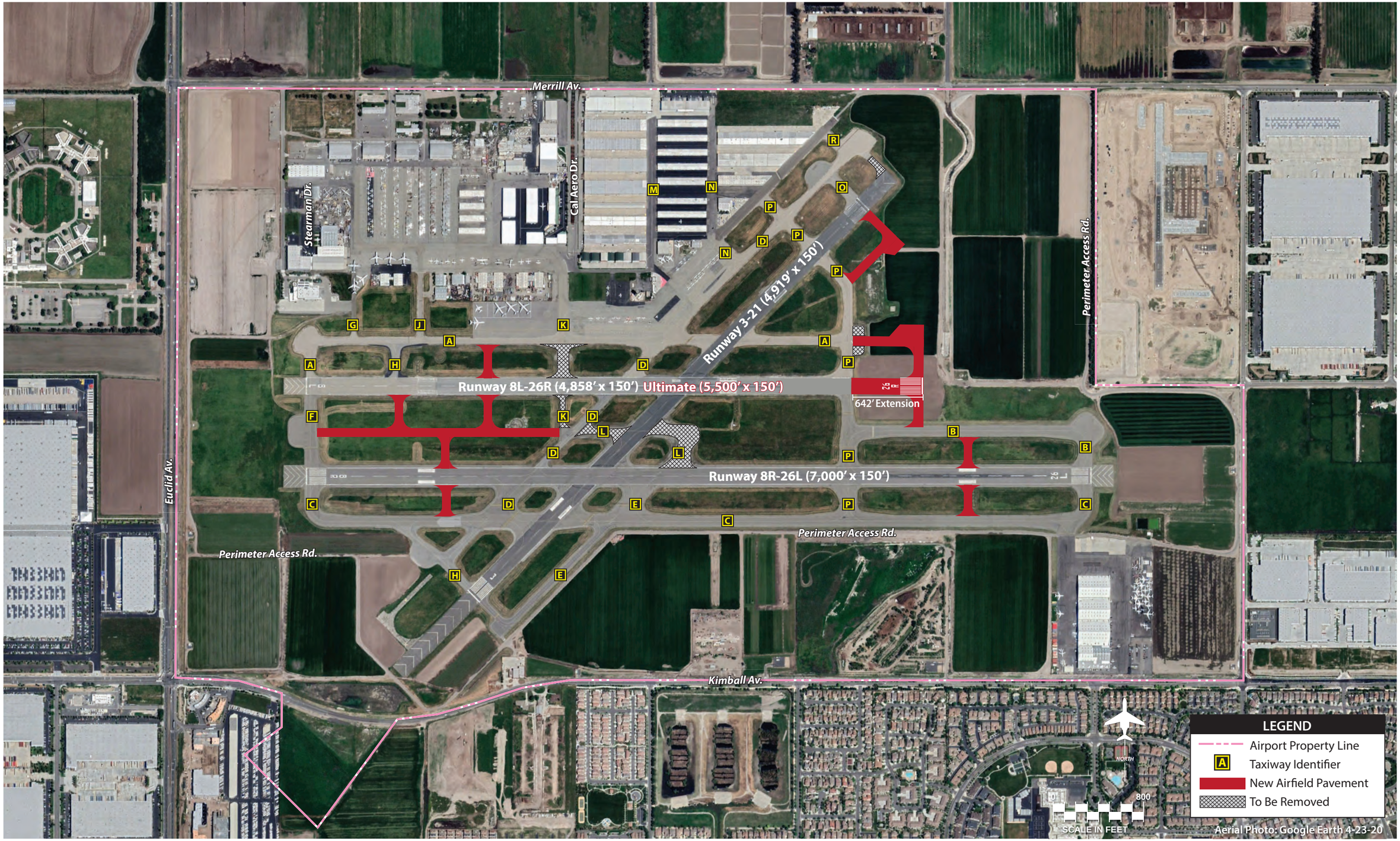
LANDSIDE ALTERNATIVES

Landside planning issues, summarized on **Exhibit 4A**, will focus on facility-locating strategies following a philosophy of separating activity levels. To maximize airport efficiency, it is important to locate facilities intended to serve similar functions close together. For example, larger hangars supporting airport businesses should be centrally located, while smaller box and T-hangars should be set farther to the sides. Allowing new facilities to be constructed haphazardly on the next available spot at the airport may preclude the highest and best use of limited and valuable airport land. It is also important to plan for facilities that airport users desire and to group those facilities together, whether they are T-hangars, box hangars, or larger conventional hangars.

The orderly development of the airport terminal area (those areas parallel to the runway and along the flight line) can be the most critical, and probably the most difficult, development to control on the airport. A development approach of “taking the path of least resistance” can have a significant effect on the long-term viability of an airport. Allowing development without regard to a functional plan can result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of valuable space along the flight line.

Activity in development areas should be divided into three categories at an airport. The high activity area should be planned and developed as the areas providing aviation services on the airport. An example of a high activity area is the aircraft parking apron, which provides outside storage and circulation of aircraft. Large conventional hangars housing fixed base operators (FBOs), other airport businesses, or those used for bulk aircraft storage would be considered high activity uses. A conventional hangar structure in the high activity area should be a minimum of 6,400 square feet (80 feet by 80 feet). If space is available, it is common to plan these hangars for up to 200 feet by 200 feet. The best location for high activity areas is along the flight line near midfield, for ease of access to all areas of the airfield.

The medium activity category defines the next level of airport use and primarily includes corporate aircraft operators that may desire their own box or conventional hangar storage on the airport. A hangar in the medium activity use area should be at least 50 feet by 50 feet, or a minimum of 2,500 square


Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
642' Extension
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier
New Airfield Pavement
To Be Removed
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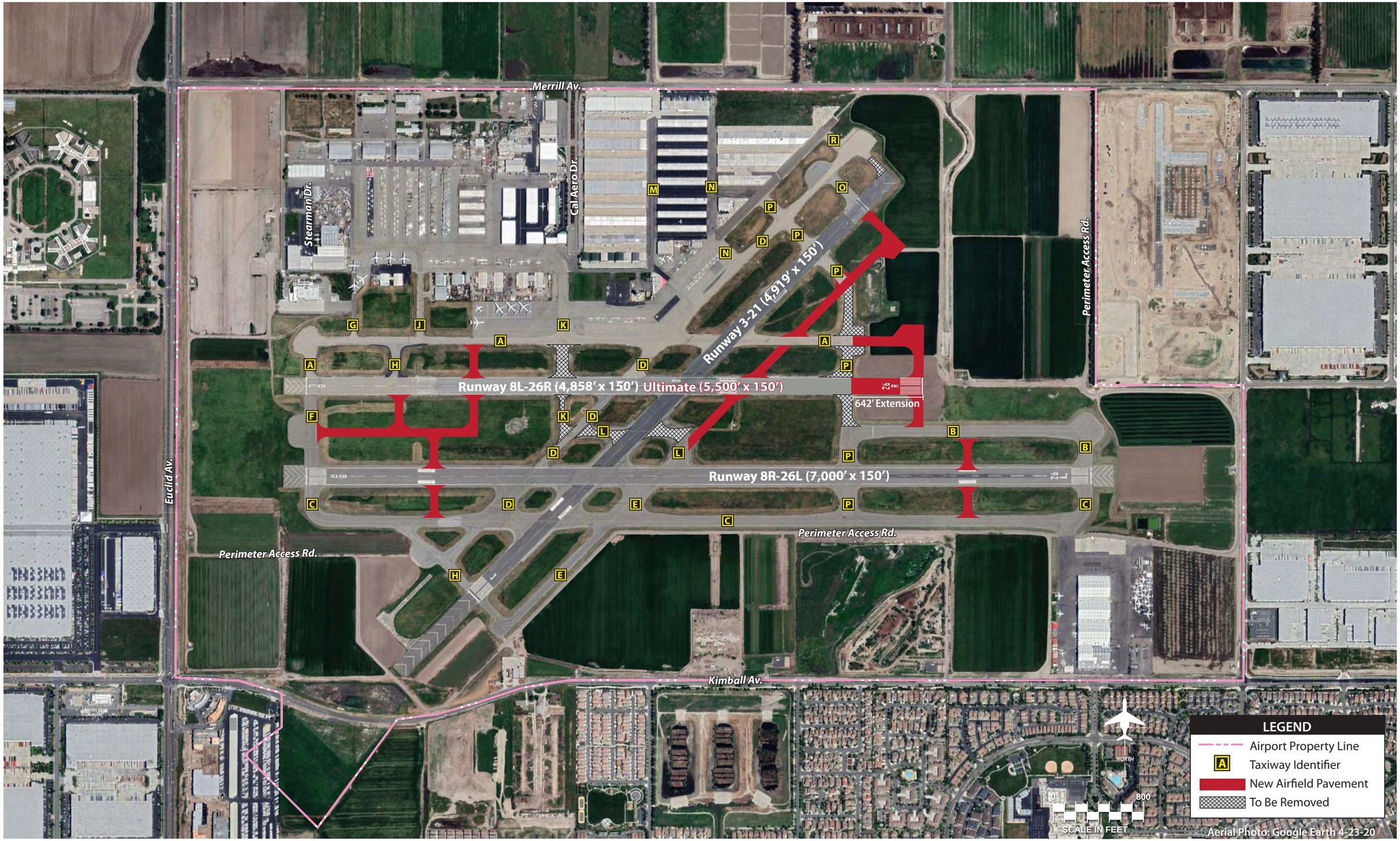
Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
642' Extension
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier
New Airfield Pavement
To Be Removed
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SCALE IN FEET
Aerial Photo: Google Earth 4-23-20

feet. The best location for medium activity use is off the immediate flight line, but still with ready access to the runway/taxiway system. Typically, these areas will be adjacent to the high activity areas. Parking and utilities, such as water and sewer, should also be provided in this area.

The low activity use category defines the area for storage of smaller single and twin-engine aircraft. Low activity users are personal or small business aircraft owners who prefer individual space in T-hangars or small box hangars. Low activity areas should be in less conspicuous areas or to the ends of the flight line. This use category will require electricity but may not need water or sewer utilities.

In addition to the functional compatibility of the terminal area, the proposed development concept should provide a first-class appearance for the airport. Consideration of aesthetics should be given high priority in all public areas, as many times the airport can serve as the first impression a visitor may have of the community.

Development at Chino Airport over the years has generally followed this growth philosophy. Large conventional hangars are for the most part grouped together as are individual T-hangar facilities. There are several areas on the airport that are currently undeveloped.

CURRENT DEVELOPMENT PLAN

At the time of the drafting of this ALP Update, the airport was also exploring development opportunities (both aeronautical and non-aeronautical) for airport property with a third party. The consultant team was asked to provide a preliminary estimate of how much land area, in acres, would be needed to meet forecast demand based on the projected growth in aeronautical activity at the airport.

Currently, there are 213 acres of land developed for aviation purposes at CNO supporting 624 based aircraft and an array of other aviation activities. Developed aviation land includes hangars, aprons, taxi-lanes, vehicle parking, and on-airport roads. By taking the developed aviation land acres and dividing by the number of based aircraft, the land density ratio results: 213 acres/624 based aircraft = 0.3413. This ratio was then multiplied by the 20-year based aircraft forecast of 729 (0.3413*729=249 acres). Thus, to support 729 based aircraft (the 20-year forecast), the airport would need approximately 249 acres of developed aviation land. This is an additional 36 acres above what is currently developed for aviation purposes.

There are approximately 157 acres of land reserved for aeronautical purposes. Should land be developed as projected, there would be 121 acres of aviation reserve land still undeveloped 20 years from now. A portion of this reserve may be required to support the potential influx of new or expanded aviation businesses. Specifically, there may be demand for expanded FBO services, aircraft fleet management, corporate air operations, charter services, and aircraft maintenance. Each of these aviation businesses typically require a large footprint, including large conventional hangars and expanded aircraft apron areas as detailed previously. The methodology used to quantify the additional aviation reserve area was to identify the footprint of these types of businesses at other airports. The average land area for each of these business types is approximately 18 acres. Therefore, the land reserved for aviation can support between six and seven of these large aviation operators.

Because the undeveloped land on the airport exceeds that which is forecast to be needed for aeronautical purposes over the next 20 years (and beyond), there is opportunity to generate revenue from airport land with airport compatible non-aeronautical land leases. Generally, any land immediately adjacent to the runway/taxiway system should be reserved for aeronautical purposes, even if it will not be developed in the next 20 years.

Exhibit 4L presents the master development plan as generated by the third-party development firm in December 2020. This exhibit also shows the lease expiration dates for most hangars and parcels. This development concept helped inform the development of landside alternatives for this ALP Update. The major components of this development plan are as follows:

- New aeronautical development to the northwest of Runway 8L threshold with non-aeronautical development north of that.
- Redevelopment of the hangars on the north side that front Runway 8L-26R (A-385, A-390, A-480, A-485, A-490, A-495, A-497, A-555, A-560)
- New terminal building at the south end of Airport Drive entrance road.
- Mix of aeronautical and non-aeronautical development in the northeast section of the airport.
- Aeronautical development on the south side of the airport east of Runway 3.
- Non-aeronautical development on the south side west of Runway 3.

CONCEPTUAL LANDSIDE ALTERNATIVES

In this section, three different landside development concepts are presented. These are intended to memorialize the concepts that were examined during this ALP Update and previous planning efforts for the airport. Some of these concepts are no longer considered viable, however, it is important to document the concepts considered at the time.

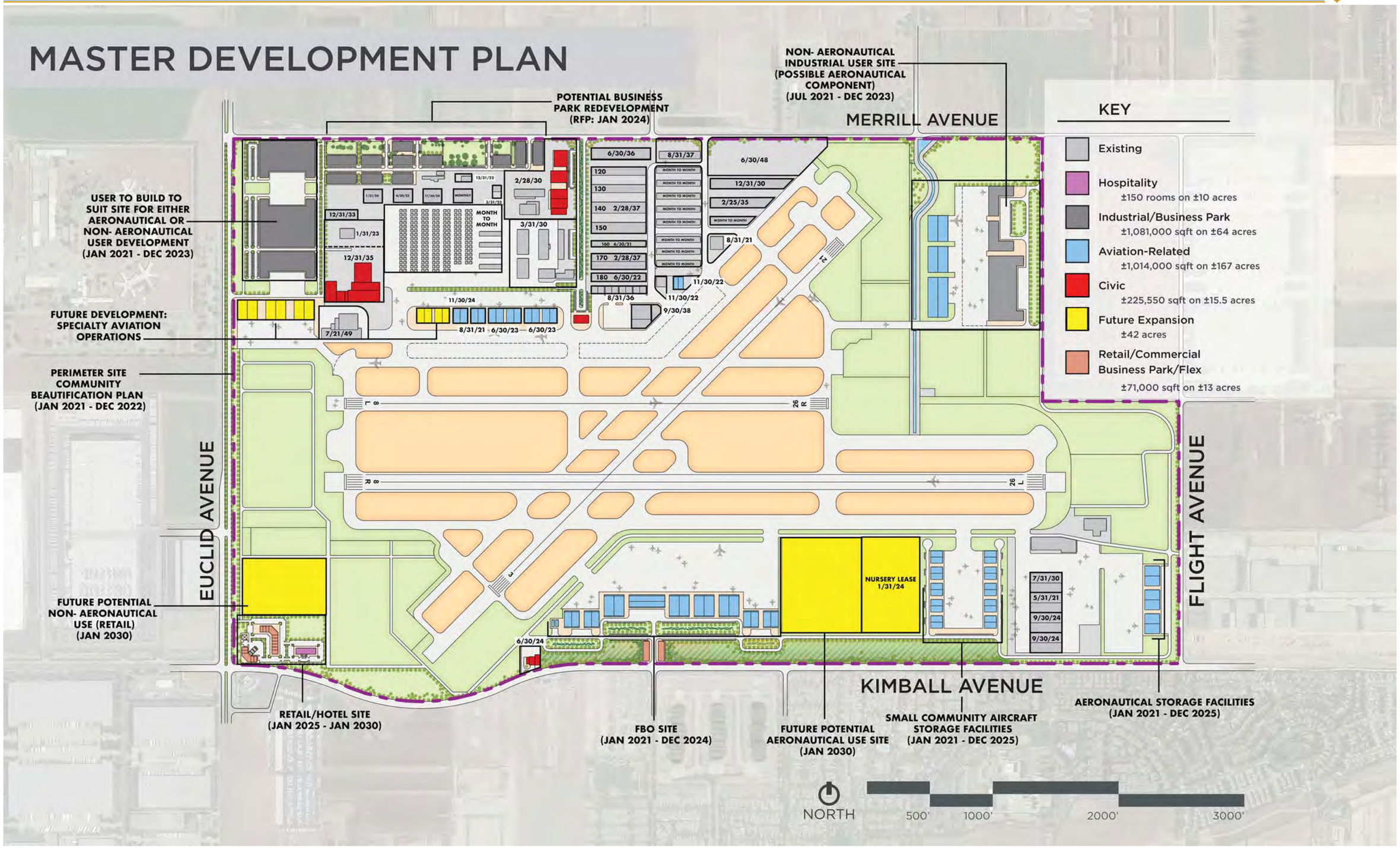
Landside Development Concept 1

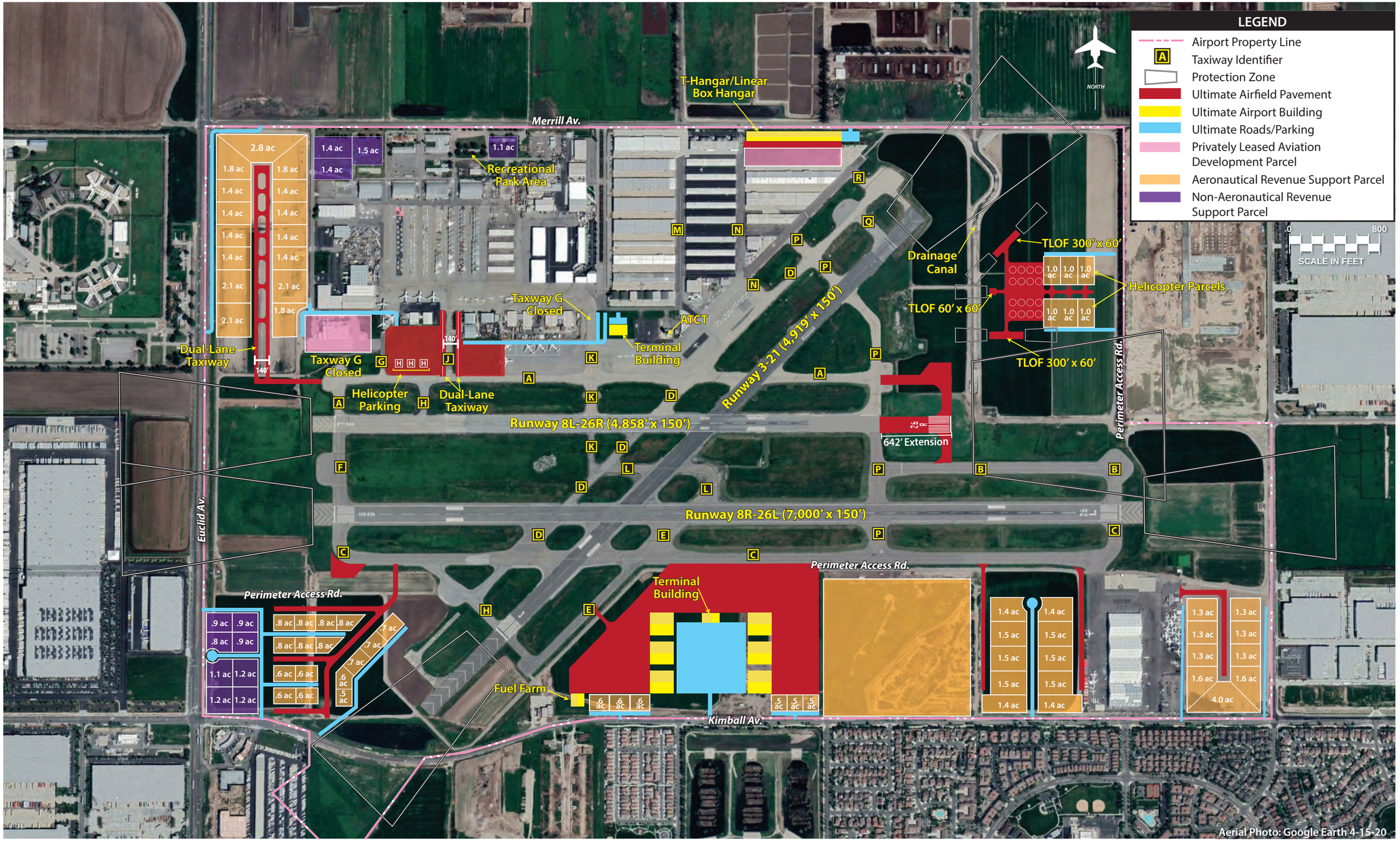
Exhibit 4M presents the first landside alternative. In the northwest quadrant of the airport, several development concepts are considered. The undeveloped land bordering on Euclid Avenue and Merrill Avenue is considered for aviation development with a dual taxilane providing access to 15 development parcels. These parcels could be made available to developers for the construction of a private hangar. Four undeveloped parcels next to Merrill Avenue are considered for non-aeronautical development, which is compatible with other non-aeronautical uses in proximity.

The main airport entrance road is planned to be extended to the south providing access to a potential new airport terminal building. The location of the terminal building in this concept is ideal as it is a highly visible location adjacent to the transient aircraft parking apron.

At the end of the extended airport entrance road, the road turns to the west and extends approximately 1,200 feet. This road would provide access and parking to several large hangars (A480-A560) that do not currently have a dedicated road. Currently anyone in a car wanting to access any of these hangars must drive on the aircraft operations area (AOA) and may potentially be in conflict with aircraft. By providing a dedicated access road, this safety issue is alleviated.

MASTER DEVELOPMENT PLAN




LEGEND
Airport Property Line
Taxiway Identifier
Protection Zone
Ultimate Airfield Pavement
Ultimate Airport Building
Ultimate Roads/Parking
Privately Leased Aviation Development Parcel
Aeronautical Revenue Support Parcel
Non-Aeronautical Revenue Support Parcel
NORTH
SCALE IN FEET
0
800
T-Hangar/Linear Box Hangar
Merrill Av.
Recreational Park Area
Drainage Canal
TLOF 300' x 60'
TLOF 60' x 60'
Helicopter Parcels
Taxway G Closed
ATCT
Terminal Building
Dual-Lane Taxiway
Helicopter Parking
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858'x 150')
642' Extension
Perimeter Access Rd.
Runway 8R-26L (7,000' x 150')
Euclid Av.
Fuel Farm
Kimball Av.
Aerial Photo: Google Earth 4-15-20

The challenge to extending an access road on the south side of these hangars is that Taxilane K would have to be closed, leaving only one ingress/egress point to a large area that is home to several hundred aircraft, which can lead to aircraft movement congestion and potential aircraft head-to-head log jams. To alleviate this potential issue, a dual taxilane, one for ingress and the other for egress, is shown. These taxilanes would meet airplane design group (ADG) II standards by being separated by 97 feet with a TOFA of 115 feet each. The total clear area width would be a minimum of 212 feet, which would allow the occasional passage of an aircraft with a very wide wingspan (e.g., historical aircraft moving to/from the museum).

The main aircraft apron fronting Taxiway A is planned to be extended on both sides of the proposed dual taxilane. East of the dual taxilanes would be additional aircraft parking area. To the west is depicted three helicopter hardstands, in addition to more aircraft apron.

There is an undeveloped parcel immediately north of hangar structure B320. This land is currently under lease; however, new hangars have not been constructed yet. This alternative calls for construction of hangars in this location.

On the northeast side of the airport is a parcel that is approximately 49 acres in size (excludes areas within a current or future RPZ). This parcel is situated to the immediate east of a stormwater drainage channel that is depressed several feet from the surrounding land. In this alternative, a dedicated helicopter operations facility is considered. The helicopter facility envisioned has formal landing areas for five different approaches and 12 individual helicopter parking hardstands. Six development parcels face a taxiway leading to the hardstands.

The south side of the airport encompasses the largest undeveloped areas on the airport. There is an existing hangar complex in the southeast. Additional hangar development is considered in this general area with new taxilanes leading to aeronautical development parcels. One large parcel encompassing approximately 38 acres is reserved for future aeronautical development.

The area east of Runway 3 is shown with one potential terminal complex layout. This could support future airport FBOs or other aeronautical businesses. A terminal building is shown as a central focal point. This location, central to the runway system with easy access to all runways, is ideal for a large scale FBO that caters to corporate aviation or larger business jet operators. Such a plan would also help to separate operators of larger business jets/turboprops from the small general aviation operators, thus adding a measure of safety.

Finally, the area to the southwest is approximately 53 acres of undeveloped land. This alternative shows the potential to support both aeronautical and non-aeronautical development.

Landside Development Concept 2

The next landside alternative is presented on **Exhibit 4N**. This layout provides some different approaches to developing various parcels.

In the northeast, the area along Euclid Avenue is shown with the south half reserved for aviation development parcels and the north half utilized for non-aeronautical development. The aeronautical half shows eight individual development parcels that would be ideal for private corporate aviation hangars. The northern half shows 10 parcels for non-aeronautical development with an access road cut from Merrill Avenue.

The alternative presents a very different concept for the location of a focal terminal building, which would be at the south end of a new airport entrance road that would bisect the large tie-down apron. Like the first landside alternative, a road would extend on the runway side of hangars (A480-A560) to provide dedicated vehicle parking for these aeronautical businesses.

Two taxilanes, one west of the planned terminal and a dual taxilane to the east, would provide access to the existing hangars. The area north of Taxiway A that is currently unpaved is planned to be future aircraft apron, including the area in front of the potential terminal building.

In the northeast, a taxilane is extended from Taxiway P to the undeveloped area east of the stormwater drainage channel. This taxilane provides access to a large aircraft apron and several large conventional hangars. The east side of this parcel can then be used for non-aeronautical development as shown.

The south side of the airfield follows a similar pattern to Landside Alternative 1 with slightly different layouts. The southeast is considered for private hangar development on leased parcel land. The area east of Runway 3 is planned for a large scale FBO/terminal business operator(s). The southwest side shows another layout option for both aeronautical and non-aeronautical development.

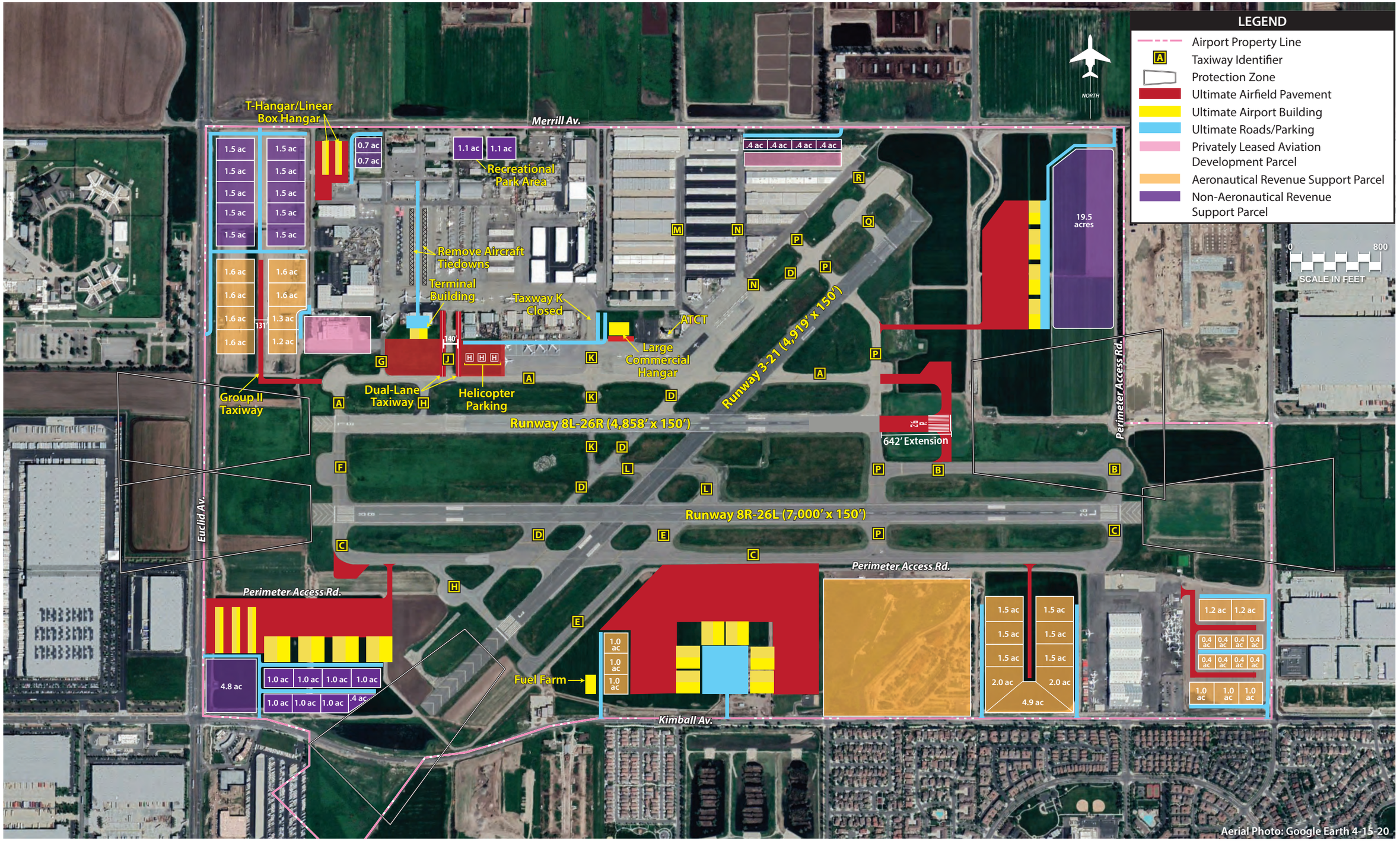
Landside Development Concept 3

The third landside alternative is presented on **Exhibit 4P**. In this alternative, the area to the northwest is planned exclusively for non-aeronautical development with a street network and access from both Euclid Avenue and Merrill Avenue.

Like both other landside alternatives, a road is extended from the south end of the current airport entrance road to the west to provide access to existing airport business hangars. Again, the purpose of this is to reduce the need for vehicles to cross aircraft movement surfaces, thus increasing safety.

To the northeast, Taxiway A is extended across the stormwater drainage infrastructure to provide access to an area of aeronautical development. The eastern half of this parcel is reserved for non-aeronautical development.

The south side of the airport is shown with a mix of aeronautical and non-aeronautical development. In addition, a buffer is planned along Kimball Avenue between airport activities and the residential communities south of Kimball Avenue. The FBO complex area is still reserved in the same location as the other landside alternatives. It should be understood that other aeronautical uses could develop in this location and not just an FBO complex.


LEGEND
Airport Property Line
Taxiway Identifier
Protection Zone
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Ultimate Airport Building
Ultimate Roads/Parking
Privately Leased Aviation Development Parcel
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Recreational Park Area
Remove Aircraft Tiedowns
Terminal Building
Taxway K Closed
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19.5 acres
Group II Taxiway
Dual-Lane Taxiway
Helicopter Parking
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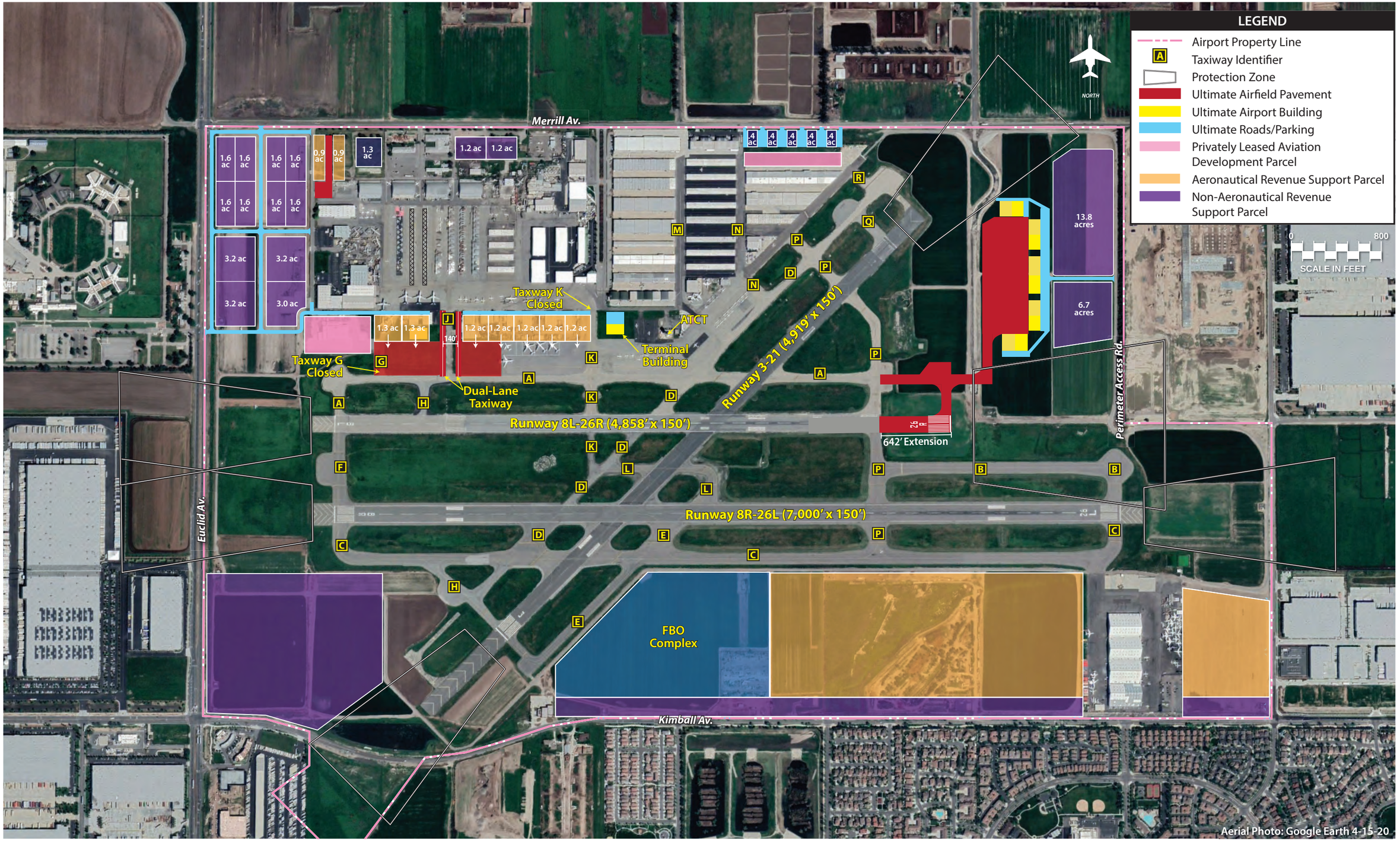
Perimeter Access Rd.
Aerial Photo: Google Earth 4-15-20



Aerial Photo: Google Earth 4-15-20

To the southwest, this exhibit is the first to indicate that the entire 53-acre parcel west of Runway 3 could be used for non-aeronautical development.

ALTERNATIVES SUMMARY

The alternatives chapter presents development alternatives for both the airside and landside. Each of the alternatives addresses specific issues identified in the Facility Requirements chapter, future demand as presented in the Forecast chapter, or an overall long-term vision for the airport. The need for alternatives is typically spurred by projections of aviation demand growth and/or by the need to resolve non-standard airport elements. FAA design standards are frequently updated with the intent of improving the safety and efficiency of aircraft movements on and around airports, which can lead to certain pavement geometries now being classified as non-standard when previously they did meet standard.

On the airside, the primary focus is the adequacy of the runway length, the geometry of the taxiways, and mitigation measures for the several Hot Spots on the airfield. Runway 8L-26R is planned to be extended to the east by 642 feet for a total length of 5,500 feet. The other two runways are planned to remain at their current length. All runway ends are planned for visibility minimums of not lower than 1-mile except Runway 26R, which is planned to continue to support an ILS with visibility minimums of not-lower-than ¾-mile.

On the landside, various areas for potential future aviation development have been identified. Several potential hangar layouts were presented to maximize the developable land. The future planned facility layout may be one of the specific alternatives or, more likely, a combination of elements from each of the alternatives. Several parcels of airport land were shown to potentially accommodate non-aeronautical purposes as long as that development is compatible with an airport environment.

The next step in the ALP Update process is to arrive at a recommended development concept. Participation of the PAC and the public will be important considerations. Additional consultation with the FAA may also be required. Once a consolidated development plan is identified, a 20-year capital improvement program with a list of prioritized projects tied to aviation demand and/or necessity will be presented. Finally, a financial analysis will be presented to identify potential funding sources and to show airport management what local funds will be necessary to implement the plan.

CHAPTER FIVE

RECOMMENDED CONCEPT

SAN BERNARDINO COUNTY

CHAPTER FIVE

RECOMMENDED CONCEPT

The airport planning process for Chino Airport (CNO) has evolved through the development of forecasts of future demand, an assessment of future facility needs, and an evaluation of airport development alternatives to meet those future facility needs. The planning process has included three sets of draft working papers, which were discussed at several coordination meetings. The draft material has also been available on a dedicated project website throughout the process.

In the previous chapter, several alternatives were analyzed to explore options that can accommodate growth and development of the Airport. The development alternatives have been refined into a single recommended development plan. This chapter describes, in narrative and graphic form, the recommended direction for the future use and development of the Chino Airport. Where appropriate, the alternatives are summarized and a rationale for the selected alternative is presented.

AIRPORT REFERENCE CODE (ARC)

Current activity levels at Chino Airport indicate an airport reference code (ARC) of C-II. CNO has been experiencing increasing levels of activity by operators of large business jets over the years. The airport is also designated as a reliever airport, which means it should be planned and designed to accommodate general aviation activity, including business jets, that might otherwise use nearby commercial service airports. This ALP Update considers the implications of a transition to ARC D-III because of the increased use of the airport by business jets with wider wingspans. The applicable design standards for C-II and D-III are the same for the runway safety area (RSA), runway object free area (ROFA), and potentially in the runway protection zone (RPZ). The separation standards are more restrictive for D-III with parallel taxiways needing to be at least 400 feet from the runway centerline (300 feet is the current standard) and aircraft parking areas being 500 feet from the runway centerline (current standard is 400 feet). In addition, taxiway and taxilane object free areas are different for C-II and D-III. The C-II Taxiway OFA is 131 feet, and for D-III it is 186 feet, both as centered on the taxiway/taxilane.

The ARC of the airport determines the first two of the three elements of the runway design code (RDC) for the runway, the third being the instrument approach visibility minimums. The lowest visibility minimum currently is ¾-mile to the Runway 26R end; therefore, the current RDC for Runway 8L-26R is C-II-4000. This visibility minimum is planned to be maintained therefore the future RDC is D-III-4000.

The current RDC for Runway 8R-26L is C-II-VIS. This runway is planned for instrument approaches with visibility minimums of not lower than 1-mile. Therefore, the future RDC is D-III-5000. Instrument approaches are not planned for Runway 3-21 and the ARC is planned to stay the same. Therefore, the current and future RDC for Runway 3-21 is C-II-VIS.

RECOMMENDED CONCEPT

The recommended concept represents the development direction for Chino Airport through the planning period and beyond. It represents an ultimate configuration for the airport that meets Federal Aviation Administration (FAA) design standards and provides a variety of landside development options to meet the increasing demands on the airport by different aviation and non-aviation activities. It is important to note that the development concept provides for anticipated facility needs over the next 20 years, as well as establishing a vision and direction for meeting facility needs even beyond the planning horizons established in this ALP Update.

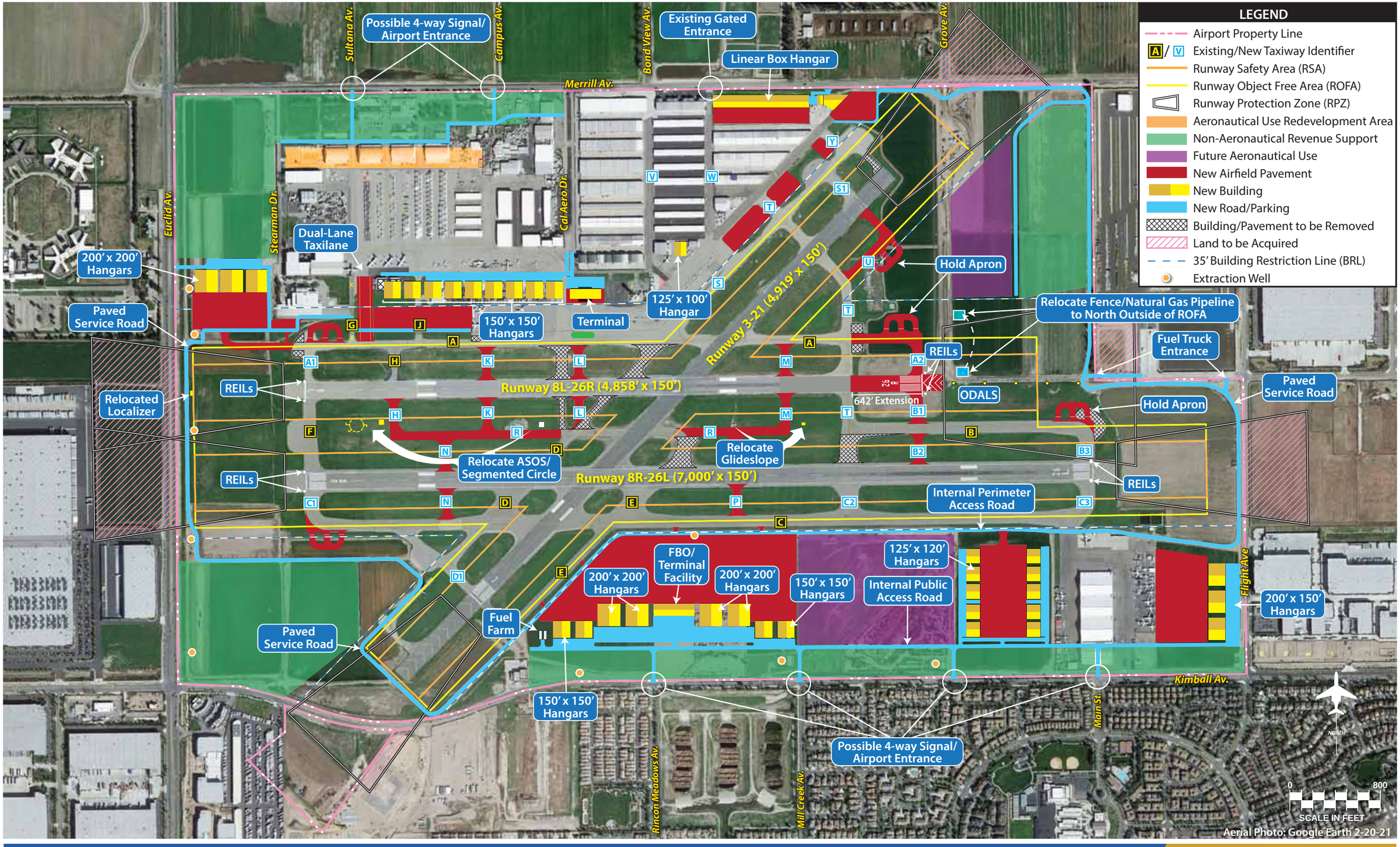
When assessing development needs, this study has separated the airport system into airside and landside functional areas. Airside components relate to runways, taxiways, navigational aids, etc., and require the greatest commitment of land area to meet the physical layout of the airport. Land-side components include hangars, aircraft parking aprons, terminal services, as well as the utilization of remaining airport property to provide revenue support for the airport and to benefit the economic development and well-being of the regional area. The recommended concept is a consolidation of these airside and landside functions as depicted on **Exhibit 5A**.

AIRSIDE DEVELOPMENT CONCEPT

The airside concept generally relates to planned improvements to the runway and taxiway system. **Exhibit 5A** presents the long-term development concept for Chino Airport.

AIRFIELD GEOMETRY STUDY

The Chino Airport administration has been working closely with FAA for several years to address various safety concerns related to the airfield. There are four Hot Spots and five Runway Incursion Mitigation (RIM) locations on the airfield (reference Exhibit 3D). During the development of this ALP Update, the FAA and the Airport administration decided to do a separate study that exclusively focused on the airfield geometry. The ALP Update was put on hold while the Airfield Geometry Study was undertaken because the results of that study were to inform the ALP Update and be included as an appendix. The completed Airfield Geometry Study is **Appendix C**.



Aerial Photo: Google Earth 2-20-21

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The Airfield Geometry Study documents the numerous measures already implemented, including enhanced taxiway centerline markings and various surface painted directional markings. The following recommendations are also discussed in the Airfield Geometry Study:

- Install omni-directional approach lights (ODALS) system on the approach to Runway 8L-26R (after runway has been extended) to help pilots to quickly identify the proper runway.
- Install runway end identification lights (REILs) on the ends of the parallel runways to assist pilots in identifying the proper runway end quickly.
- Close Taxiways K and L to eliminate the confusing geometry that has led to runway incursions in the past.
- Add new runway crossing taxiways for aircraft movement efficiency.
- Add new partial parallel taxiway between runways.

FUTURE RUNWAY LENGTH

Runway 8L-26R is currently 4,858 feet long, and it supports the only instrument approach to the airport. Analysis in Chapter Three – Facility Requirements indicated that the minimum recommended length for this runway is 5,500 feet. Previous planning for the airport also included an extension of this runway. The need for a 642-foot extension is justified by current activity on the runway, because most business jet operators will prefer this runway because of the presence of the ILS. In addition, the analysis in the Airfield Geometry Study (see **Appendix C**) indicated that extending the runway will facilitate a new taxiway geometry that would enhance the safety of ground movements and reduce runway incursions. Thus, the runway extension is not only a capacity benefit but also a safety benefit. All other runways are planned to be maintained at their current length.

RUNWAY WIDTH

The FAA design standard for runway width is based on the critical aircraft for each runway and the instrument approach visibility minimums. The critical aircraft for both parallel runways is forecast to transition from C-II to D-III. The current C-II runway width standard is 100 feet. At the next reconstruction of either parallel runway, the 100-foot standard width would be eligible for grant funding from FAA. If the airport sponsor desires to maintain one or both parallel runways at the current 150-foot width, then the sponsor may be financially responsible for the remaining 50 feet.

Runway 3-21 is a C-II runway, and it is planned to remain as such. This runway is 150 feet wide, which exceeds the design standard. If at the time of the next reconstruction of the runway, the critical aircraft for Runway 3-21 is confirmed to have remained C-II, then a 100-foot runway would be eligible for grant funding from FAA. If the airport sponsor desires to maintain the runway at a 150-foot width, then the sponsor may be financially responsible for the remaining 50 feet. It should be noted that Runway 3-21 would need to be designated by FAA as a secondary runway to be eligible for any grant funding.

RUNWAY STRENGTH

Airfield pavements should be constructed to provide adequate support for the loads imposed by aircraft using the runway, as well as resist the abrasive action of traffic and deterioration from adverse weather conditions and other influences. There are various aircraft landing gear configurations that displace aircraft weight differently, thereby affecting a runway's ability to handle the load. Single wheel loading (S) refers to having one wheel per landing gear strut. Dual wheel loading (D), dual tandem wheel loading (2D), and double dual tandem (2D/2D2) include the design of aircraft with additional wheels on each landing gear strut which helps distribute the aircraft's weight on the runway surface.

Runway 8R-26L has been strength-rated at 75,000 pounds single wheel loading (S), 150,000 pounds dual wheel loading (D), and 215,000 pounds dual tandem wheel loading (2D). This strength rating is adequate to accommodate repeated usage by the critical aircraft now and in the future. Runway 3-21 is strength-rated at 21,000 pounds single wheel loading (S), 130,000 pounds dual wheel loading (D), and 50,000 pounds dual tandem wheel loading (2D). This strength rating is adequate for the type of aircraft that will typically use the crosswind runway.

Runway 8L-26R is strength rated at 12,000 pounds for single wheel landing gear and is not specifically strength rated for dual wheel landing gear. Runway 26R is outfitted with an ILS which is an instrument approach aid that is most often utilized by operators of heavier aircraft such as turboprops and business jets. At the time of the next reconstruction of this runway, the pavement strength should be enhanced to at least 30,000(S) and 60,000(D).

RUNWAY SAFETY AREAS

There are several objects currently located in the runway safety area and runway object free area. The localizer antenna is in the Runway 8L-26R RSA, approximately 898 feet from the Runway 8L threshold. This localizer antenna is not considered fixed by function and should be removed from the RSA if feasible. However, the localizer antenna is on frangible mounts which is permissible for certain navigational aids in safety areas.

In the alternatives chapter, consideration was given to relocating the localizer antenna to the west, outside of the RSA. The perimeter service road is approximately 1,030 feet from the Runway 8L threshold, so the localizer could be relocated outside the RSA. However, the localizer antenna has a critical area of 50 feet behind the antenna array; therefore, the critical area would be encroached by the service road. It is unlikely that the service road could be shifted 20 feet west because of the Edison Avenue right-of-way; therefore, it is recommended that the localizer antenna, resting on frangible mounts, remain in its current location.

On the east end of Runway 8L-26R, approximately 920 from the Runway 26R threshold, there is some above ground gas pipeline equipment that is surrounded by chain link fencing. The equipment and the fence are currently in the RSA. These facilities are planned to be relocated to the north, outside the RSA and ROFA.

At the southeast corner of the airport are located two fire suppression retention ponds, which are surrounded by chain link fencing. The fencing and the berms around the ponds are penetrations to the ROFA. These are planned to be redesigned so that they are no longer a ROFA penetration.

RUNWAY PROTECTION ZONES (RPZ)

RPZs are trapezoidal shaped areas extending from each runway end, dimensioned according to the aircraft utilizing the runway and the availability of instrument approach procedures. The RPZ should be cleared of incompatible land uses such as public roads, homes, buildings, and other uses where people can gather. It is recommended that airports own RPZ lands, if feasible, to have positive control of the land to insure they have compatible land uses. Since airports do not always own or have the capability to own RPZ lands, they should then seek an avigation easement for the RPZ lands and support compatible land use zoning strategies of RPZ lands.

On September 16, 2022, the FAA published AC 150/5190-4B, *Airport Land Use Compatibility Planning*. This AC represented a significant effort to address RPZ land use compatibility. Airport-compatible land uses are those that can coexist with a nearby airport without constraining the safe and efficient operations of the airport. Assuring compatible land uses within the RPZ is best achieved through:

1. Airport ownership of the RPZ property;
2. Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.;
3. Possessing sufficient land use control authority to regulate land use in the jurisdiction containing the RPZ;
4. Possessing and exercising the power of eminent domain over the RPZ property; or
5. Possessing and exercising permitting authority over proponents of development within the RPZ.

All the RPZ's at Chino Airport extend beyond airport property (except the existing RPZ for Runway 26R). No change is planned to the size or location of the RPZs for runway ends 8L, 8R, 26L, 3, and 21, which means no immediate action is necessary to mitigate the roads in these RPZs.

The RPZ to Runway 26R contains an existing dirt airport service road that is not open for the public to use. Since the runway is planned to be extended 642 feet to the east, the associated RPZ will also shift to the east. This will place the new shifted RPZ over a portion of Remington Avenue. Ultimately, this portion of Remington Avenue is planned to be improved to accommodate public road access to the northeast quadrant of the airport which is currently identified for future aeronautical and non-aeronautical development. Improvement of Remington Avenue to a public road will be a new incompatible land use in the RPZ which may require additional consultation with FAA. While not guaranteed, approval will likely rest on the fact that there is no other feasible route to the northeast quadrant especially since additional entrance points from Merrill Avenue are not likely to be approved by county traffic engineers.

WEATHER INFORMATION AIDS

The automated surface observation system (ASOS) is located approximately 1,800 feet from the Runway 26R threshold. Once the runway is extended, the ASOS will be approximately 1,158 feet from the Runway 26R threshold. Technically, the ASOS equipment is not a penetration to any existing or future protective imaginary surface leading to or from the runway, so it could remain in its current location. However, it is unusual to have such equipment on the extended runway centerline and close to the runway threshold. Typically, such weather equipment is more centrally located to permit better and more consistent readings.

Previous planning showed the relocation of this equipment to the south side of Taxiway C near where Taxiway P intersects Taxiway C. This location is acceptable but not ideal because ultimately this land may be needed for aeronautical development, and the requisite critical area surrounding the relocated ASOS will significantly limit potential development. This plan presents a new location for the ASOS that is more centrally located and would not infringe upon future development. The recommended location for the ASOS is adjacent to the existing segmented circle in the mid-field of the airport. The ASOS would have to be on a frangible mount because this location is within the ROFA.

NAVIGATIONAL AIDS

At busy airports such as CNO, certain navigational aids can enhance safety. Runway end identifier lights (REILs) are planned for the ends of the parallel runways. These flashing strobe lights are set to the sides of the landing threshold and help pilots to locate the runway from up to 20 miles.

To better distinguish the parallel runways an omni-directional approach lights (ODALs) system is planned leading to the threshold of Runway 26R. The ODALs consists of five individual light stands extending for a length of 1,400 feet from the runway threshold. Other more sophisticated approach lighting systems such as a MALS and MALSR were considered, however some of the light stands would encroach into the Taxiway B object free area, thus the ODALs is recommended.

INSTRUMENT APPROACHES

Improvements to the instrument approach visibility minimums are planned. The instrument approach to Runway 26R will maintain the current visibility minimums of ¾-mile. An instrument approach with ½-mile visibility minimums was considered, but the larger RPZ would then cross over buildings, and the required MALSR lights would encroach on the Taxiway B OFA. For these reasons, the single row of ODALs was selected. Runway ends 8L, 8R, and 26L are planned for instrument approaches with not less than 1-mile minimums. Runway 3-21 is planned to remain a visual runway.

As a busy reliever airport, the instrument approach minimums should be as low as possible with at least one runway end (the predominant end for business jets) offering the lowest visibility minimums. The additional instrument approaches are GPS based providing for 1-mile minimums.

TAXIWAYS

Planned improvements to the taxiway system are largely the result of efforts to reduce and/or eliminate runway incursions as outlined in the Airfield Geometry Study (see **Appendix C**).

Taxiways K and L are planned to be removed from service, and the pavement removed from the airfield. The geometry of these two taxiways has contributed to numerous runway events/incursions, and the Airfield Geometry Study analysis recommended that these be closed permanently.

Closing Taxiways K and L will reduce ground movement efficiency; therefore, several new taxiways are planned. To the west a partial parallel taxiway is planned between the parallel runways. Taxiway H is extended south to intersect with the partial parallel taxiway. A second connector is planned to the east of Taxiway H, and a single connector is planned to extend south, across Runway 8R-26L, to intersect with Taxiway C.

Several new taxiways are planned to replace the taxiways identified for closure. This includes partial parallel taxiways between the runway and two runway crossing taxiways.

TAXIWAY WIDTH AND EDGE SAFETY MARGIN

The taxiway width and taxiway edge safety margin standard are both based on the Taxiway Design Group (TDG) of the critical aircraft. The current and future critical TDG is 2, and the associated taxiways width standard is 35 feet. At the time of the next reconstruction of any taxiways, the current width standard at the time should be considered and taxiways narrowed to 35 feet if necessary.

The Taxiway Edge Safety Margin (TESM) is the distance between the outer edge of the landing gear of an airplane with its nose gear on the taxiway centerline and the edge of the taxiway pavement. The TESM standard is based on the taxiway design group (TDG) of the critical aircraft. The TDG 2 standard is 7.5 feet. In some cases, the width of taxiways fillets, particularly taxiways connecting to runways, may be wider than standard to meet the TESM standard.

Taxiway shoulders are graded and/or paved areas to the sides of the paved taxiway surface that are suitable to support an aircraft that has veered off the taxiway or emergency vehicles. The taxiway shoulder width standard at CNO is 15 feet (TDG 2). All primary taxiways provide 15 feet of shoulder width.

HOLD/RUNUP APRONS

Busy general aviation airports with a high volume of activity particularly by smaller fixed-wing aircraft should make available hold/runup aprons near the ends of the parallel taxiways for pilots to perform pre-flight checks and engine runups. Hold/runup aprons should be located at the end of parallel taxiways as close to the runway threshold as possible. They should not extend beyond the lateral edge of the runway threshold to ensure clear safety surfaces surrounding and leading to runways.

Holding bays should be designed to allow aircraft to bypass one another to taxi to the runway. The typical hold/runup apron configuration includes clearly marked entrances and exits. Each parking area is independent, with the ability for aircraft to bypass others both on entrance and exit. Non-movement islands situated between the parking positions provide additional cues to pilots.

Hold/runup aprons are currently available in proximity to Runways 8L, 3, 21, 26R and 26L. All these existing hold/runup aprons are of an older design and do not meet the current design configuration described in FAA AC 150/5300-13B, *Airport Design*. Typically, when a hold/runup apron of older design is in need of reconstruction (often in association with a taxiway reconstruction), the new design should be considered to replace the old design. Only in special circumstances, such as a constrained location, is FAA permitting an old design to remain in place.

The recommended concept includes the most current hold/runup apron design. The depth of the holding bay is a function of the length of the aircraft that are likely to use it. In this case, a Challenger 300 was the design aircraft. This aircraft is 88 feet long, so space is available for aircraft to bypass on both sides of a Challenger 300 parked in the holding bay.

TERMINAL APRONS/AIRCRAFT PARKING

An aircraft parking apron is typically located in the non-movement area near the terminal area. The function of an apron is to accommodate aircraft during loading and unloading of passengers and cargo or to accommodate short- and long-term aircraft parking. Other activities, such as fueling and maintenance activities, also occur on apron areas. A well laid-out apron minimizes runway incursions and effectively expedites aircraft services. Good apron design should promote pilot situation awareness by forcing pilots to consciously make turns onto taxiways or taxilanes. The taxilane connectors leading to/from aprons should be clearly distinguished from aprons and taxiways. Wide expanses of taxiway pavement connecting to an apron are not recommended. Direct taxiway access from an apron area, across a parallel taxiway, to a runway intersection is not recommended.

Chino has a large terminal aircraft parking apron that is connected to Taxiways A and D. Taxilanes are distinguished with pavement markings as they connect to and pass through the apron. A standard non-movement line is marked on the edge of the apron to alert pilots that they are not to cross onto Taxiways A or D without tower clearance. The Airfield Geometry Study (see **Appendix C**) addressed the current apron/Taxiway A and D connections. The study indicated that the non-movement line on the apron was adequate to prevent inadvertent access to the Taxiways. An option to mark the pavement with large green “no-taxi” islands, between the taxiways and the non-movement line was considered but is not recommended at this time because there have not been significant issues associated with the apron pavement connecting to Taxiway A and D because of the non-movement marking.

The direct access issue from Taxiway K to the runway was considered, and several mitigating options were presented in the Airfield Geometry Study (see **Appendix C**). An intermediate solution is recommended which will shift a portion of Taxilane K as it traverses the apron, to the west, which will force pilots to make a conscious turn onto Taxiway A. Ultimately, Taxiway K is recommended to be removed completely solving the direct access issue as well as the confusing mid-field geometry. Once Taxiway K is removed (south of Taxiway A), then the temporary apron marking can be removed.

There are locations to the west and east of the existing terminal apron that are currently unpaved. Because of the need for additional apron, these are planned to be paved, but not to connect directly to Taxiway A and D except at designated taxilane entrances. That portion of the west new apron that is in line with Taxiway H will not be the connection to the new apron to avoid creating a direct access issue to the runway. A new taxiway (labeled Taxiway K in the future) is planned on the west end of the airfield that will connect to Runway 8L-26R; however, it will not connect directly to the new apron, also to not create a direct access issue.

Several large aircraft parking and circulation aprons are planned for undeveloped land on the southside of the airfield. One is located central to the runway system at the corner of Taxiways E and C. This apron area is envisioned to support active aeronautical businesses such as FBO, MRO (maintenance, repair, and overhaul), and corporate aviation flight departments.

To the east is an apron area shown to support 10 medium sized box hangars. This area may be for smaller aeronautical businesses or private hangar development. In the southeast corner is an undeveloped parcel envisioned for larger conventional hangar development. The hangar layouts presented are conceptual in nature and based on the forecast demand for more, larger hangars to support growing activity by larger aircraft. If trends change, the airport and private developers may desire to build something different than what is depicted here which is acceptable.

According to FAA AC 150/5300-13B, *Airport Design*, for ARC D-III, aircraft parking areas should begin a minimum of 500 feet from the runway centerline. All aircraft parking areas at CNO are at least 500 feet from the runway centerline.

LANDSIDE CONCEPT

The landside concept includes planning for future hangar needs and various support facilities. As discussed in Chapter Four – Alternatives, planning for additional hangar needs should follow a philosophy of segmenting activity levels. High activity facilities, such as large conventional hangars, should be co-located and central to the runway system. Medium activity hangars, such as box or executive hangars, should be located to the sides or behind the high activity conventional hangars. Low activity hangars, such as T-hangars or small individual box hangars, should be located farther to the sides.

It is critical to maximize the developable land at the airport because aviation land is a limited resource. Therefore, the recommended concept provides for reserving all land that is immediately adjacent to the runway and taxiway system for aviation purposes.

BUILDING RESTRICTION LINE

The Building Restriction Line (BRL) is an imaginary line which identifies suitable building areas on airports. The BRL encompasses the runway protection zones, object free areas, and areas required for control tower line-of-sight (where applicable).

The FAR Part 77 transitional surface extends from the edge of the primary surface (which follows the centerline elevation of the runway) at a slope of 7:1 to the intersection with the horizontal surface, which is 150 feet above the airport elevation. It is the transitional surface that defines the BRL. The current primary surface is 500 feet wide for Runways 8R-26L and 3-21. Therefore, the current 35-foot BRL is 495 feet from the centerline of these two runways. All existing structures are below or behind the BRL for these runways. The 35-foot BRL for Runway 8L-26R is situated 745 feet from the centerline since the primary surface for this runway is 1,000 feet wide (based on the existing and future ¾-mile visibility minimum to Runway 26R). All existing structures are below the BRL elevation for Runway 8L-26R. All future structures planned for the airport are height limited to remain below the BRL/transitional surface elevation.

FUTURE HANGAR DEVELOPMENT

Any plan for future hangar development is conceptual in nature until the airport sponsor or a developer/builder initiates the process of building a hangar. While the plan may show a hangar of a certain size, significant flexibility should be made available to any developer to build to suit their operational needs as long as the overall development philosophy (separation of activity levels) is followed.

The facility requirements chapter indicated that the airport may need up to 164,000 square feet of additional hangar space. **Exhibit 5A** shows a near full build-out scenario with approximately 182,500 square feet of new hangar space on the north side of the airport and 490,000 square feet of new hangar space on the south side of the airport.

Several existing hangars on the north side of the airport are beyond their useful life and are becoming costly to maintain. These hangars are planned to be redeveloped with more modern facilities.

Chino Airport is in the enviable position of having large undeveloped tracts of land on the south side of the airport. These southside lands present great possibilities for orderly and efficient development of the land. It also provides an opportunity for the airport to control the development to ensure that the aesthetic appearance of the new development meets minimum standards. While various taxilanes, aprons, and hangar layouts are presented on the south side, airport management should remain flexible to assess other scenarios that developers may bring to the table. For example, it is unusual for an urban airport to be able to offer 40+ acres for lease to a single aeronautical entity. Activities such as aircraft manufacturing and aircraft maintenance, repair, and overhaul (MRO), typically require large parcels of aeronautical land. The undeveloped southside could serve such a specialized aeronautical function.

FUTURE TERMINAL BUILDING DEVELOPMENT

Terminal buildings serve as an entrance to the community and provide various services to pilots and the public. Often terminal services such as a pilot's lounge, weather stations, and restrooms are available. These services can also be provided to some degree by FBOs.

The plan has identified a location at the south end of CalAero Drive, on the main apron, for a general aviation terminal building. This is an ideal location as it is served by the main airport entrance road and is centrally located on the main apron. Because the terminal building may be the first impression that business leaders arriving by private aircraft experience, all care should be given to making the terminal building first class.

PROPERTY ACQUISITION

An important consideration when planning the future of an airport is to identify any adjacent property that may need to be acquired to accommodate potential growth or to protect the airport from encroachment. Fee simple acquisition is not always possible, and in such cases the airport should consider acquisition of an avigation easement to protect the airspace. Land for airport expansion of either the runways or for hangar development is not needed. Rather, all recommended land acquisition is RPZ land that the airport should have positive ownership of if possible. **Table 5A** summarizes the RPZ lands recommended for acquisition or easement.

Table 5A | RPZ Land Acquisition or Easement - Chino Airport

Parcel ID	Location/Runway End	Fee Simple or Easement	Acres
1	West End/Runways 8L and 8R RPZ	Fee Simple	21.1
2	West End/Runways 8L and 8R RPZ	Easement (Roadway and Edge of Parking Lot)	3.5
3	Southwest/Runway 3 RPZ	Fee Simple (eastside of RPZ, south of Kimball)	1.6
4	East/ Runway 26L RPZ	Fee Simple (east of Flight Ave)	10.9
5	East/Future Runway 26R RPZ	Fee Simple (Adjacent FedEx)	7.2
6	Northeast/Runway 21 RPZ	Fee Simple (northeast corner of Merrill and Grove)	6.7
7	Northeast/Runway 21 RPZ	Fee Simple (northwest corner of Merrill and Grove)	0.51

Parcel 1: Approximately 21.1 acres of undeveloped Runway 8 RPZ land extend west of Euclid Avenue. The airport has been successful in limiting development of this land, nonetheless, it is better if the airport had ownership of the land.

Parcel 2: Approximately 3.5 acres of Runway 8 RPZ land are already developed with an entrance road and parking lot associated with a large warehouse facility to the west. The airport should consider acquiring an avigation easement over these developed portions of the Runway 8 RPZs.

Parcel 3: The Runway 3 RPZ crosses Kimball Avenue and the airport owns most of this RPZ land. Two areas on the edges of the RPZ and south of Kimball Avenue are privately owned and currently undeveloped. The airport should acquire the edge-of-RPZ lands if feasible.

Parcel 4: The RPZ for Runway 26L extends off airport property. The County recently acquired this land, in part to protect the airport. This portion of the RPZ is approximately 10.9 acres. While the land is likely protected from incompatible land use development because the county owns it, it should be absorbed into airport property and positively protected in that way.

Parcel 5: When Runway 26R is extended, the RPZ will extend beyond airport property. This area is approximately 7.2 acres and currently serves as a stormwater runoff detention pond. If possible, the airport should acquire this land when the runway is extended.

Parcel 6 and 7: The Runway 21 RPZ extends beyond airport property north of Merrill Avenue at the corner of Grove Avenue. Development is occurring in this area, and the airport has successfully directed that no development occurs within this RPZ land. If possible, the airport should acquire these RPZ lands.

SURFACE ROAD ACCESS

The main entrance to the airport is via Cal Aero Drive at Merrill Avenue on the north side. While this is planned to remain the primary airport entrance road, there is no left-hand turn lane when travelling westbound on Merrill. This intersection is also not signalized. Over time, as Merrill Avenue supports more traffic, this will become problematic and congested. Ultimately, the Airport and county should support signalizing this intersection and adding turning lanes.

Current county planning is considering adding signalized intersections on Merrill Ave at both the Campus and Soltana Avenue right-of-ways. The Airport is advocating to make one or both of these intersections four-way, which will allow for an additional or new entrance to the north side of the Airport. There has been some consideration for ultimately closing the airport entrance at Cal Aero Drive and making an entrance at Campus or Soltana Avenues the primary airport entrance. Additional traffic planning and engineering will be necessary to make the connections from a new airport entrance to Cal Aero Drive, however one possible internal roadway layout is depicted on **Exhibit 5A**.

The development of the FedEx facility included extension of a portion of Remington Avenue from Flight Avenue. Consideration is given to extending Remington Avenue from the FedEx facility west to the airport property line which will then provide public road access to the northeast airport land identified for future aeronautical and non-aeronautical development.

An additional airport entrance is considered on Remington Avenue near the intersection with Flight Avenue. This entrance is primarily for fuel delivery trucks that can then utilize the on-airport service road (Walker Avenue) to access fuel storage facilities on the south side of the airfield. This is especially important now because Kimball Avenue is not a truck route, and trucks are restricted from using Kimball Avenue.

On the south side of the airport, Kimball Avenue has several existing airport entrance cuts toward the Airport. These are located at the intersections with Main Street, Grove Avenue, Mill Creek Avenue, and Rincon Meadows Avenue. Each of these is planned to serve as an entrance to the south side of the airport. All are planned to intersect with the Airport's internal circulation road providing access to airside facilities.

PERIMETER SERVICE ROAD

Airport management must monitor airport activity on a constant basis. To accomplish this, perimeter service roads are typically developed so staff can access all areas of the airport. Chino Airport has a perimeter service road system; however, the portions that are paved are in poor condition, and other portions are not paved at all. **Exhibit 5A** depicts the perimeter service road to be paved. Where the service road crosses taxilanes, appropriate signage will be installed (surface painted stop signs and/or vertical signage).

The service road route on the northside of the airport is somewhat undefined currently. When service vehicles are travelling from west to east, they exit the service road at former Taxilane G (immediately west of Taxilane J) and travel through the hangar areas (immediately south of the primary aircraft tie-

down apron), and then continue to use other aprons and taxilanes to reconnect with the service road near the Runway 21 threshold. An alternative to consider is to establish the service road on the edge of the terminal apron, just outside of the TOFA. This would mean losing approximately 20 feet of apron edge, but it would provide a safer and more efficient route around the airport.

PERIMETER FENCING

The Chino Airport has full perimeter fencing currently. This is an important safety and security measure especially in more populated areas. Currently (2001-2022), Kimball Avenue is planned to be widened, and the roadway right-of-way will impact the current location of the perimeter fence. A replacement fence will be needed and should be installed before the old fence is removed, if possible. Periodically, perimeter fencing in other areas of the airport will need to be upgraded and/or replaced.

EXTRACTION WELLS

There are approximately ten water extraction wells on the Airport. Most are located on the perimeter. Several are operated by the Chino Basin Desalter Authority (CDA), and others are operated by San Bernardino County. These wells are critical infrastructure that serve the region to manage the production, treatment, and distribution of highly treated potable water. All care has been given to planning new airport infrastructure around these existing water extraction wells.

LAND USE – ON-AIRPORT

The recommended concept largely reflects the initial land use designations shown previously on **Exhibit 4B**. The following summarizes the on-airport land use designations.

AIRFIELD OPERATIONS

Airfield operations consist of that portion of airport property encompassing the major airside elements, such as the runways, taxiways, runway safety area, runway object free area, runway obstacle free zone, runway protection zone (on airport property), taxiway safety area, taxiway object free area, and any navigational aid critical areas. Airfield operations are intended for the safe and efficient movement of aircraft to and from the airfield. This land use designation includes the various object clearing areas, and only elements necessary for aircraft navigation can be located here.

AERONAUTICAL DEVELOPMENT

The Aeronautical Development land use category includes those areas that should be reserved for development that requires access to the airfield operations area. Any aviation business needing access to the runway and taxiway system should locate in these areas. Generally, any land adjacent to the runway/taxiway system should be reserved for current and future aviation purposes.

NON-AERONAUTICAL REVENUE SUPPORT

This land use classification includes development that is compatible with aviation activities but is unlikely to require access to the runway and taxiway system. Typically, it is preferable that activities in these areas complement airport activities to some degree, but that is not required. Examples of potential uses include research facilities, laboratories, manufacturing and processing facilities, warehouses, and other facilities compatible with an airport environment.

Development of airport property with non-aeronautical uses is only permitted by the FAA if it can be shown that the land will not be needed for aeronautical uses in the future. When non-aeronautical uses are introduced, the airport must receive a fair-market lease from the tenant, either through a land lease or facility lease.

When reviewing the airport layout plan (ALP), the FAA will examine if the non-aeronautical land uses are reasonable and do not negatively impact future aeronautical development. The FAA may desire to begin the process of releasing non-aeronautical land from the existing aviation use obligation. The land would remain on airport property, but it would be an easier process to permit non-aeronautical development.

The airport land use map is a concept drawing that will be included as one of the official drawings in the airport layout plan set. Identifying potential non-aeronautical land in the ALP set is only the first step toward allowing non-aeronautical uses. The airport must follow a prescribed FAA process to release the land from airport obligations. The airport must also receive fair-market value from any developer or tenant for a ground lease. All revenue generated from the lease must remain with the airport and cannot be diverted for other needs that are unrelated to the airport.

SUMMARY

The recommended concept depicted on **Exhibit 5A** presents a long-term strategic development plan for the airport. On the airside, Runway 8L-26R is planned to be extended from 4,858 feet to 5,500 feet to better accommodate current activity by the critical aircraft family of business jets. The other two runways are planned to remain at their current length.

The airfield currently has four Hot Spots and five RIM locations. A separate Airfield Geometry Study was undertaken during this ALP Update (see **Appendix C**), and the findings of that study are incorporated into the ALP Update. Taxiway K and L are planned to be removed to eliminate the confusing taxiway geometry in the mid-field of the airport. Additional taxiways to the east and west of Runway 3-21 are then to be constructed to provide ground movement efficiency.

Additional navigation aids are planned that will help reduce the potential for approaching pilots to line-up on the wrong runway end. All four ends of the parallel runways are planned to be equipped with runway end identification lights (REILS). In addition, the approach to Runway 26R is planned for omni-directional approach lights (ODALs) which will further distinguish this runway end from the parallel runway.

The landside plan was developed by first distinguishing between aeronautical and non-aeronautical land uses on the airport. Once enough land was reserved for aeronautical use (well beyond the 20-year horizon of this ALP Update), then the remaining land was identified for non-aeronautical revenue support development. Essentially undeveloped land with access to the taxiway system was reserved for future aeronautical development.

Several existing but aging hangars on the north side of the airfield have been identified for redevelopment. As hangars age, they become outdated and more expensive to maintain.

The southside of the airfield is largely undeveloped except for one large aircraft maintenance business. The southside is envisioned to support FBO services, and other aeronautical businesses, as well as private aircraft hangars. Development of the south side will relieve existing congestion on the north side and allow for more efficient separation of activity levels where smaller aircraft can remain on the northside and larger business jets can be accommodated on the southside.

The next chapter of this ALP Update will present a 20-year capital improvement program (CIP) and a project phasing plan for implementation of the CIP. Strategies for funding the recommended development plan are also presented.

CHAPTER SIX

CAPITAL IMPROVEMENT PLAN

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CHAPTER SIX

CAPITAL IMPROVEMENT PLAN

The analyses completed in previous chapters evaluated development needs at the airport over the next 20 years and beyond, based on forecast activity and operational efficiency. Next, basic economic, financial, and management rationale is applied to each development item so that the feasibility of each item contained in the plan can be assessed.

The presentation of the capital improvement program (CIP) has been organized into two sections. First, the airport development schedule and CIP cost estimate is presented in narrative and graphic form. Second, capital improvement funding sources on the federal, state, and local levels are identified and discussed.

AIRPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

Now that the recommended development concept has been presented, and specific needs and improvements for the airport have been established, the next step is to determine a realistic schedule (implementation timeline) and associated cost estimates for the plan. The recommended improvements are grouped by planning horizon: short term, intermediate term, and long term. The short-term planning horizon is further subdivided into yearly increments.

As an ALP Update is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, some projects may require additional infrastructure improvements (i.e., drainage improvements, extension of utilities, etc.) that may take more than one year to complete. In addition, on an annual basis, the airport capital improvement plan (ACIP) is updated in coordination with FAA.

At this juncture, it is difficult to know, precisely, what the cost of individual projects will be; however, preparing order-of-magnitude cost estimates is an effective way to get a feel for the current costs. Many federal agencies utilize a system of five classes of estimates, as presented in **Table 6A**.

TABLE 6A | Cost Estimate Classification

Estimate Class	Name	Purpose	Project Definition Level
Class 5	Order of Magnitude	Screening or Feasibility	0% to 2%
Class 4	Intermediate	Concept Study or Feasibility	1% to 15%
Class 3	Preliminary	Budget, Authorization, or Control	10% to 40%
Class 2	Substantive	Control or Bid/Tender	30% to 70%
Class 1	Definitive	Check Estimate or Bid/Tender	50% to 100%

Source: U.S. Department of Energy

Once the list of recommended projects was identified and refined, project-specific cost estimates were developed. The cost estimates include environmental documentation, design, engineering, construction administration, and contingencies that may arise on the project. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficient for planning purposes. Cost estimates were developed based on recent airport construction costs in the region. Cost estimates for each of the development projects in the CIP are in current (2022) dollars. **Exhibit 6A** presents the proposed CIP for Chino Airport (CNO).

FAA utilizes a priority ranking system to help objectively evaluate potential airport projects. Projects are weighted toward safety, infrastructure preservation, standards, and capacity enhancement. FAA will participate in the highest priority projects before considering lower priority projects, even if a lower priority project is considered a more urgent need by the local sponsor. Nonetheless, the project should remain a priority for the airport, and funding support should continue to be requested in subsequent years.

An important goal of the CIP is that future projects for which the airport may request FAA funding are included on the list. On an annual basis, the CIP is updated and reviewed with FAA and Caltrans. Projects on the CIP will be moved up and down, depending on priority and funding availability. Periodically, new projects will arise that can then be added to the annual CIP presented to the FAA.

Often hangar construction is left to the private sector. It is typical for private hangar development to include a portion of the ramp area in front of the hangar. Taxilanes providing access to/from hangar areas are generally eligible for FAA grant funding unless they are exclusive use taxilanes.

The following sections will describe in greater detail the projects identified for the Airport over the next 20 years. The short-term projects cover the first five years and are presented in yearly increments. The intermediate term covers years 6-10, and long-term projects cover years 11-20. All projects are ranked according to their priority at the time of developing the list.

PAVEMENT CONDITION

The most important asset for any airport is the pavement including the runways and taxiways. Over time, airport pavement will deteriorate, and it is critical to maintain those pavements to ensure the safety of aircraft activity. In addition, airports that are eligible and receive Federal funding, such as CNO, are required by their Grant Assurances to maintain the useful life of the airport pavements.

	ID	PROJECT DESCRIPTION	NPR	Fed Share	Local Share	Total
SHORT TERM (Years 1-5)						
'22	1	Design Perimeter Fence Improvements	86	$76,500	$8,500	$85,000
2023	2	Construct Perimeter Fence Improvements	86	$2,681,100	$297,900	$2,979,000
	3	Taxiway K Pavement Marking	-	$0	$50,000	$50,000
	4	Safety Area Improvements for Rwy 26L - Planning and Environmental	50	$202,500	$22,500	$225,000
2024	5	Safety Area Improvements for Rwy 26L - Design and Construction	50	$169,200	$18,800	$188,000
	6	Airport Land Use Compatibility Plan Update (ALUCP)	-	$0	$80,000	$80,000
	7	CatEX for West Taxiway Improvements	68	$72,000	$8,000	$80,000
2025	8	Design West Taxiway Improvements	92	$912,600	$101,400	$1,014,000
	9	Update Pavement Maintenance/Management Plan (PMMP)	58	$54,000	$6,000	$60,000
	10	Rwy 8R-26L Rehabilitation - Seal and Mark	72	$315,000	$35,000	$350,000
2026	11	Construct West Taxiway Improvements/Relocate ASOS	92	$9,734,400	$1,081,600	$10,816,000
	12	Install REILs - Rwys 8R, 8L, 26L/Vault Upgrade	50	$324,000	$36,000	$360,000
SHORT TERM TOTAL				**$14,541,300**	**$1,745,700**	**$16,287,000**
INTERMEDIATE TERM (Years 6-10)						
	1	CatEx for East Taxiway Improvements	68	$72,000	$8,000	$80,000
	2	Design & Construct East Taxiway Improvements/ Relocate Glideslope	92	$6,076,800	$675,200	$6,752,000
	3	Environmental Assessment (EA) Rwy 26R Extension	68	$270,000	$30,000	$300,000
	4	Design & Construct Runway Extension Improvements	91	$9,296,100	$1,032,900	$10,329,000
	5	Install ODALS - Rwy 26R	50	$360,000	$40,000	$400,000
	6	Construct/Pave Airport Service Road	22	$1,745,100	$193,900	$1,939,000
	7	Rwy 8L-26R - Reconstruction/Strengthen	72	$13,743,000	$1,527,000	$15,270,000
	8	Rehabilitation Terminal Apron between TL K & N - Mill/Overlay/Stripe	62	$995,400	$110,600	$1,106,000
	9	Rehabilitate All North Hangar Area TL M & N - Crack Fill/Seal Coat	68	$1,685,700	$187,300	$1,873,000
	10	Reconstruct North Tie-Down Apron	62	$10,621,800	$1,180,200	$11,802,000
	11	Reconstruct North Apron Movement Areas	62	$9,235,800	$1,026,200	$10,262,000
	12	Reconstruct Twy F	68	$1,682,100	$186,900	$1,869,000
	13	Rehabilitate Southeast Commercial Apron - Crack Fill/Seal Coat	62	$1,013,400	$112,600	$1,126,000
	14	Rehabilitate Apron West of TL K - Crack Fill/Seal Coat	62	$313,200	$34,800	$348,000
	15	Update Pavement Maintenance/Management Plan (PMMP)	58	$54,000	$6,000	$60,000
	16	Construct Runway 21 Taxiway and Hold Bay	61	$3,425,400	$380,600	$3,806,000
	17	Construct New Apron between Twy N and Twy R	56	$2,157,300	$239,700	$2,397,000
	18	Rehabilitate Rwy 8R-26L - Crack Fill/Seal Coat	72	$1,545,300	$171,700	$1,717,000
	19	Rehabilitate Twy E - Crack Fill/Seal Coat	68	$306,000	$34,000	$340,000
	20	Rehabilitate Twy D - Crack Fill/Seal Coat	68	$461,700	$51,300	$513,000

KEY

NPR - National Priority Rating
ODALS - Omnidirectional Approach Lighting System
REIL - Runway End Identification Lights
Rwy - Runway
Twy - Taxiway
TL - Taxilane

ID	PROJECT DESCRIPTION	NPR	Fed Share	Local Share	Total
21	Rehabilitate Twy A - Crack Fill/Seal Coat	68	$517,500	$57,500	$575,000
22	Rehabilitate Twy C - Crack Fill/Seal Coat	68	$636,300	$70,700	$707,000
23	Reconstruct Twy A Hold Bay (West End)	61	$533,700	$59,300	$593,000
INTERMEDIATE TERM TOTAL			**$66,747,600**	**$7,416,400**	**$74,164,000**
LONG TERM (Years 11-20)					
1	Master Plan Update	68	$720,000	$80,000	$800,000
2	Land Acquisition - RPZ Rwy 8L, 8R, 3, 21, 26L, 26R (51 acres)	45	$13,770,000	$1,530,000	$15,300,000
3	Construct Dual Taxilane J	61	$1,306,800	$145,200	$1,452,000
4	Construct Apron East of Taxilane J	56	$2,781,000	$309,000	$3,090,000
5	Update Pavement Maintenance/Management Plan (PMMP) 2x	58	$108,000	$12,000	$120,000
6	Rehabilitate Twy B Between P and Rwy 26L - Crack Fill/Seal Coat	68	$209,700	$23,300	$233,000
7	Reconstruct Twy B Hold Bay at Rwy 26L	68	$533,700	$59,300	$593,000
8	Construct Twy A Extension West	53	$735,300	$81,700	$817,000
9	Construct Apron West	56	$3,417,300	$379,700	$3,797,000
10	Construct Apron Southeast	56	$4,929,300	$547,700	$5,477,000
11	Construct Taxilane Southeast	61	$1,267,200	$140,800	$1,408,000
12	Construct Apron South	56	$18,181,800	$2,020,200	$20,202,000
13	Construct Access Road Northwest Side	23	$990,000	$110,000	$1,100,000
14	Construct Access Road Frontage South	23	$905,400	$100,600	$1,006,000
15	Construct Hold Bay West end of Twy C	61	$533,700	$59,300	$593,000
16	Rehabilitate Taxiway P	61	$396,000	$44,000	$440,000
LONG TERM TOTAL			**$50,785,200**	**$5,642,800**	**$56,428,000**
GRAND TOTAL			**$132,074,100**	**$14,804,900**	**$146,879,000**

KEY

NPR - National Priority Rating
ODALS - Omnidirectional Approach Lighting System
REIL - Runway End Identification Lights
Rwy - Runway
Twy - Taxiway
TL - Taxilane

The Federal Aviation Administration Authorization Act of 1994 (Public law 103-305) mandates that any airport that requests federal AIP funding for pavement construction or restoration have a pavement maintenance management system. One common method that airports use to assess and prioritize pavement condition is to develop a Pavement Maintenance/Management Program (PMMP). Often a consultant specializing this pavement condition assessments is engaged to perform this analysis.

These firms typically utilize the Army Core of Engineers' Micropaver program as a foundation for pavement assessment. Airfield pavements are visually inspected. The type and severity of pavement conditions are entered into the computer program database. Pavement Condition Index (PCI) values are given by a visual assessment of pavement while following the current FAA Advisory Circular (AC) 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*. The values range from 0 (failed) to 100 (excellent). A complete database update is recommended at least every three years.

The most recent PMMP for CNO was completed in 2015. **Exhibit 6B** presents the PCI map produced at that time. It has been six years since the PMMP has been updated, and pavements have naturally deteriorated some since that time. Based upon recent visual inspections by the planning team and an understanding of the rate of deterioration of airfield pavements in general, the CIP in this study includes several pavement maintenance and rehabilitation projects as outlined in the sections below.

Pavement maintenance projects typically fall into one of three categories: crack fill/slurry seal, mill & overlay, or reconstruction. The first two are intended to maintain the useful life of the pavement and in some cases extend the life of the pavement. Ultimately all airfield pavements will need to be reconstructed. The CIP includes an assessment for various airfield pavements and identifies which of these three pavement improvement methods are most likely needed.

SHORT-TERM IMPROVEMENTS (YEARS 1-5)

The projects identified for the short-term planning period have been prioritized based on airport need and potential to be funded. If any of these projects cannot be funded in the timeframe indicated, the airport sponsor should move the project to a more appropriate timeframe. **Exhibit 6C** presents the short-term CIP phasing plan.

Project #1: Perimeter Fence Improvements - Design
Description: Planning and design of 32,000 linear feet of replacement fencing. The fencing project will provide appropriate separation of pedestrian and vehicle traffic from airside operations. This project includes replacement of approximately 10,000 linear feet of fencing along Kimball Avenue that will be removed due to a project to widen the roadway.
Cost Estimate: $85,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #2: Perimeter Fence Improvements - Construction
Description: Construction of 32,000 linear feet of perimeter fencing for the airport. Fencing is eight-foot with three strand barbed wire on top. Project includes installation of five double swing vehicle gates. Project also includes removal and disposal of existing fencing and gates.
Cost Estimate: $2,979,000
Funding Eligibility: FAA – 90% / Local Share – 10%

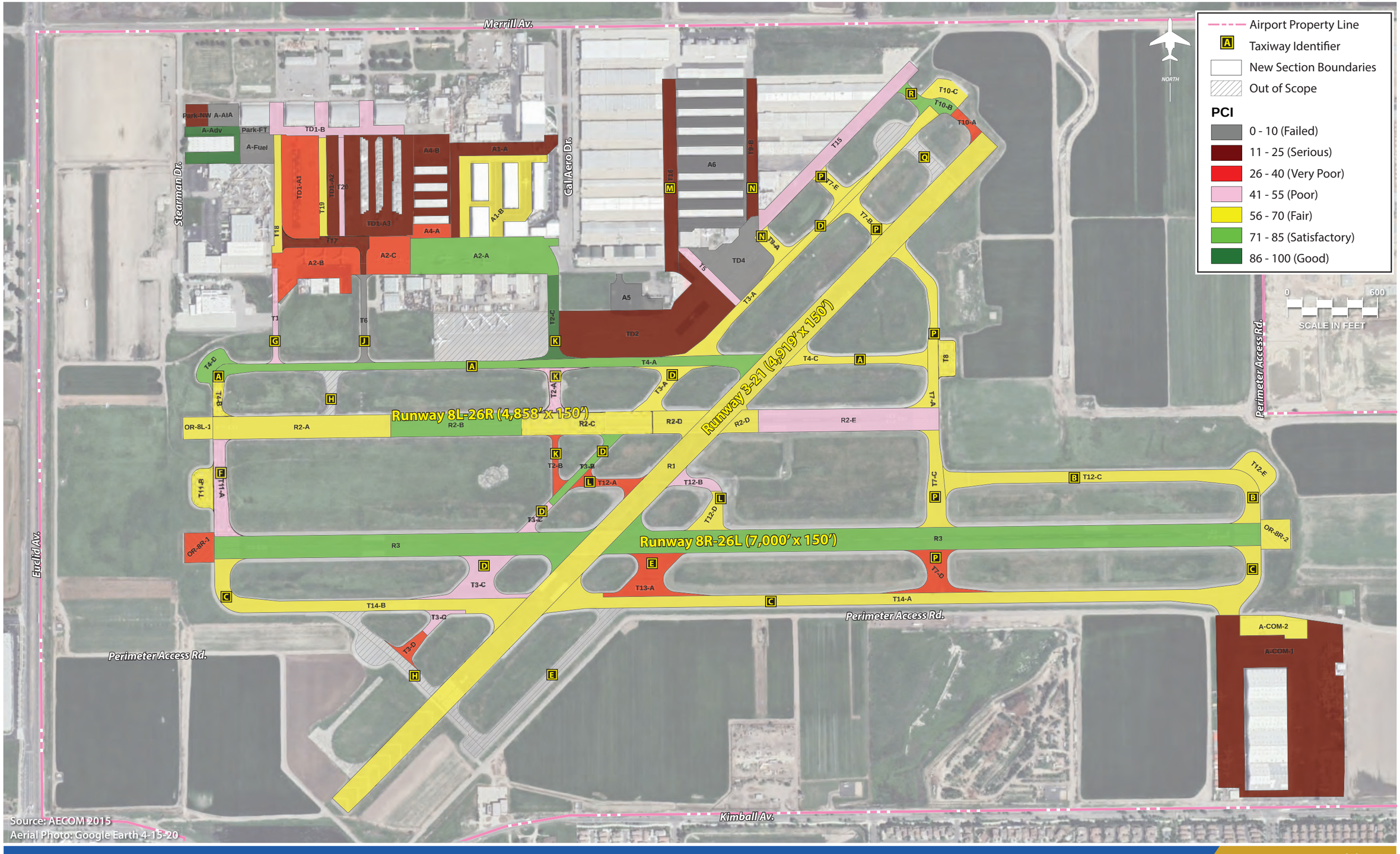
Project #3: Taxiway K Pavement Marking
Description: Currently, Taxiway K extends from the terminal apron area, across Taxiway A, and then across Runway 8L-26R. This design allows for direct access from the apron to the runway and it has contributed to past runway incursions. This project is an interim solution by marking the airport so that the taxiway curves and intersects with Taxiway A, thus forcing pilots to make a turn onto Taxiway A prior to turning toward the runway.
Cost Estimate: $50,000
Funding Eligibility: FAA – 0%/Local Share – 100%. It is anticipated that the airport will fund this project.

Project #4: Safety Area Improvements for Runway 26L – Planning and Environmental
Description: Design and environmental documentation for removal of the existing above ground fire suppression ponds. These ponds are a wildlife attractant and a runway object free area obstruction.
Cost Estimate: $225,000
Funding Eligibility: FAA – 90% / Local Share – 10%

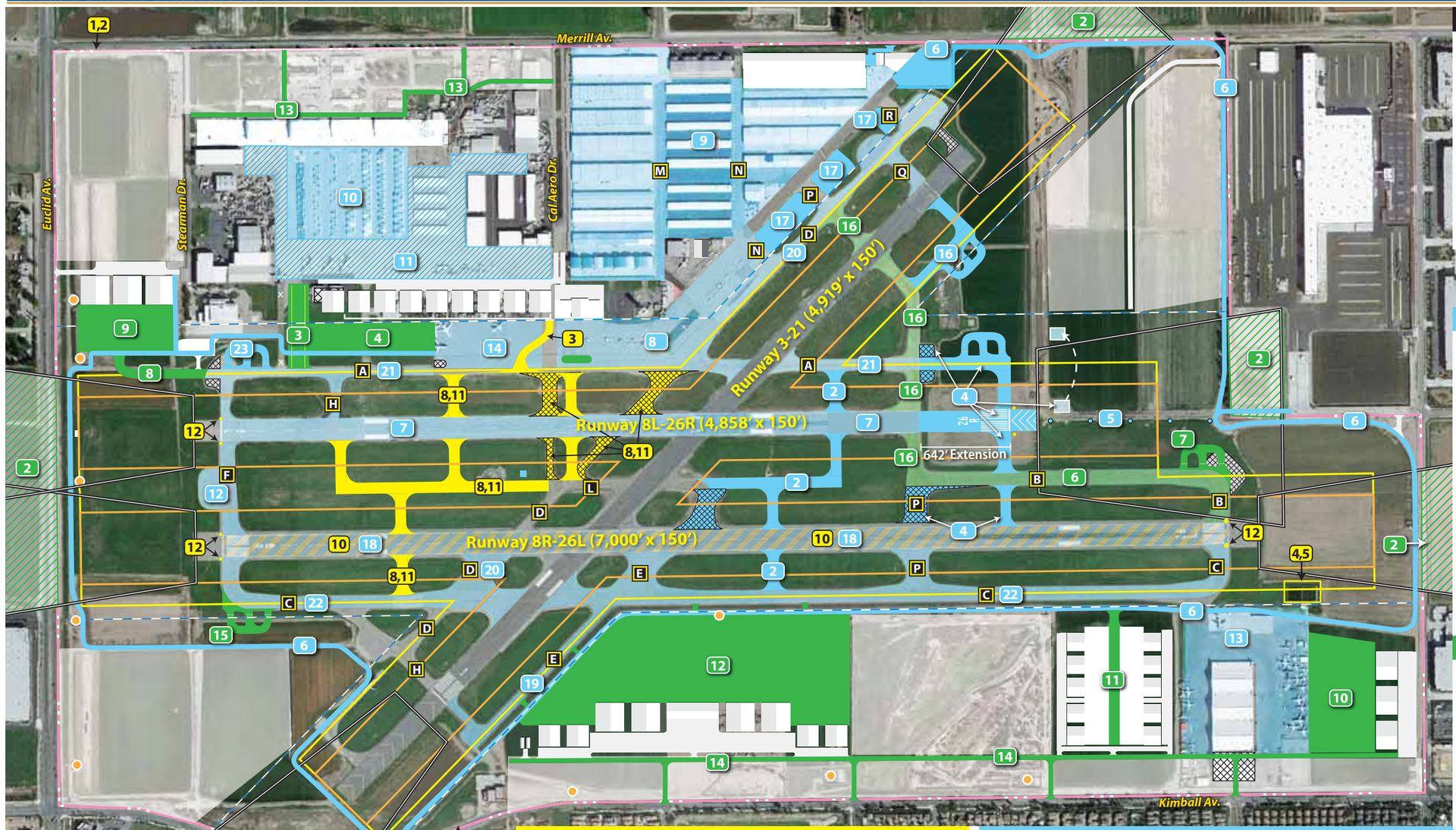
Project #5: Safety Area Improvements for Runway 26L – Design and Construction
Description: This project is the construction element of the removal of the fire suppression ponds that penetrate the Runway 26L ROFA.
Cost Estimate: $188,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #6: Airport Land Use Compatibility Plan Update (ALUCP)
Description: When making land use decisions, it is important that the type and density of land use and its cumulative impacts are given careful consideration so that appropriate decisions are made for the airport, its context, and its environment. ALUCP's are intended to protect the public health, safety, and welfare by encouraging orderly expansion of airports and the adoption of land use measures that minimize exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses. Generally, ALUCPs examine an area within at least two miles around an airport. This study will provide a roadmap for area leaders to identify and implement policy and procedures that will protect the airport from incompatible land uses.
Cost Estimate: $80,000
Funding Eligibility: FAA – 0% / Local Share – 100%

Project #7: CatEX for West Taxiway Improvements
Description: It is anticipated that the taxiway improvements planned will require a Categorical Exclusion under NEPA. This project is completion of the required environmental documentation.
Cost Estimate: $80,000
Funding Eligibility: FAA – 90% / Local Share – 10%



Source: AECOM 2015
Aerial Photo: Google Earth 4-15-20



LEGEND

- Airport Property Line
- Taxiway Identifier
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Protection Zone (RPZ)
- Short Term Project
- Intermediate Term Project
- Long Term Project
- 35' Building Restriction Line (BRL)
- Extraction Well

SHORT TERM (YEARS 1-5)

1. Perimeter Fence Improvements - Design
2. Perimeter Fence Improvements - Construction
3. Taxiway K Pavement Marking
4. Safety Area Improvements for Runway 26L - Planning and Environmental
5. Safety Area Improvements for Runway 26L - Design/Construct
6. Airport Land Use Compatibility Plan Update (ALUCP) - ***NP***
7. CatEx for West Taxiway Improvements - ***NP***
8. Design West Taxiway Improvements
9. Update Pavement Maintenance/Management Plan (PMMP) - ***NP***
10. Runway 8R-26L Rehabilitation - Seal and Mark
11. Construct West Taxiway Improvements/Relocate ASOS
12. Install REILS - Runways 8R, 8L, 26L

INTERMEDIATE TERM (YEARS 6-10)

1. CatEx for East Taxiway Improvements - ***NP***
2. Design & Construct East Taxiway Improvements/Relocate Glideslope
3. Environmental Assessment (EA) Runway 26R Extension - ***NP***
4. Design & Construct Runway Extension Improvements
5. Install ODALS - Runway 26R
6. Construct/Pave Airport Service Road
7. Runway 8L-26R - Reconstruction/Strengthen
8. Rehabilitation Terminal Apron between Taxilane K & N - Mill/Overlay/Stripe
9. Rehabilitate All North Hangar Area Taxilane M and N - Crack Fill/Seal Coat
10. Reconstruct North Tie-Down Apron
11. Reconstruct North Apron Movement Areas

INTERMEDIATE TERM (YEARS 6-10) - *continued*

12. Reconstruct Taxiway F
13. Rehabilitate Southeast Commercial Apron - Crack Fill/Seal Coat
14. Rehabilitate Apron West of Taxilane K - Crack Fill/Seal Coat
15. Update Pavement Maintenance/Management Plan (PMMP) - ***NP***
16. Construct Runway 21 Taxiway and Hold Bay
17. Construct New Apron between Taxiways N and R
18. Rehabilitate Runway 8R-26L - Crack Fill/Seal Coat
19. Rehabilitate Taxiway E - Crack Fill/Seal Coat
20. Rehabilitate Taxiway D - Crack Fill/Seal Coat
21. Rehabilitate Taxiway A - Crack Fill/Seal Coat
22. Rehabilitate Taxiway C - Crack Fill/Seal Coat
23. Reconstruct Taxiway A Hold Bay (West End)

LONG TERM (YEARS 11-20)

1. Master Plan Update - ***NP***
2. Land Acquisition - RPZ Runway 8L, 8R, 3, 21, 26L, 26R (51 acres)
3. Construct Dual Taxilane J
4. Construct Apron East of Taxilane J
5. Update Pavement Maintenance/Management Plan (PMMP) 2x - ***NP***
6. Rehabilitate Taxiway B Between P and Runway 26L - Crack Fill/Seal Coat
7. Reconstruct Taxiway B Hold Bay at Rwy 26L
8. Construct Taxiway A Extension West
9. Construct Apron West
10. Construct Apron Southeast
11. Construct Taxilane Southeast
12. Construct Apron South
13. Construct Access Road Northwest Side
14. Construct Access Road Frontage South
15. Construct Hold Bay West end of Taxiway C
16. Rehabilitate Taxiway P

NP - Not Pictured
White - Private Development or Beyond Planning Period

Project #8: West Taxiway Improvements - Design
Description: This is the engineering design element of the taxiway improvements west of Runway 3-21. This includes removal of Taxiway K and removal of a portion of Taxiway D. These are to be replaced with several new taxiways that will have the effect of enhancing safety and movement efficiency.
Cost Estimate: $1,014,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #9: Pavement Maintenance/Management Plan (PMMP)
Description: All airports that are eligible and receive federal funds are required to monitor and maintain airfield pavements. This study will utilize industry recognized standards to assess the current and future pavement conditions. From this information, the Airport can prioritize pavement maintenance and rehabilitation projects for which they may seek federal financial participation. The Airport last updated this information in 2015. It is recommended that the pavement condition be analyzed at least every three years, if not more frequently.
Cost Estimate: $60,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #10: Runway 8R-26L Rehabilitation – Seal and Mark
Description: Maintaining runway pavements is an obvious priority for any airport. Runway 8R-26L had a PCI value of between 71 and 85 in 2015, which is satisfactory. Six years later, this runway is in need of rehabilitation. This is a slurry seal and marking project that will improve the runway and extend its useful life for several years.
Cost Estimate: $350,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #11: West Taxiway Improvements - Construction
Description: This is the construction element of the taxiway improvements west of Runway 3-21. This includes removal of Taxiway K and removal of a portion of Taxiway D. These are to be replaced with several new taxiways that will have the effect of enhancing safety and movement efficiency. The ASOS, segmented circle and lighted windcone are to be relocated to the west.
Cost Estimate: $10,816,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #12: Install REILS – Runways 8R, 8L, 26L/Vault Upgrades
Description: Runway End Identifier Lights (REILs) are bright strobing lights set to the sides of the landing threshold. Pilots can quickly locate the runway for up to 20-miles. REILs are typically installed on runways with frequent turbine aircraft activity and to increase the safety margin for all pilots. The REILs intended for these runway ends are also a safety measure intended to mitigate wrong runway alignments. This project includes necessary electrical vault upgrades to support the REILs.
Cost Estimate: $360,000
Funding Eligibility: FAA – 90% / Local Share – 10%

INTERMEDIATE TERM PROJECTS

The intermediate term projects are generally planned for years 6-10 of the 20-year CIP. Intermediate term projects are generally sequenced in order of priority; however, many factors can influence the timing of a project that is planned several years into the future including funding availability. Many projects will require preliminary steps which may include environmental documentation and engineering design. Where not specifically identified with their own project number, those steps are included in the project total.

Project #1: CatEX for East Taxiway Improvements
Description: It is anticipated that the taxiway improvements planned will require a Categorical Exclusion under NEPA. This project is completion of the required environmental documentation for the planned taxiways to the immediate east of Runway 3-21.
Cost Estimate: $80,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #2: East Taxiway Improvements/Relocate Glideslope – Design and Construct
Description: This is the engineering design element of the taxiway improvements east of Runway 3-21. This includes removal of Taxiway K and removal of a portion of Taxiway D. These are to be replaced with several new taxiways that will have the effect of enhancing safety and movement efficiency.
Cost Estimate: $1.014.000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #3: Environmental Assessment (EA) Runway 26R Extension
Description: Prior to construction of the planned 642-foot extension of Runway 26R, appropriate environmental documentation will be necessary. It is anticipated that an environmental assessment will be required. This planning study will address the potential environmental impacts of the runway extension.
Cost Estimate: $300,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #4: Runway 26R Extension Improvements – Design and Construct
Description: Following the EA, the runway extension project will enter this engineering design phase followed by construction. This project includes extension of Taxiway A to the new Runway 26R threshold, an aircraft hold apron on Taxiway A, and a taxiway connector from the new Runway 26R threshold extending south to Runway 26L.
Cost Estimate: $10,329,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #5: Install ODALS – Runway 26R
Description: An omni-directional approach lighting system (ODALS) projects a horizontal beam pattern, bright flashes, and a sequential strobing flash pattern that rolls toward the runway threshold to help the pilot identify the runway end. The ODALS includes REILs as part of the system. Ultimately, Runway 26R is planned to be extended, which will require relocation of the ODALS system; however, there is a critical need to address the frequency of wrong runway alignments, and this system will mitigate that.
Cost Estimate: $400,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #6: Construct/Pave Airport Perimeter Service Road
Description: The Airport has a partial perimeter service road, portions of which are paved and others that are unpaved. This project will provide for a uniform perimeter road that will allow airport staff to safely access all areas of the airport.
Cost Estimate: $1,939,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #7: Runway 8L-26R – Reconstruction/Strengthen
Description: Currently runway 8L-26R is strength rated at only 12,000 pounds for single wheel landing gear. This runway has the lowest instrument approach visibility minimums (¾-mile) and is highly utilized by aircraft exceeding this pavement strength. This runway is also shown to be in fair to poor condition currently and needs to be reconstructed. If feasible, the runway extension project should be combined with this reconstruction project.
Cost Estimate: $15,270,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #8: Rehabilitate Terminal Apron Between Taxilanes K & N – Crack Fill/Seal Coat
Description: The main terminal apron adjacent (south) of the control tower needs to be rehabilitated. This project is planned as a crack fill/slurry seal, however further investigation may reveal that it needs something more significant including the possibility of reconstruction. Project includes remarking taxilane centerlines and tie-down positions.
Cost Estimate: $1,106,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #9: Rehabilitate All North Hangar Area Taxilanes M & N – Crack Fill/Seal Coat
Description: Taxilanes M and N are in serious and near failed condition. While this project is planned as a crack fill/seal coat, the results of an updated pavement condition assessment may show a need for reconstruction. A small portion of the south end of Taxilane M was reconstructed in 2021 and is not included in this project.
Cost Estimate: $1,873,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #10: Reconstruct North Tie-Down Apron
Description: The northwest aircraft tie-down apron is highly utilized and is in failed condition. This apron needs to be completely reconstructed.
Cost Estimate: $11,802,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #11: Reconstruct North Apron Movement Areas
Description: There are circulation taxilanes and smaller apron areas associated with the northwest tie-down apron. This project will reconstruct these pavement areas. If feasible, this project should be combined with the reconstruction of the northwest tie-down apron.
Cost Estimate: $10,262,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #12: Reconstruct Taxiway F
Description: Taxiway F serving the thresholds on the Runway 8 end of the airport is in poor condition and needs to be reconstructed.
Cost Estimate: $1,869,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #13: Rehabilitate Southeast Commercial Apron – Crack Fill/Seal Coat
Description: The southeast commercial apron is in failed condition and needs rehabilitation. This project is currently described as a crack fill and seal coat, however, if feasible, this apron should be reconstructed.
Cost Estimate: $1,126,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #14: Rehabilitate Apron West of Taxilane K – Crack Fill/Seal Coat
Description: The apron located west of Taxilane K was constructed in 2007 and has had some minor rehabilitation over the years. This crack seal and seal coat project is to extend the useful life of the pavement.
Cost Estimate: $348,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #15: Update Pavement Maintenance/Management Plan (PMMP)
Description: As noted previously, the Airport must have a PMMP as required by federal law and FAA grant assurances. This project is to update the Airport's PMMP.
Cost Estimate: $60,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #16: Construct Runway 21 Threshold Taxiway and Hold Bay
Description: This project will provide threshold taxiway access to the southeast side of Runway 21. This taxiway will also have the benefit of providing additional ground movement options for controllers. An aircraft hold bay is included in the project.
Cost Estimate: $3,806,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #17: Construct New Apron Between Taxiways N & R
Description: Chino Airport needs additional ramp space which is in short supply. There is space available between Taxiways N and P and west of Taxiway D. This area is planned to be paved up to the edge of the taxiway object free area associated with Taxiway D. Several new aircraft tie-down positions will be made available with this project.
Cost Estimate: $2,397,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #18: Rehabilitate Runway 8R-26L – Crack Fill/Seal Coat
Description: On-going pavement maintenance is critical to maximizing the useful life of airport pavements. This is a crack fill and seal coat project which is anticipated 5-7 years after the previous maintenance project associated with this runway.
Cost Estimate: $1,717,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #19: Rehabilitate Taxiway E – Crack Fill/Seal Coat
Description: This projects covers rehabilitation of the existing portion of Taxiway E
Cost Estimate: $340,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #20: Rehabilitate Taxiway D – Crack Fill/Seal Coat
Description: Crack fill and seal coat of the entirety of Taxiway D.
Cost Estimate: $513,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #21: Rehabilitate Taxiway A – Crack Fill/Seal Coat
Description: Crack fill and seal coat of Taxiway A.
Cost Estimate: $575,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #22: Rehabilitate Taxiway C – Crack Fill/Seal Coat
Description: Crack fill and seal coat of Taxiway C.
Cost Estimate: $707,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #23: Reconstruct Taxiway A Hold Bay (West End)
Description: The FAA has introduced a new design standard for hold bays. They should be situated near the end of taxiways, should not extend beyond the lateral end of the runway, and should have individual designated aircraft positions to provide for adequate separation. This project will replace the existing non-conforming hold apron.
Cost Estimate: $593,000
Funding Eligibility: FAA – 90% / Local Share – 10%

LONG TERM PROJECTS

The long-term projects are generally planned for years 11-20 of the 20-year CIP. Long term projects are generally sequenced in order of priority; however, many factors can influence the timing of a project that is planned several years into the future including funding availability. Many projects will require preliminary steps which may include environmental documentation and engineering design. Where not specifically identified with their own project number, those steps are included in the project total.

Project #1: Master Plan Update
Description: The FAA recommends that airport planning documents be updated approximately every 7-10 years, or as necessary to address changes to the industry or the airport. Over time, the forecasting element of an airport planning study will become stale, and assumptions made years in the past may no longer be a priority or applicable. Therefore, this project serves as a placeholder for future planning efforts.
Cost Estimate: $800,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #2: Land Acquisition – RPZ Lands (51 Total Acres)
Description: Several parcels of land adjacent to the airport have been identified for acquisition by the airport. All of these parcels are contained within the RPZs. If feasible, the Airport should acquire these parcels to gain full positive control over the future use of the land (which should be to remain vacant). The Airport and San Bernardine County have been successful in protecting these RPZ lands to date, however, fee simple ownership is preferred.
Cost Estimate: $15,300,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #3: Construct Dual Taxilane J
Description: The ALP Update calls for the development of a dual Taxilane J to access the northwest tie-down and hangar development area. This project is the construction of that dual taxilane. This dual taxilane will replace the existing Taxilane J and will be adjacent closed Taxiway G.
Cost Estimate: $1,452,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #4: Construct Apron East of Taxilane J
Description: As noted, the Airport is lacking adequate apron areas. This project will construct additional apron area to the east of the new Taxilane J. The apron is approximately 22,000 square yards in size.
Cost Estimate: $3,090,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #5: Update PMMP (2x)
Description: As noted previously, the Airport must have a PMMP as required by federal law and FAA grant assurances. This project is to update the Airport's PMMP.
Cost Estimate: $120,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #6: Rehabilitate Taxiway B Between Taxiway P and Runway 26L – Crack Fill/Seal Coat
Description: Crack fill and seal coat of Taxiway B between Taxiway P and Runway 26L.
Cost Estimate: $233,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #7: Reconstruct Taxiway B Hold Bay at Runway 26L
Description: The FAA has introduced new design standard for hold bays. They should be situated near the end of taxiways, should not extend beyond the lateral end of the runway, and should have individual designated aircraft positions to provide for adequate separation. This project will replace the existing non-conforming hold apron.
Cost Estimate: $593,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #8: Construct Taxiway A Extension West
Description: This project would construct an extension of Taxiway A to the west to provide access to undeveloped aeronautical land.
Cost Estimate: $817,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #9: Construct Apron West
Description: This is a planned public apron serving several hangar development parcels. The apron is estimated at approximately 27,000 square yards.
Cost Estimate: $3,797,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #10: Construct Apron Southeast
Description: This is a planned public apron serving several hangar development parcels. The apron is estimated at approximately 39,000 square yards. This public apron would also serve up to three larger hangar parcels.
Cost Estimate: $5,477,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #11: Construct Taxilane Southeast
Description: This project is a planned taxilane that would serve future aeronautical development. With the presence of the taxilane, private developers can construct their hangar and apron to connect to the taxilane.
Cost Estimate: $1,408,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #12: Construct Apron South
Description: This is a large 144,000 square yard public apron intended to serve commercial aeronautical development.
Cost Estimate: $20,202,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #13: Construct Access Road Northwest Side
Description: There are significant issues with access to the Airport and with internal access roads. This project is a placeholder and an initial routing concept for new interior roadways. The layout depicted would take advantage of County plans to signalize intersections at Merrill Avenue with Campus and Sultana Avenues.
Cost Estimate: $1,100,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #14: Construct Access Road South Side
Description: This project is an internal access road which will connect aeronautical land uses (both existing and future). Several access points to Kimball Avenue are also identified.
Cost Estimate: $1,006,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #15: Construct Hold Bay West End of Taxiway C
Description: A new hold bay is planned at the west end of Taxiway C. This hold bay will become more necessary as southside development advances.
Cost Estimate: $593,000
Funding Eligibility: FAA – 90% / Local Share – 10%

Project #16: Rehabilitate Taxiway P
Description: This is a crack fill/seal project to rehabilitate Taxiway P.
Cost Estimate: $440,000
Funding Eligibility: FAA – 90% / Local Share – 10%

CIP SUMMARY

A total of 51 potential capital improvement projects have been identified for Chino Airport. The highest priority projects are those directly related to improving the taxiway system to reduce the potential for runway incursions. This includes relocating Taxiway K and adding several other taxiways. While the CIP is sequenced based on priority, it is anticipated that the project can and will shift based on funding availability, and potential changes to priority. The CIP totals nearly $147 million over the 20-year planning horizon.

CAPITAL IMPROVEMENT FUNDING SOURCES

Financing capital improvements at the airport will not rely solely on the financial resources of the airport or the county. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. Historically, Buchanan Field Airport has received federal and state grants. While some years more funds could be available, the CIP was developed with project phasing to remain realistic and within the range of anticipated grant assistance. The following discussion outlines key sources of funding potentially available for capital improvements at CCR.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public use airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal airport funding is the *FAA Reauthorization Act of 2018*.

The current law authorizes the FAA's Airport Improvement Program (AIP) at $3.35 billion for fiscal years 2019 through 2023. The AIP is funded through the collection of user fees, such as those imposed on airline tickets, aircraft parts, and aviation fuel. Eligible airports are those included in the *National Plan of Integrated Airport Systems* (NPIAS), such as CCR. **Table 6C** presents the approximate distribution of AIP funds and those categories for which the airport may be eligible. The FAA determines which source grant funding would come from.

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which FAA provides up to 90 percent of the cost, and the airport sponsor provides a 10 percent match. In exchange for this level of funding, the airport sponsor is required to meet various Grant Assurances, including maintaining the improvement for a certain period of time, typically 20 years for constructed pavement. The following discussion of each of the funding categories is contingent upon Congressional authorization (i.e., *FAA Reauthorization Act of 2018*) and an annual appropriation of at least $3.2 billion for AIP.

TABLE 6C | Federal AIP Funding Distribution

Funding Category	Percent of Total	Approximate Funds Available	Available to CNO
Passenger Entitlements	26.6%	$891,100,000	No
Cargo Entitlements	3.5%	$117,250,000	No
Nonprimary Entitlements	12.5%	$418,750,000	Yes
State Apportionment	7.4%	$247,900,000	Yes
Alaska Supplemental	0.7%	$23,450,000	No
Small Airport Fund	15.2%	$509,200,000	Yes
Discretionary Set Aside Funds			
Noise and Environmental Set Aside	4.2%	$140,700,000	Yes
Military Airports Program Set Aside	0.5%	$16,750,000	No
Reliever Set Aside	0.1%	$3,350,000	Yes
Discretionary Remaining after Set Asides			
Capacity/Safety/Security/Noise (C/S/S/N)	5.4%	$180,900,000	Yes
Pure Discretionary	1.8%	$60,300,000	Yes
Discretionary from Converted Entitlements/Apportionment	22.0%	$737,335,000	Yes
Totals	**99.9%**	**$3,350,000,000**	

AIP: Airport Improvement Program

Source: FAA Order 5100.38D, Airport Improvement Program Handbook

Passenger Entitlements: AIP provides funding for eligible projects at airports through an entitlement program. Primary commercial service airports receive a guaranteed minimum level of federal assistance each year based on their enplaned passenger levels and Congressional appropriation levels. General aviation airports, such as CNO, are not eligible for funding from this source.

Cargo Entitlements: An airport may receive cargo entitlements if they reach a minimum landed cargo weight of 1.0 million pounds. Chino Airport has not reached 1.0 million pounds of landed cargo weight in the past and is not anticipated to reach this level in the future and is, therefore, not eligible for funding from this AIP source.

Non-Primary Entitlements (NPE): Non-primary entitlements are the lesser of $150,000 annually or 1/5th of an airport's five-year development costs listed in the NPIAS. As a general aviation airport, CNO is eligible for $150,000 annually.

State Apportionment: Based on an area/population formula, AIP funds are available for distribution to any NPIAS airport within each state. CNO is eligible for AIP grant funding from this source.

Alaska Supplemental: This set-aside is reserved for Alaska airports. CNO is not eligible for AIP funding from this source.

Small Airport Fund: If a large- or medium-hub commercial service airport chooses to institute a passenger facility charge (PFC), which is a fee of up to $4.50 on each airline ticket, for funding of capital improvement projects, then their passenger entitlement is reduced. Part of the reduced entitlement goes to the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, and general aviation airports. CNO is eligible for funds from this source.

Discretionary Set-Aside Funds: Portions of AIP funds are set-asides designed to achieve specific funding minimums for noise compatibility planning and implementation, select former military airfields (Military Airport Program [MAP]), and reliever airports. CNO may be eligible for noise compatibility planning and implementation funds if it meets certain criteria (i.e., a noise compatibility issue). CNO does not qualify for MAP but does qualify for the reliever airport set-aside funds.

Remaining Discretionary Funds: The remaining AIP funds are distributed by FAA based on the priority of the project for which they have requested federal assistance through discretionary apportionments. A national priority ranking system is used to evaluate and rank each airport project. Those projects with the highest priority from airports across the country are given preference in funding. High priority projects include those related to meeting design standards, capacity improvements, and other safety enhancements.

Under the AIP program, examples of eligible development projects include the airfield, public aprons, and access roads. Additional buildings and structures may be eligible if the function of the structure is to serve airport operations in a non-revenue-generating capacity, such as airport maintenance facilities. Some revenue-enhancing structures, such as T-hangars, may be eligible if all airfield improvements have been made; however, the priority ranking of these facilities is very low.

Whereas entitlement monies are guaranteed on an annual basis when certain thresholds are achieved, discretionary funds are not assured. CNO is eligible for discretionary funds.

STATE AID TO AIRPORTS

All state grant programs for airports are funded from the Aeronautics Account in the California State Transportation Fund. Tax revenues, which are collected on general aviation fuel, are deposited in the Aeronautics Account. General aviation jet fuel is taxed at $.02 per gallon, and Avgas is taxed at $.18 per gallon. These taxes generate approximately $7.5 million per year.

The Revenue and Taxation Code spells out the priority for expenditure of funds:

- Administration and collection of taxes;
- Operations of Division of Aeronautics; and
- Grants to airports.

The Public Utilities Code further specifies the priority allocation of Aeronautics Account funds to airports:

- Annual Credit Grants;
- AIP Matching; and
- Acquisition and Development (A&D) grants.

Annual Credit Grants

To receive an Annual Credit, an airport cannot be designated by the FAA as a reliever or commercial service airport. The Annual Credit can fund projects for airport and aviation purposes as defined in the *State Aeronautics Act*. It can also be used to fund operations, fueling facilities, restrooms, aircraft wash racks, and to match federal AIP grants. The annual funding level is $10,000; up to five years' worth of Annual Credits may be accrued at the sponsor's discretion. No local match is required.

Chino Airport is not eligible for Annual Credits as a reliever airport.

AIP Matching Grants

An FAA AIP grant can be matched with state funds; the current matching rate is five (5) percent of the federal portion of the total project cost. Generally, state matching is limited to projects that primarily benefit general aviation. A project which is being funded by an AIP grant must be included in the Capital Improvement Program (CIP). The amount set aside for AIP matching is determined by the California Transportation Commission (CTC) each fiscal year. Unused set-aside funds are available for additional A&D Grants.

State matching is limited to non-commercial service airports such as Chino Airport. In the past, the Airport has received State AIP matching funds.

Acquisition and Development (A&D) Grants

This grant program is open to general aviation, reliever, and commercial service airports. A city or county may also receive grants on behalf of a privately owned, public use airport. An airport land use commission (ALUC) can receive funding to either prepare or update a comprehensive land use plan (CLUP). An A&D grant can fund projects for airport and aviation purposes as defined in the *State Aeronautics Act*. An A&D grant cannot be used as a local match for an AIP grant. The minimum amount of an A&D grant is $10,000, while the maximum amount that can be allocated in a single fiscal year is $500,000 (single or multiple grants). The local match is 10 percent of the total project cost. The Annual Credits may not be used for the local match to an A&D grant. **Table 6C** presents a list of eligible projects for the Annual Credit and A&D Grant programs.

California Airport Loan Program

The Local Airport Loan Program provides low interest (3.288 percent as of October 2012) discretionary state loans to eligible airports for projects that enhance an airport's ability to provide general aviation services (e.g., hangars, GA terminals, utilities, GA fuel facilities, A&D eligible projects, etc.). A loan may also provide the local share for an AIP grant. Such loans can be used in conjunction with state-funded AIP matching grants. The maximum term of a loan is 17 years.

TABLE 6C | Eligible Projects for Caltrans Funds

Eligible for Annual Credits and A&D Grants	
A	Obstruction Removal. Removal of obstructions from runway safety areas, RPZs or approach surfaces, and other imaginary surfaces, if they have been determined by the FAA or the Department to be a hazard.
B	Radios. Aviation radio equipment and facilities.
C	Land. Acquisition of land and avigation easements.
D	Lighting. Purchase and installation of runway, taxiway, boundary, or obstruction lights, with directly related electrical equipment, to meet general aviation needs.
E	Fencing. Minimum security fencing around the perimeter of an airport, for general aviation purposes.
F	Transient Parking. Construction/reconstruction of transient general aviation aircraft parking areas.
G	Bond Service. Servicing of revenue or general obligation bonds that have been issued to finance airport capital improvements.
H	Navaids. Air navigation aids including rotating beacons, runway end identifier lights, and localizer transmitters.
I	Airport marking systems, such as segmented circles, windsocks, traffic pattern indicators, and wind tees.
J	Noise monitoring equipment to meet general aviation needs.
K	Project Services. Engineering for eligible construction projects; appraisal and escrow fees for land acquisition.
L	Runways and Taxiways. Construction and reconstruction.
M	Service roads that are not open to the public.
N	Surfacing of runways, taxiways, and aircraft parking areas to GA standards.
O	Water supply and sanitary disposal systems for airport use.
P	ALP Update and Narrative Reports and airport layout plans.
Q	Comprehensive Land Use Plan (CLUP). Activities of an airport land use commission (ALUC) to prepare or update a CLUP.
Eligible for Annual Credits but not A&D Grants	
R	Operations and Maintenance (wages/salaries, utilities, service vehicles, and all other noncapital expenditures).
S	GA fueling facilities.
T	Restrooms/showers.
U	GA airplane wash racks.

Source: Caltrans, Division of Aeronautics

The Division of Aeronautics approves the amount of the loan in accordance with the project's feasibility and the sponsor's financial situation. Details related to the loan program are available in the State publication, "State Dollars for Your Airport" chapter 2 and California Code of Regulations, Title 21, Division 2.5, chapter 5, California Airport Loan program.

There are three different types of loans available under this program.

1. Revenue Generation
2. Matching Funds
3. Airport Development

Loans are subject to state audit. Records that substantiate the expenditure of loan monies should be retained until three years after the retirement of the loan. Funds may have to be repaid by the sponsor if an audit finds that state law or generally accepted accounting principles have been violated.

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. A goal of the airport is to generate enough revenue to cover all operating and capital expenditures. As with many general aviation airports, this is not always possible and other financing methods will be needed.

There are several alternatives for local financing options for future development at the airport, including airport revenues, direct funding from the airport sponsors, bonds, and leasehold financing. These strategies could be used to fund the local matching share or complete a project if grant funding cannot be arranged.

Airport Revenues: An airport's daily operations are funded through the collection of various rates and charges generated by airport operations. Airports that serve both a commercial service sector and the general aviation sector have more potential revenue streams available to them. Potential revenue streams may include landing fees, fuel flowage fees, aircraft parking and remain-over-night fees, terminal building space, hangar space, and land leases.

Bonding: Bonding is a common method to finance large capital projects at airports. A bond is an instrument of indebtedness of the bond issuer to the bond holders, thus a bond is a form of loan or IOU. While bond terms are negotiable, typically the bond issuer is obligated to pay the bond holder interest at regular intervals and/or repay the principal at a later date.

Leasehold Financing: Leasehold financing refers to a developer or tenant financing improvements under a long-term ground lease. The obvious advantage of such an arrangement is that it relieves the airport sponsor of all responsibility for raising the capital funds for the improvement. However, the private development of facilities on a ground lease, particularly on property owned by an airport, produces a unique set of concerns. It may be more difficult for the tenant or developer to obtain private financing as only the improvements and the right to continue the lease can be utilized as collateral. Ground leases at public airports typically provide for reversion of improvements to the airport sponsor at the end of the lease term, which reduces the potential value to a lender taking possession in a default situation. Also, companies wanting to own their property as a matter of financial policy may not locate where land is only available for lease.

Public/Private Partnerships: In addition to leasehold financing, it is acceptable for the airport to enter into some form of public/private partnership for various airport projects. Typically, this would be limited to hangar construction, but there are some examples where a private developer constructs, for example, a taxilane, and deeds it to the airport for ongoing maintenance. When entering any such arrangement, the airport must ensure the private developer does not gain an economic advantage over other airport tenants.

FINANCIAL AUDIT COMPLIANCE

The operations of CNO generate revenues, which are secured by federal grant assurances to be utilized at the airport. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or for additions or improvements to airport facilities.

CNO is owned and operated by San Bernardino County. The Airport is financially self-supporting and does not receive funding from the county for operating expenses. The accounting methods used for airport revenues appropriately separates airport revenues from general county accounts. This accounting method meets FAA requirements as outlined in the following grant assurances.

Grant Assurance #24 – Fee and Rental Structure: Requires the airport sponsor to set fees, lease rates, and other charges that are directed at making the airport as self-sustaining as possible. Airport sponsors must impose fair market value charges for noncommercial uses of airport property, but aeronautical user charges may be less than fair market value. As demonstrated, the fee and rental structure for airport property and facilities is fair and equitable.

Grant Assurance #25 – Airport Revenues: Restricts the use of airport revenues generated by the airport and local taxes on aviation fuel to be expended for the capital or operating costs of the airport, the local airport system, or other facilities owned or operated by the airport sponsor, which directly and substantially relate to the actual air transportation of passengers or property or noise mitigation efforts. Under the *Single Audit Act of 1984*, the airport must conduct an annual audit and assure the government that airport funds have been properly used. In general, revenue generated by the airport may not be diverted to functions unrelated to the operation and maintenance of the airport. Examples of revenue diversion include:

a) General economic development;
b) Marketing and promotional activities unrelated to the airport;
c) Payments in lieu of taxes or other assessments that exceed the value of services;
d) Payments to compensate sponsoring governmental bodies for lost tax revenues exceeding stated tax rates; and
e) Direct or indirect payments of airport revenues beyond that which is required to pay for services and facilities provided to the airport.

ALP UPDATE IMPLEMENTATION

To implement the recommendations, it is key to recognize that planning is a continuous process and does not end with approval of this document. The airport should implement measures that allow them to track various demand indicators, passenger enplanements, based aircraft, hangar demand, and operations. The issues that this ALP Update is based on will remain valid for several years. The primary goal is for the airport to best serve the air transportation needs of the region, while striving to be economically self-sufficient.

The actual need for facilities is best established by airport activity levels rather than a specified date. For example, projections have been made as to when additional hangars may be needed at the airport. In reality, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate development. Although every effort has been made in this planning process to conservatively estimate when facility development may be needed, aviation demand will dictate timing of facility improvements.

The value of an ALP Update is keeping the issues and objectives at the forefront of the minds of managers and decision-makers. In addition to adjustments in aviation demand, when to undertake the improvements recommended in this ALP Update will impact how long the plan remains valid. The format of this plan reduces the need for formal and costly updates by simply adjusting the timing of project implementation. Updating can be done by the airport manager, thereby improving the plan's effectiveness.

In summary, the planning process requires airport staff to consistently monitor operations and based aircraft. Analysis of aviation demand is critical to the timing and need for new airport facilities.

APPENDIX A

GLOSSARY OF TERMS

SAN BERNARDINO COUNTY

GLOSSARY OF TERMS

A

Above Ground Level: The elevation of a point or surface above the ground.

Accelerate-Stop Distance Available (ASDA): See declared distances.

Advisory Circular: External publications issued by the FAA consisting of non-regulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

Air Carrier: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

Air Route Traffic Control Center (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

Air Taxi: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

Air Traffic Control: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

Air Traffic Control System Command Center: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

Air Traffic Hub: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

Air Transport Association Of America: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

Aircraft: A transportation vehicle that is used or intended for use for flight.

Aircraft Approach Category: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- **Category A:** Speed less than 91 knots.
- **Category B:** Speed 91 knots or more, but less than 121 knots.
- **Category C:** Speed 121 knots or more, but less than 141 knots.

- **Category D:** Speed 141 knots or more, but less than 166 knots.
- **Category E:** Speed greater than 166 knots

Aircraft Operation: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

Aircraft Operations Area (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

Aircraft Owners And Pilots Association: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

Aircraft Rescue And Fire Fighting: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

Airfield: The portion of an airport which contains the facilities necessary for the operation of aircraft.

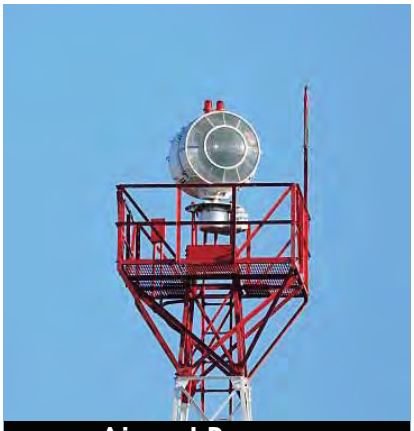
Airline Hub: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

Airplane Design Group (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- **Group I:** Up to but not including 49 feet.
- **Group II:** 49 feet up to but not including 79 feet.
- **Group III:** 79 feet up to but not including 118 feet.
- **Group IV:** 118 feet up to but not including 171 feet.
- **Group V:** 171 feet up to but not including 214 feet.
- **Group VI:** 214 feet or greater.

Airport Authority: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

Airport Beacon: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.



Airport Beacon

Airport Capital Improvement Plan: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

Airport Elevation: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

Airport Improvement Program: A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for airport planning and development.

Airport Layout Drawing (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

Airport Layout Plan (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

Airport Layout Plan Drawing Set: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

Airport Master Plan: A local planning document that serves as a guide for the long-term development of an airport.

Airport Movement Area Safety System: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

Airport Obstruction Chart: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

Airport Reference Code (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

Airport Reference Point (ARP): The latitude and longitude of the approximate center of the airport.

Airport Sponsor: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

Airport Surface Detection Equipment: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

Airport Surveillance Radar: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

Airport Traffic Control Tower (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

Airside: The portion of an airport that contains the facilities necessary for the operation of aircraft.

Airspace: The volume of space above the surface of the ground that is provided for the operation of aircraft.

Alert Area: See special-use airspace.

Altitude: The vertical distance measured in feet above mean sea level.

Annual Instrument Approach (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

Approach Lighting System (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on final approach and landing.

Approach Lighting System

Approach Minimums: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

Approach Surface: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

Apron: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

Area Navigation: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

Automated Terminal Information Service (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

Automated Surface Observation System (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

Automated Weather Observation System (AWOS): Equipment used to automatically record weather conditions (i.e., cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

Automatic Direction Finder (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

Avigation Easement: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

Azimuth: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

Base Leg: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

Based Aircraft: The general aviation aircraft that use a specific airport as a home base.

Bearing: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

Blast Fence: A barrier used to divert or dissipate jet blast or propeller wash.

Blast Pad: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

Building Restriction Line (BRL): A line which identifies suitable building area locations on the airport.

Blast Fence

C

Capital Improvement Plan: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

Cargo Service Airport: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

Ceiling: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

Circling Approach: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.

Class A Airspace: See Controlled Airspace.

Class B Airspace: See Controlled Airspace.

Class C Airspace: See Controlled Airspace.

Class D Airspace: See Controlled Airspace.

Class E Airspace: See Controlled Airspace.

Class G Airspace: See Controlled Airspace.

Clear Zone: See Runway Protection Zone.

Commercial Service Airport: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

Common Traffic Advisory Frequency (CTAF): A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

Compass Locator (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

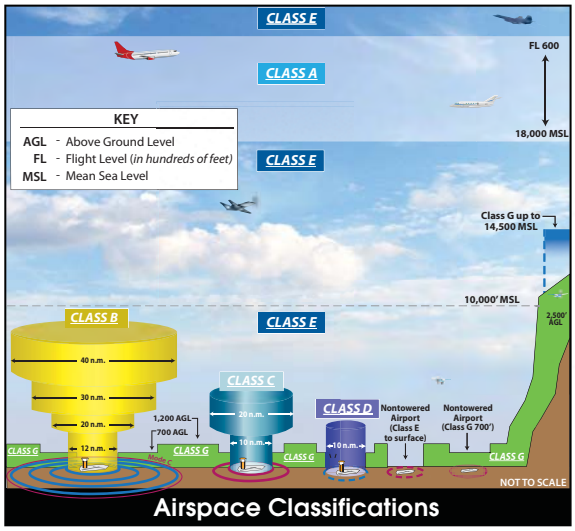
Conical Surface: An imaginary obstruction- limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Controlled Airport: An airport that has an operating airport traffic control tower.

Controlled Airspace: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

CLASS A: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

CLASS B: Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.



CLASS C: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure. Unless otherwise authorized, all persons must establish two-way radio communication.

CLASS E: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

CLASS G: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

Controlled Firing Area: See special-use airspace.

Crosswind: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

Crosswind Component: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

Crosswind Leg: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

Decibel: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

Decision Height/Decision Altitude: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

Declared Distances: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

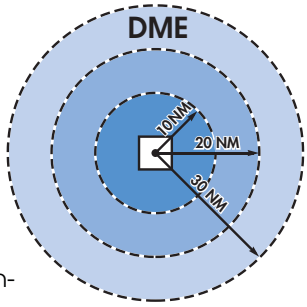
- **Takeoff Run Available (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off.
- **Takeoff Distance Available (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **Accelerate-stop Distance Available (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **Landing Distance Available (LDA):** The runway length declared available and suitable for landing.

Department Of Transportation: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

Discretionary Funds: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

Displaced Threshold: A threshold that is located at a point on the runway other than the designated beginning of the runway.

Distance Measuring Equipment (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

Downwind Leg: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

Easement: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any

specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

Elevation: The vertical distance measured in feet above mean sea level.

Enplaned Passengers: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

Enplanement: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

Entitlement: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

Environmental Assessment (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

Essential Air Service: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

Federal Aviation Regulations: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

Federal Inspection Services: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

Final Approach: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

Final Approach and Takeoff Area (FATO): A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

Final Approach Fix: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

Finding Of No Significant Impact (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

Fixed Base Operator (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

Flight Level: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

Flight Service Station (FSS): An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides preflight and in-flight advisory services to pilots through air and ground based communication facilities.

Frangible Navaid: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

General Aviation: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

General Aviation Airport: An airport that provides air service to only general aviation.

Glideslope (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

- Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or
- Visual ground aids, such as PAPI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

Global Positioning System (GPS): A system of satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

Ground Access: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

Ground Based Augmentation System (GBAS): A program that augments the existing GPS system by providing corrections to aircraft in the vicinity of an airport in order to improve the accuracy of these aircrafts' GPS navigational position

H

Helipad: A designated area for the takeoff, landing, and parking of helicopters.

High Intensity Runway Lights (HIRL): The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

High-speed Exit Taxiway: An acute-angled exit taxiway forming a 30 degree angle with the runway centerline, designed to allow an aircraft to exit a runway without having to decelerate to typical taxi speed.

Horizontal Surface: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

Hot Spot: A location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

I

Initial Approach Fix: The designated point at which the initial approach segment begins for an instrument approach to a runway.

Instrument Approach Procedure: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions **and the type of flight plan under which an aircraft is operating.**

Instrument Landing System (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer
2. Glide Slope
3. Outer Marker
4. Middle Marker
5. Approach Lights

Instrument Meteorological Conditions: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

Itinerant Operations: Operations by aircraft that are arriving from outside the traffic pattern or departing the airport traffic pattern.

K

Knots: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

Landside: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

Landing Distance Available (LDA): See declared distances.

Large Airplane: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

Local Operations: Aircraft operations performed by aircraft that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport. Typically, this includes touch and-go training operations.

Localizer: The component of an ILS which provides course guidance to the runway.

Localizer

Localizer Type Directional Aid (LDA): A facility of comparable utility and accuracy to a localizer but is not part of a complete ILS and is not aligned with the runway.

Low Intensity Runway Lights: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

Medium Intensity Runway Lights: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

Military Operations: Aircraft operations that are performed in military aircraft.

Military Operations Area (MOA): See special-use airspace

Military Training Route: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

Missed Approach Course (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

- When the aircraft has descended to the decision height and has not established visual contact; or
- When directed by air traffic control to pull up or to go around again.

Movement Area: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

National Airspace System (NAS): The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

National Plan Of Integrated Airport Systems (NPIAS): The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

National Transportation Safety Board: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

Nautical Mile: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

Navaid: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e., PAPI, VASI, ILS, etc.)

Navigational Aid: A facility used as, available for use as, or designed for use as an aid to air navigation.

Noise Contour: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

Non-directional Beacon (NDB): A beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine their bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

Non-precision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

Notice To Air Missions (NOTAM): A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

NDB

O

Object Free Area (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

Operation: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

Outer Marker (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

Pilot-controlled Lighting: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

Precision Approach: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I):** A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- **CATEGORY II (CAT II):** A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- **CATEGORY III (CAT III):** A precision approach which provides for approaches with minimal less than Category II.

Precision Approach Path Indicator (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. A PAPI normally consists of four light units but an abbreviated system of two lights is acceptable for some categories of aircraft.

Precision Approach Path Indicator

Precision Approach Radar: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

Precision Object Free Zone (POFZ): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFZ is a clearing standard which requires the POFZ to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA is only in effect when the approach includes vertical guidance, the reported ceiling is below 250 feet, and an aircraft is on final approach within two miles of the runway threshold.

Primary Airport: A commercial service airport that enplanes at least 10,000 annual passengers.

Primary Surface: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

Prohibited Area: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

Radial: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

Regression Analysis: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

Remote Communications Outlet (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

Remote Transmitter/receiver (RTR): See remote communications outlet. RTRs serve ARTCCs.

Reliever Airport: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

Restricted Area: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

Runway: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

Runway Alignment Indicator Light (RAIL): A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

Runway Design Code: A code signifying the FAA design standards to which the runway is to be built.

Runway End Identification Lighting (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

REIL

Runway Gradient: The average slope, measured in percent, between the two ends of a runway.

Runway Protection Zone (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minimal.

Runway Reference Code: A code signifying the current operational capabilities of a runway and taxiway.

Runway Safety Area (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway Visibility Zone (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of sight from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

Runway Visual Range (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

Scope: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

Segmented Circle: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers, often co-located with a wind cone.

Shoulder: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder Does Not Necessarily Need To Be Paved.

Slant-range Distance: The straight line distance between an aircraft and a point on the ground.

Small Aircraft: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

Special-use Airspace: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA:** Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- **CONTROLLED FIRING AREA:** Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.
- **MILITARY OPERATIONS AREA (MOA):** Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA:** Designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA:** Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** Airspace which may contain hazards to nonparticipating aircraft.

Standard Instrument Departure (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

Standard Instrument Departure Procedures: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or enroute airspace.

Standard Terminal Arrival Route (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

Stop-and-go: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

Stopway: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

Straight-in Landing/approach: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

Tactical Air Navigation (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN **station.**

Takeoff Runway Available (TORA): See declared distances.

Takeoff Distance Available (TODA): See declared distances.

Taxilane: A taxiway designed for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area and provide access to from taxiways to aircraft parking positions and other terminal areas.

Taxiway: A defined path established for the taxiing of aircraft from one part of an airport to another.

Taxiway Design Group: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

Taxiway Safety Area (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

Terminal Instrument Procedures: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

Terminal Radar Approach Control: An element of the air traffic control system responsible for monitoring the enroute and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

Tetrahedron: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

Tetrahedron

Threshold: The beginning of that portion of the runway available for landing. In some instances, the threshold may be displaced.

Touch-and-go: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

Touchdown: The point at which a landing aircraft makes contact with the runway surface.

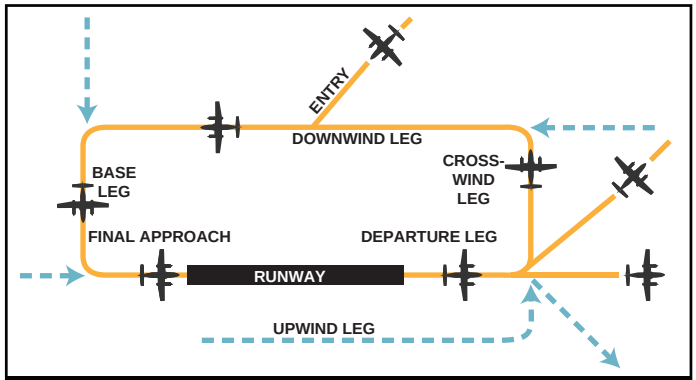
Touchdown and Lift-off Area (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which a helicopter lands or takes off.

Touchdown Zone (TDZ): The first 3,000 feet of the runway beginning at the threshold.

Touchdown Zone Elevation (TDZE): The highest elevation in the touchdown zone.

Touchdown Zone Lighting: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Traffic Pattern: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



Traffic Pattern

U

Uncontrolled Airport: An airport without an airport traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

Uncontrolled Airspace: Airspace within which aircraft are not subject to air traffic control.

Universal Communication (UNICOM): A non-government communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

Upwind Leg: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

Very High Frequency Omni-directional Range (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

Very High Frequency Omni-directional Range/Tactical Air Navigation (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

Victor Airway: A system of established routes that run along specified VOR radials, from one VOR station to another.

Visual Approach: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

Visual Approach Slope Indicator (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing. The VASI is now obsolete and is being replaced with the PAPI.

Visual Flight Rules (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Visual Meteorological Conditions: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

Visual Runway: A runway without an existing or planned instrument approach.

VOR: See "Very High Frequency Omni-directional Range."

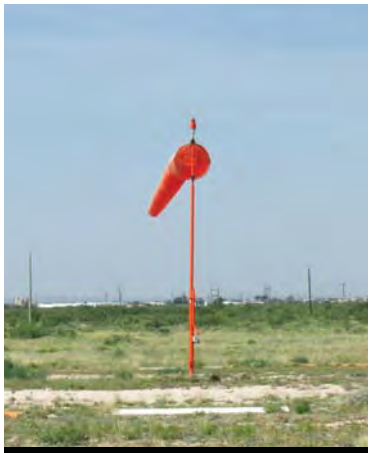
VORTAC: See "Very High Frequency Omni-directional Range/Tactical Air Navigation."

W

Warning Area: See special-use airspace.

Wide Area Augmentation System: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Windsock/Windcone: A visual aid that indicates the prevailing wind direction and intensity at a particular location.



Windsock/Windcone

Abbreviations

AC: advisory circular

ACIP: airport capital improvement program

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APRC: approach reference code

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ASV: annual service volume

ATC: airport traffic control

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DPRC: departure reference code

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GA: general aviation

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LNAV: lateral navigation

LOC: localizer

LOM: compass locator at outer marker

LP: localizer performance

LPV: localizer performance with vertical guidance

MALS: medium intensity approach lighting system

MALSR: MALS with runway alignment indicator lights

MALSF: MALS with sequenced flashers

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

MTOW: maximum takeoff weight

NAVAID: navigational aid

NDB: non-directional radio beacon

NEPA: National Environmental Policy Act

NM: nautical mile (6,076.1 feet)

NPDES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omni-directional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCI: pavement condition index

PCL: pilot-controlled lighting

PIW: public information workshop

POFZ: precision object free zone

PVC: poor visibility and ceiling

RCO: remote communications outlet

RDC: runway design code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: taxiway design group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: very high frequency omni-directional range/tactical air navigation

WAAS: wide area augmentation system

APPENDIX B

FORECAST APPROVAL

SAN BERNARDINO COUNTY

U.S. Department
of Transportation
Federal Aviation Administration

Western-Pacific Region
Airports Division
Los Angeles Airports District Office

777 S. Aviation Blvd, Suite 150
El Segundo, CA 90245

November 29, 2023

James Jenkins
Director
San Bernardino County, Department of Airports
268 W. Hospitality Lane
Suite 302
San Bernardino, CA 92408-0831

Chino Airport (CNO)
Aviation Activity Forecast Approval

Dear Mr. Jenkins,

The Federal Aviation Administration (FAA) has reviewed the aviation forecast for the Chino Airport (CNO) dated June 29, 2023. FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions requires Aviation Forecasts to aid in efficient environmental analyses. The forecast is supported by reasonable planning assumptions, current data, and appears to be developed using acceptable forecasting methodologies. The FAA approves this forecast for use in the analysis for the Master Plan Update.

It is important to note that the approval of this forecast does not guarantee future funding for capital improvements as future projects will need to be justified by current activity levels reached at the time the projects are proposed for implementation and will need to be further analyzed for Airport Improvement Program eligibility purposes.

If you have any questions about this forecast approval, please call me at 424-405-7276.

Sincerely,

JUSTIN GUAN Digitally signed by JUSTIN GUAN
Date: 2023.11.29 15:33:42 -08'00'

Justin Guan
Community Planner

APPENDIX C

AIRFIELD GEOMETRY STUDY

SAN BERNARDINO COUNTY

AIRFIELD GEOMETRY STUDY

CHINO AIRPORT
City of Chino, California

Prepared for
San Bernardino County

By

Coffman Associates
Airport Consultants

FINAL PRINTING
September 2022

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Appendix E - FAA Comments

INTRODUCTION

The objective of the Airfield Geometry Study is to evaluate the existing airfield system at Chino Airport (Airport or CNO) and identify problematic/deficient airfield geometry associated with the runway/ taxiway network. Through this evaluation, a series of options will be prepared that would enhance airfield safety and adhere to Federal Aviation Administration (FAA)-recommended geometry standards. Finally, an implementation plan will be formulated that allows the Airport Sponsor (County of San Bernardino – Department of Airports) to properly plan necessary airfield improvements with the FAA and other entities.

Specific objectives of the Airfield Geometry Study include:

- Analyze the runway/taxiway layout and provide planning recommendations aimed at modifying certain airfield configurations;
- Pay particular attention to FAA-designated Hot Spots and Runway Incursion Mitigation (RIM) locations;
- Provide alternative airfield layouts to include new taxiways, modifications to existing taxiways and other airfield infrastructure (i.e., run-up areas), and/or removal of certain existing taxiways and other airfield infrastructure; and
- Following collaboration with the Airport Sponsor, the FAA, and Airport users, provide a recommended plan that improves and enhances airfield geometry.

The findings and recommendations of this study are to inform airport decisionmakers, including airport management and the FAA, about options to improve the safety of aircraft ground movements. In addition, the findings and recommendations of this study will be included as an appendix to the airport master plan currently being developed for the airport. Recommendations in this study will be included in the master plan development concept and the airport layout plan (ALP).

INVENTORY EXISTING CONDITIONS

Chino Airport is classified in the *National Plan of Integrated Airport Systems* (NPIAS 2021-2025) as a regional general aviation reliever airport. Chino Airport is a towered facility with an FAA owned and operated airport traffic control tower (ATCT) that is open from 7:00 a.m. to 9:00 p.m., 365 days a year.

CNO has three runways. Runway 8R-26L is the primary runway and measures 7,000 feet long and 150 feet wide. Runway 8L-26R is parallel to the primary runway and it is 4,858 feet long and 150 feet wide. Runway 3-21 serves as a crosswind runway, intersecting both parallel runways. Runway 3-21 is 4,919 feet long and 150 feet wide. **Exhibit GS1 – Airport Facilities** shows the airport environment, including the runway and taxiway system.

Runway 26R is the only runway with instrument approach procedures, including a sophisticated instrument landing system (ILS) approach. The ILS approach provides the lowest minimums with 250-foot cloud ceilings and ¾-mile visibility minimums. **Table GS1** summarizes the visibility and cloud ceiling minimums associated with the instrument approaches to Runway 26R.

TABLE GS1 | Instrument Approach Procedures
Chino Airport

	WEATHER MINIMUMS BY AIRCRAFT TYPE			
	Category A	Category B	Category C	Category D
ILS or LOC Runway 26R				
S-ILS	250'/¾-mile			
S-LOC	424'/1-mile		424'/1¼-mile	
Circling	530'/1-mile		590'/1½-mile	590'/2-mile
RNAV (GPS) Runway 26R				
LPV DA	394'/1¼-mile			
LNAV/VNAV DA	541'/2-mile			
LNAV MDA	624'/1-mile		624'/1¾-mile	624'/2-mile
Circling	608'/1¾-mile			608'/2-mile
RNAV (GPS) - A				
Circling	1,794'/1¼-mile	1,794'/1½-mile	NA	

Aircraft categories are based on the approach speed of aircraft, which is determined as 1.3 times the stall speed in landing configuration as follows:

Category A:	0-90 knots (e.g., Cessna 172)
Category B:	91-120 knots (e.g., Beechcraft King Air)
Category C:	121-140 knots (e.g., Canadair Challenger, Boeing 737)
Category D:	141-166 knots (e.g., Gulfstream IV, Boeing MD-88)
Category E:	Greater than 166 knots (e.g., Certain large military or cargo aircraft)

Abbreviations:
GPS - Global Positioning System
LPV - A technical variant of GPS (Localizer Performance with Vertical Guidance)
MDA - Minimum Decision Altitude
DA - Decision Altitude
Note: (xxx'/ x-mile) = Cloud ceiling height/Visibility minimum

Source: U.S. Terminal Procedures (Effective April 22, 2021)

Chino Airport is a busy airport averaging more than 180,000 annual operations over the last 10 years. There are approximately 624 based aircraft which includes 43 jets. In 2019, the airport had more than 217,000 operations, the most since 1990. In 2020, total operations declined to 176,991, due to the Covid-19 pandemic's economic impact. Local operations represent approximately 63 percent of total operations. **Exhibit GS2 – Master Plan Forecasts** shows the recently completed aviation demand forecasts for the CNO master plan. The 20-year forecast shows based aircraft increasing from 624 in 2019 to 729 in 2039. Operations are forecast to increase from 217,181 to 299,552 in 2039.

The current and future critical aircraft for the airport was also determined in the forecast element of the master plan. The current critical aircraft is the family of business jets that fall in C-II-2. A common aircraft in this category is a Gulfstream 300 business jet. In the future, the airport is expected to transition to a D-III-2 critical aircraft, such as a Gulfstream 650. **Table GS2** shows the applicable runway and taxiway design standards that apply to the airport now and in the future. These design standards are the physical planning criteria which will guide any alternatives that impact airfield geometry.

LEGEND

- Airport Property Line
- A — Taxiway Identifier
- Runway Safety Area (RSA)
- Runway Protection Zone (RPZ)

ASOS - Automated Surface Observation System
ATCT- Airport Traffic Control Tower
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights

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	BASE YEAR 2019	FORECAST 2024	FORECAST 2029	FORECAST 2039	CAGR 2019-39
ANNUAL OPERATIONS					
Commercial Operations (Itinerant)					
Air Taxi	505	649	763	992	3.43%
Total Commercial Operations	505	649	763	992	3.43%
Military Operations					
Itinerant Military Operations	484	439	439	439	-0.49%
Local Military Operations	869	829	829	829	-0.24%
General Aviation Operations					
Itinerant	78,730	86,580	96,533	116,438	1.98%
Local	136,593	140,157	153,723	180,854	1.41%
Total General Aviation Operations	215,323	226,737	250,256	297,292	1.63%
Total Local Operations	137,462	140,986	154,552	181,683	1.40%
Total Itinerant Operations	79,719	87,668	97,735	117,869	1.97%
TOTAL ANNUAL OPERATIONS	**217,181**	**228,654**	**252,287**	**299,552**	**1.62%**
BASED AIRCRAFT					
Single-engine piston	487	502	517	553	
Multi-engine piston	63	60	57	50	
Turboprop	18	22	26	34	
Jet	43	50	57	71	
Helicopter	13	15	17	21	
TOTAL BASED AIRCRAFT	**624**	**649**	**674**	**729**	**0.78%**
PEAKING CHARACTERISTICS					
Peak Month (10.46%)	21,088	22,202	24,497	29,086	
Design Day (31)	680	716	790	938	
Design Hour (11.0%)	78	82	90	107	

* Compound Annual Growth Rate

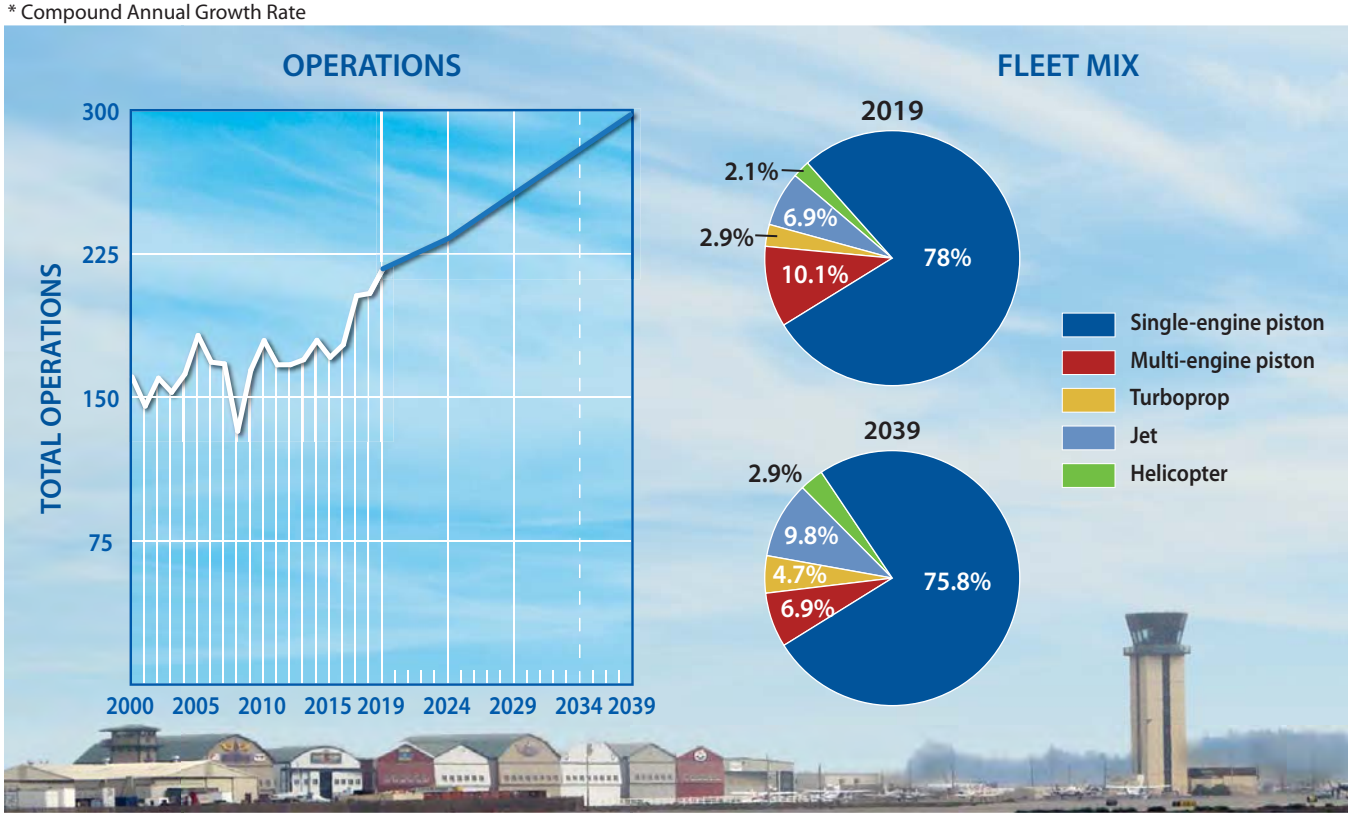


TABLE GS2 | Design Standards
Chino Airport

RUNWAY CLASSIFICATION	CURRENT		FUTURE	
Runway Design Code	C-II-2		D-III-2*	
RUNWAY DESIGN				
Runway Width	100		NC	
Shoulder Width	10		NC	
Blast Pad Width	120		140	
Blast Pad Length	150		200	
RUNWAY PROTECTION				
Runway Safety Area				
Length beyond departure end	1,000		NC	
Length prior to landing	600		NC	
Width	500		NC	
Runway Object Free Area				
Length beyond departure end	1,000		NC	
Length prior to landing	600		NC	
Width	800		NC	
Runway Obstacle Free Zone				
Length beyond runway end	200		NC	
Width	400		NC	
Approach Runway Protection Zone	*All but 26R*	*Rwy 26R*	*All but 26R*	*Rwy 26R*
Length	1,700	1,700	NC	NC
Inner Width	500	1,000	NC	NC
Outer Width	1,010	1,510	NC	NC
Acres	29.465	48.978	NC	NC
Departure Runway Protection Zone				
Length	1,700		NC	
Inner Width	500		NC	
Outer Width	1,010		NC	
Acres	29.465		NC	
RUNWAY SEPARATION				
Runway centerline to:				
Holding Position	250		257	
Parallel taxiway/taxilane centerline	300		400	
Aircraft parking area	400		500	
TAXIWAY DESIGN STANDARDS				
Taxiway Width	35		NC	
Taxiway OFA	131		186	
Taxilane OFA	115		162	

Note: All measurements in feet.
NC: No Change
*Maximum weight of less than 150,000 lbs. and not lower than ¾-mile visibility minimums.

Source: FAA AC 150/5300-13A, Airport Design.

A change to aircraft approach category from C to D and the airplane design group from II to III triggers changes to the applicable design standards. The holding position changes from 250 feet from the runway centerline to 257 feet. The taxiway OFA, as centered on the taxiway, increases from 131 feet in width to 186 feet, and the taxilane OFA width also changes from 115 feet to 162 feet. If a blast pad is available, its dimensions change as well.

RUNWAY/TAXIWAY SAFETY GUIDANCE AND PROGRAMS FROM FAA

The top priority of the FAA is safety, and to this end, the FAA is always analyzing ways to improve safety of air travel whether it be commercial service or general aviation activity. The FAA provides guidance to airports and industry consultants with the goal of improving safety. Nearly every FAA publication has some relationship to improving safety; however, there are several primary documents and programs that specifically address ground movements on airports, which include the following guidance and programs:

- FAA Guidance:
  - FAA AC 150/5300-13A, *Airport Design*
  - FAA AC 150/5340-18G, *Standards for Airport Sign Systems*
  - FAA Order 7050.1B, *Runway Safety Program*
  - FAA Order 8000.396C, *Safety Management Systems*

- FAA Programs:
  - Runway Incursion Mitigation (RIM) program
  - Aviation Safety Action Program (120-66C)
  - Aviation Safety Reporting Program (00-46F)
  - FAA Runway Safety – Hot Spot List

AIRFIELD AREAS OF CONCERN AT CHINO AIRPORT

Hot Spots

A hot spot is defined as a location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

By identifying hot spots, it is easier for users of an airport to plan the safest possible path of movement in and around that airport. Planning is a crucial safety activity for airport users — both pilots and air traffic controllers alike. By making sure that aircraft surface movements are planned and properly coordinated with air traffic control, pilots add another layer of safety to their flight preparations. Proper planning helps avoid confusion by eliminating last-minute questions and building familiarity with known problem areas.

There are four hot spots identified on the airport diagram for Chino Airport, which are shown on **Exhibit GS3 – Hot Spots and RIM Locations**. The hot spots are described as follows:

- **HS 1**: Pilots taxiing south of Taxiway D sometimes fail to turn onto Taxiway A and inadvertently proceed onto Runway 8L-26R.
- **HS 2**: Pilots taxiing west on Taxiway L sometimes turn onto Runway 3-21 by mistake.
- **HS 3**: Pilots taxiing south on Taxiway K sometimes fail to turn onto Taxiway A and proceed onto Runway 8L-26R by mistake.
- **HS 4**: Complex intersection. After Crossing Runway 21 westbound on Taxiway L, pilots sometimes confuse Taxiway D and Taxiway K and cross the Runway 8L-26R holding position markings without authorization.

RIM Locations

The Runway Incursion Mitigation (RIM) program identifies airport risk factors that might contribute to a runway incursion and develops strategies to help airport sponsors mitigate those risks. The RIM program is a data-driven, risk-based, proactive program that develops solutions at runway/taxiway intersections to help prevent runway incursions.

A runway incursion is any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. Risk factors that contribute to runway incursions may include unclear taxiway markings, airport signage, and more complex issues, such as the runway or taxiway layout. Through RIM, the FAA focuses on reducing runway incursions by addressing risks at specific locations at an airport that have a history of runway incursions. To be included on the RIM list, there must be three or more runway incursions (PD & V/PD) in a calendar year or an average of one or more runway incursions (RI) per year since 2007.

Table GS3 presents the RIM locations at CNO and the number of reported incidents. These RIM locations are also shown on **Exhibit GS3 – Hot Spot and RIM Locations**.

TABLE GS3 | RIM Location Data
Chino Airport

RIM Location	FAA ID	Year Added to RIM	Cumulative Runway Incursions[1]	Peak Year Runway Incursions[1]
Twy P between Rwy 26R approach end and Rwy 26L	CNO-05	2015	12	4
Hold short bar on Twy P north of Rwy 26R	CNO-10	2017	25	8
Rwy 26L Approach End	CNO-19	2015	19	6
Twy L between Rwy's 3-21 and 8R-26L	CNO-HS2	2018	7	5
Intersections of Twys D, K, L and Rwys 8L-26R and 3-21	CNO-HS4	2016	20	5
[1]Pilot & Vehicle/Pedestrian Deviations				

Source: FAA RIM Database Dated 1.12.2021. Available here: https://www.faa.gov/airports/special_programs/rim/

A RIM location may also be classified as a Hot Spot, but a Hot Spot is not necessarily included in the RIM database.

ATIS
125.85
CHINO TOWER ★
118.5
GND CON
121.6

20086

AIRPORT DIAGRAM

AL-5599 (FAA)

CHINO (CNO)
CHINO, CALIFORNIA
/61±

HOT SPOT DESCRIPTIONS

HS 1 Pilots taxiing south on Twy D, sometimes fail to turn on to Twy A and proceed onto Rwy 08L-26R by mistake.

HS 2 Pilots taxiing west on Twy L, sometimes turn onto Rwy 03-21 by mistake.

HS-3 Pilots taxiing south on Twy K sometimes fail to turn onto Twy A and proceed onto Rwy 08L-26R by mistake.

HS 4 Complex int - after crossing Rwy 21 westbound on Twy L, pilots sometimes confuse Twy D and Twy K and cross the 08L-26R runway holding position marking without authorization

RIM LOCATIONS

RIM 1: Twp P between Rwy 26 approach end and Rwy 26L

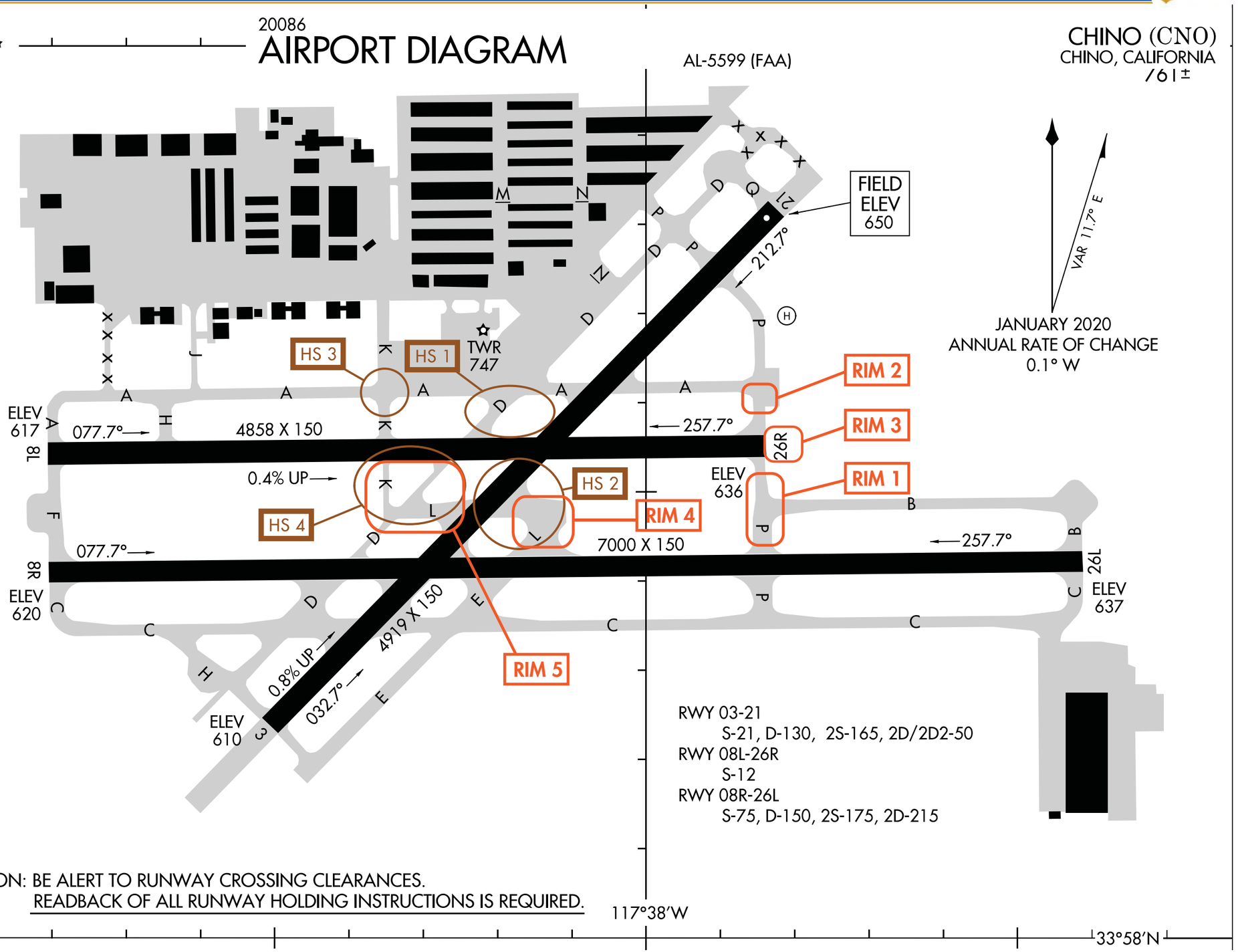
RIM 2: Hold short bar on Twy P north of Rwy 26R

RIM 3: Rwy 26L Approach End

RIM 4: Twy L between Rwy's 3-21 and 8R-26L

RIM 5: Intersections of Twys D, K, L and Rwys 8L-26R and 3-21

RIM - Runway Incursion Mitigation



JANUARY 2020
ANNUAL RATE OF CHANGE
0.1° W

VAR 11.7° E

CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES.
READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.

117°39'W — 117°38'W — 33°58'N

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19 RIM GEOCODES

RIM locations on airports are classified as one or more of the 19 RIM Geocodes, which are presented in **Table GS4**. Generally, the cause of a runway incursion will fall into one of these 19 categories.

TABLE GS4 | 19 RIM Geocodes

No.	RIM Geocodes
1	Y-shaped taxiways crossing a runway
2	Wrong runway events
3	Wide expanses of taxi pavements entering or along a runway
4	Convergence of numerous taxiway types entering a runway
5	High-speed exit crossing a taxiway
6	Two runway thresholds in close proximity
7	Short taxiways (stubs) between runways
8	Direct taxiing access to runway from ramp areas
9	An aligned taxiway entering runway ends
10	Nonstandard markings and/or signage placement
11	Greater than three-node taxiway intersection
12	Taxiway connection to V-shaped runways
13	Taxiway intersects runway at other than a right angle
14	Short taxi distance from ramp/apron area to a runway
15	High-speed exits leading directly onto another runway
16	Taxiway coinciding with the intersection of two runways
17	Using a runway as a taxiway
18	Unexpected holding position marking on parallel/entrance taxiway
19	Miscellaneous to include nonsequential taxiway designation schemes, absence of a full-length parallel taxiway, and taxiway intersection along the middle third (high-energy area) of a runway.

Source: FAA Runway Incursion Mitigation program.

Figure GS1 presents a history of national runway incursions as ranked by RIM Geocode for the period from 2007 to 2016. In total for this period, there were 16,764 runway incursions. Nearly 20 percent of those were Geocoded as having a short taxi distance from the ramp/apron to a runway. The second most frequent Geocode was direct taxiing access to runways from ramp areas, which accounted for approximately 15 percent.

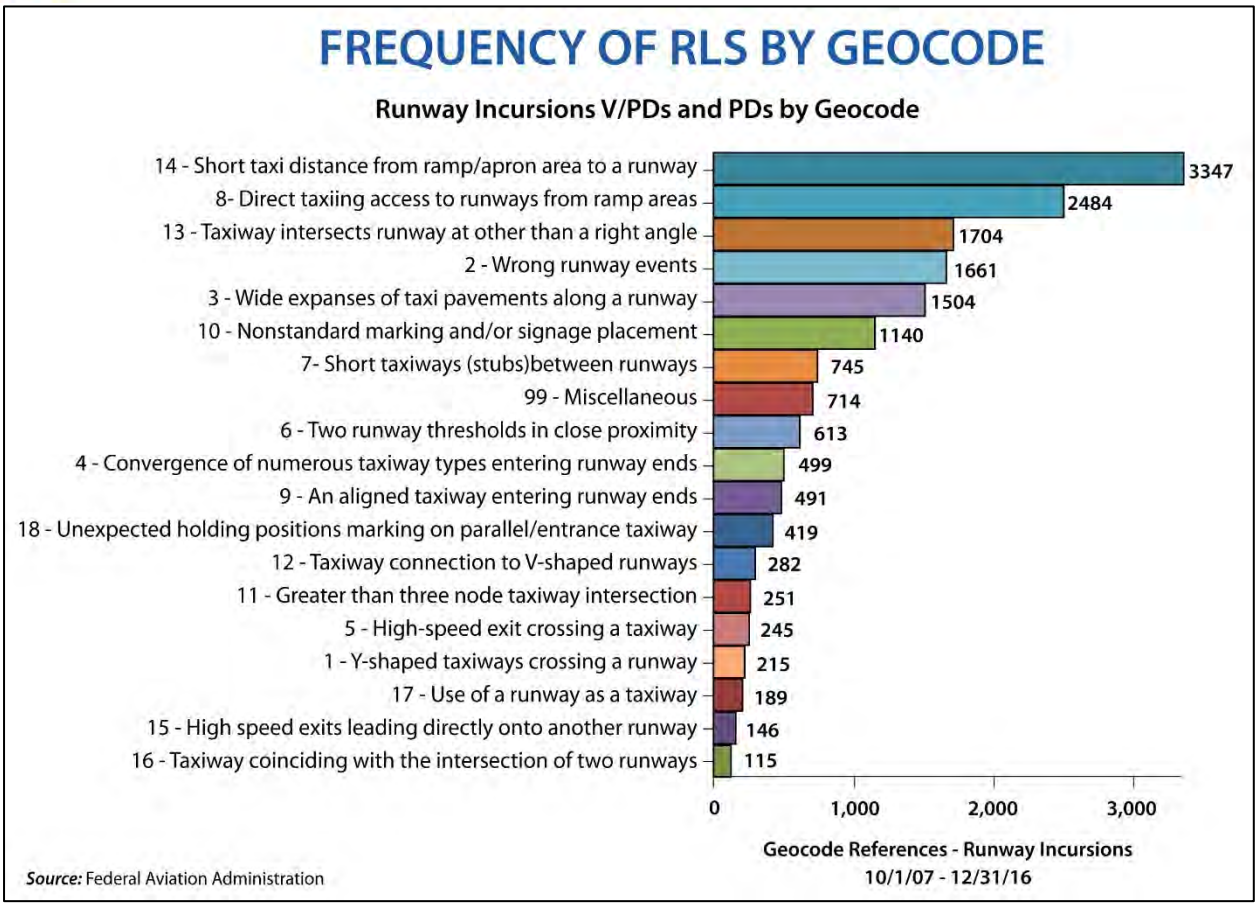


Figure GS1 – Historical Runway Incursions by Geocode

RUNWAY EVENTS

A runway event is a documented safety concern that has happened at an airport. Runway events are classified by FAA as a Runway Incursion (RI), Surface Incident (SI), or a Runway Excursion (RE), which are defined as follows:

- A Runway Incursion (RI) is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.
- A Surface Incident (SI) is an unauthorized or unapproved movement within the designated movement area (excluding runway incursions) or an occurrence in that same area associated with the operations of an aircraft that affects or could affect the safety of flight.
- A Runway Excursion (RE) is a veer-off or overrun from the runway surface, which occurs while an aircraft is taking off or landing.

Surface Incident Classification System

Runway events are further classified with a surface incident classification that provides an indication of the responsible party. The incident classification system is as follows:

- Operational Incident (OI): A surface event attributed to ATC action or inaction.
- Pilot Deviation (PD): Action of a pilot that violates any federal regulation.
- Vehicle or Pedestrian Deviation (V/PD): Vehicle/Pedestrian Deviation: Any entry or movement on the movement area or safety area by a vehicle or pedestrian not authorized by ATC.
- Other: Surface events which cannot clearly be attributed to incorrect actions by ARC, pilot, or pedestrian. These include events caused by equipment failures or other factors.

Runway Incursion Severity Classification System

Runway incursions are classified based on the level of risk involved and the potential for a collision. The runway incursion classification system is as follows:

- Accident: An incursion that results in a collision. These are classified as Category A.
- Category A: A serious incident in which a collision was narrowly avoided.
- Category B: An incident in which separation decreased and there is a significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.
- Category C: An incident characterized by ample time and/or distance to avoid a collision.
- Category D: An incident that meets the definition of RI, such as incorrect presence of a single vehicle/ person/aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.
- Category E: An incident in which insufficient or conflicting evidence of the event precludes assigning another category.

Runway Excursion

A runway event may also be classified as a Runway Excursion (RE), which is a veer-off or overrun from the runway surface, which occurs while an aircraft is taking off or landing. Contributing factors typically include strong crosswinds, tailwinds, mechanical issues, or runway conditions. Runway Safety Areas are designed and dimensioned to protect airport users in the event of a runway excursion.

FAA tracks runway events at NPIAS airports across the country with the goal of identifying patterns that may require mitigation to improve safety. **Exhibit GS4 – 2020 Runway Safety Events** summarizes runway events at airports across the country in 2020. In 2020, there were more than 44 million operations (take-offs and landings). During this time, there were 1,260 runway incursions, 374 surface incidents, and 294 runway excursions for a total of 1,928 runway events.

RUNWAY EVENTS AT CHINO AIRPORT

There were 25 runway events at Chino Airport for the 12-month period from May 2020 through April 2021. Of these, 12 were categorized as runway incursions, 12 were surface incidents, and one was a runway excursion. All these runway events had a severity rating of C or D, meaning there was ample time to avoid a collision. **Table GS5** shows information about the 12 runway incursions.

TABLE GS5 | Runway Incursions (RI) from May 2020 through April 2021
Chino Airport

Date	RI Classification	RI Severity Rating	General Description
16-Apr-21	PD	C	Aircraft landed Rwy 26L, exiting on Twy L. Instructed to cross Rwy 21, turn right onto Twy D and hold at Rwy 26R. Aircraft failed to hold short of Rwy 26R.
30-Mar-21	PD	C	Aircraft instructed to hold short of Rwy 26R at Twy P. Aircraft failed to hold short and an aircraft on final to Rwy 26R had to go around.
29-Mar-21	PD	C	Aircraft instructed to hold short of Rwy 26R at Twy P. Aircraft failed to hold short. Aircraft on final to Rwy 26R had to go around.
19-Mar-21	PD	D	Aircraft landed Rwy 26L, exiting on Twy L. Instructed to cross Rwy 21, turn right onto Twy K and hold at Rwy 26R. Aircraft failed to hold short of Rwy 26R.
27-Feb-21	PD	C	Aircraft landed Rwy 26L, exiting on Twy L. Instructed to cross Rwy 21, turn right onto Twy K and hold at Rwy 26R. Aircraft failed to hold short of Rwy 26R and an aircraft on final to Rwy 26R had to go around.
5-Jan-21	PD	D	Aircraft cleared for departure Rwy 26L at Twy P. Aircraft turned the wrong way for departure.
17-Nov-20	OI	C	ATC instructed aircraft on Twy P to proceed across Rwy 26R to enter Rwy 26L at Twy P for departure. Another aircraft was on final to Rwy 26L.
12-Nov-20	PD	D	Aircraft cleared to land Rwy 26R but landed Rwy 26L.
30-Aug-20	PD	D	Aircraft landed Rwy 26L, exiting on Twy L. Instructed to taxi Twy L to Twy D and hold short Rwy 26R. Aircraft crossed Rwy 26R hold bar at Twy D.
19-Aug-20	PD	D	Aircraft landed Rwy 26L, exiting at Twy F. Aircraft failed to hold short of Rwy 8L as instructed.
1-Jun-20	OI	C	Aircraft instructed to land Rwy 26L and rolled out long. Aircraft still on runway when another aircraft crossed Rwy 26L threshold to land.
30-May-20	PD	D	Aircraft was doing touch-and-go's to Rwy 26R. Pilot failed to readback clearance on final landing to Rwy 26R.

RI: Runway Incursion

RI Classification
OI - Operational Incident: A surface event attributed to ATC action or inaction.
PD - Pilot Deviation: Action of a pilot that violates any federal regulation.
V/PD - Vehicle/Pedestrian Deviation: Any entry or movement on the movement area or safety area by a vehicle or pedestrian not authorized by ATC.

RI Severity Rating
A – A serious incident in which a collision was narrowly avoided.
B – An incident in which separation decreased and there is a significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.
C – An incident characterized by ample time and/or distance to avoid a collision.
D – An incident that meets the definition of RI, such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.

Source: FAA Aviation Safety Information Analysis and Sharing (ASIAS); https://www.asias.faa.gov/apex/f?p=100:28:::NO:28::

2020 RUNWAY SAFETY EVENTS NATIONALLY

OVER 44,000,000 TAKE-OFFS AND LANDINGS DURING FY 2020

RUNWAY INCURSIONS (RI)

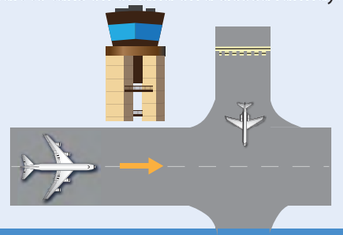
Any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.

Pilot Deviation Example

Action of a pilot that violates any Federal Aviation Regulation Example: a pilot crosses a runway without a clearance while en-route to an airport gate.

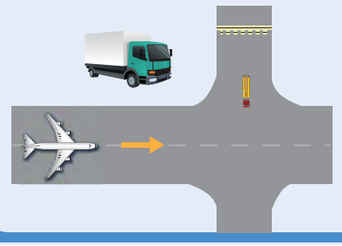
Operational Incident Example

Action of an air traffic controller that results in: Less than required minimum separation between 2 or more aircraft, or between an aircraft and obstacles, or clearing an aircraft to take off or land on a closed runway.



Vehicle/Pedestrian Deviation Example

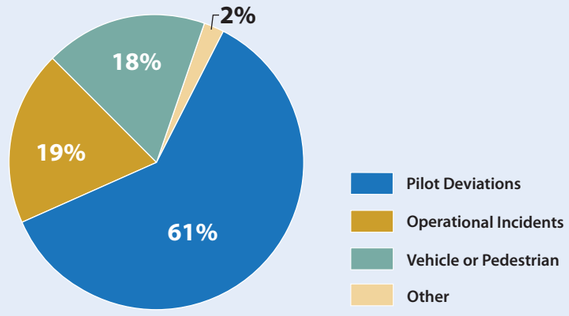
Pedestrians or vehicles entering any portion of the airport movement areas (runways/taxiways) without authorization from air traffic control.



Severity Rating

- **Accident:** An incursion that results in a collision. These are classified as Category A.
- **Category A:** An accident or serious incident in which a collision was narrowly avoided.
- **Category B:** An incident in which separation decreased and there is a significant potential for collision which may result in a time critical corrective/evasive response to avoid a collision.
- **Category C:** An incident characterized by ample time and/or distance to avoid a collision.
- **Category D:** Incident that meets the definition of RI, such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.
- **Category E:** An incident in which insufficient or conflicting evidence of the event precludes assigning another category.

1,260 Runway Incursions in FY 2020



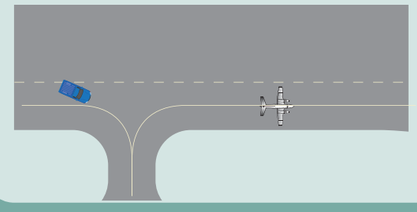
SURFACE INCIDENTS (SI)

An unauthorized or unapproved movement within the designated movement area (excluding runway incursions) or an occurrence in that same area associated with the operation of an aircraft that affects or could affect the safety of flight.

Wrong Surface Incident Example

Landing or taking off on taxiway instead of Runway

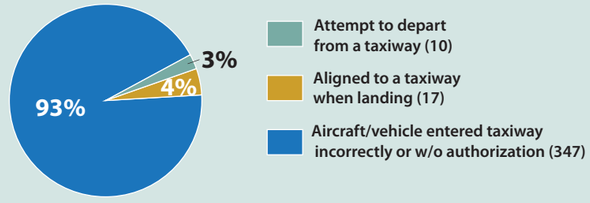
Vehicle/Pedestrian Deviation Example



Incident Classification

- **Operational Incident (OI):** A surface event attributed to ATC action or inaction.
- **Pilot Deviation (PD):** Action of a pilot that violates any federal regulation.
- **Vehicle or Pedestrian Deviation (V/PD):** Any entry or movement on the movement area or safety area by a vehicle or pedestrian not authorized by ATC.
- **Other:** Surface events which cannot clearly be attributed to incorrect actions by ARC, pilot, or pedestrian. These include events caused by equipment failures or other factors.

374 Surface Incidents in FY 2020



RUNWAY EXCURSIONS (RE)

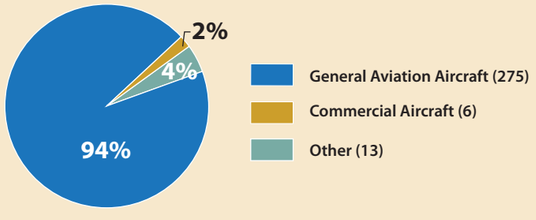
An aircraft veer off or overrun from the runway surface which occurs while an aircraft is taking off or landing.

Veer Off Runway Incident Example

Overrun Runway Incident Example

Main contributing factors: Aircraft problem, loss of control, exited the runway.

294 Runway Excursions in FY 2020



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Most of the runway incursions involved aircraft failing to hold short of the active runway when instructed by ATC to do so. There are two locations where this happened frequently:

- The complex taxiway geometry at Taxiway L/K/D where this occurred four times in the last 12 months, and
- At Taxiway P, where this occurred four times in the last 12 months.

Of the 12 surface incidents, nine were the result of pilots lining up on the wrong runway while in the air. The remaining three surface incidents involved vehicles or pedestrians entering the taxiway environment without authorization. The one runway excursion was the result of a flat tire on the aircraft and resulted in no injuries.

The full history of runway incursions at CNO since FAA began keeping track in 2001 is listed in **Appendix B**. In total, there have been 281 runway incursions at CNO. All but three had a severity rating of C or D.

The number of runway incursions at similarly busy airports was examined for the 12-month period ending in March 2021. **Table GS6** summarizes this data in comparison to CNO. Among this list, CNO ranks third highest in runway incursions behind Van Nuys and North Las Vegas. One of the airports, Miami Executive, had no runway incursions in the 12-month period examined. The severity rating for all runway incursions listed in the table was either C or D. What this comparison indicates is that Chino Airport is at the high end for runway incursions when compared to similarly busy airports.

TABLE GS6 | Runway Incursion Comparison (April 2020-March 2021)

Identifier	Airport	State	Runway Incursions
CNO	**Chino**	**CA**	**11**
VNY	Van Nuys	CA	13
FRG	Farmingdale	NY	2
CHD	Chandler	AZ	7
PUB	Pueblo	CO	2
PRC	Prescott	AZ	9
TMB	Miami Executive	FL	0
RHV	Santa Clara County	CA	3
VGT	North Las Vegas	NV	13
SEE	Gillespie Field San Diego	CA	6

Source: FAA Aviation Safety Information Analysis and Sharing (ASIAS); https://www.asias.faa.gov/apex/f?p=100:28:::NO:28::

RIM MITIGATION STRATEGIES

FAA has identified several strategies that may be employed to mitigate RIM locations. One or more of these strategies may be instituted to alleviate any problematic RIM locations. The following are those strategies to be considered for mitigation of RIM locations on an airport.

- Capital improvements to:
  - Geometry
  - Signage, Marking, Lighting

- Procedures
  - Operational
  - Air Traffic Control

- Technology and Education
  - Runway Incursion Prevention through Situational Awareness Pilot Education

The first option listed is a geometry solution. The FAA strongly supports changing airfield geometry to eliminate hot spots or RIM locations and to provide standard geometry to the greatest degree possible. As a point of clarification, the airfield geometry refers to the physical layout of airfield pavements, including runways, taxiways, and holding aprons. **Exhibit GS5** presents six examples of airfield geometry improvements at other airports. Each is briefly discussed as follows:

Waco Regional Airport (ACT): Runways 1 and 32 were coupled runways with pavement connecting them and the runway safety areas of each intersecting. There were non-standard taxiways in this area with non-standard angles to the runway and an unusual threshold taxiway to Runway 32.

Several improvements were made to reduce the potential for wrong runway departures and to increase pilots' peripheral view. Two of the three angled taxiway entrances were reconstructed with 90-degree turns. While the threshold taxiway to Runway 32 is still at a slight angle, it has been improved over what was there previously.

Albuquerque International Sunport (ABQ): ABQ had two runway ends converging in the same location and a lead-in taxiway to Runway 21. These runways were decoupled by eliminating the lead-in taxiway to Runway 21, painting the taxiway edge, and adding non-movement chevrons leading to the runway.

Tulsa International Airport (TUL): TUL had several taxiways at non-standard angles to the runway, wide expanses of pavement, and direct access from aprons to runways. One of the angled taxiways was removed completely, while others were relocated and reconstructed with more standard geometry.

Corpus Christi International Airport (CRP): Several taxiway and runway coupling issues had been leading to pilot confusion and the potential for wrong runway departures. Both runways were shifted away from each other so that the runway ends are clearly distanced. The taxiway system was reconstructed to provide 90-degree angles to the runway.

Dallas Love Field (DAL): The issue in the location depicted on the exhibit was the wide expanse of pavement that caused confusion among pilots about which way to go. A small no-taxi island was painted on the pavement, which clearly separates both paths to the runway threshold. In-ground taxiway centerline lighting was also added to show the route at night.

WACO REGIONAL AIRPORT (ACT)

Issues: Potential confusion between runway thresholds, unusual taxiway geometry with non-standard angles.

Mitigation: Decouple runways through pavement removal. New taxiway geometry providing maximum right angles.

ALBUQUERQUE INTERNATIONAL SUNPORT (ABQ)

Issues: Potential confusion between Runway 8 and 21 thresholds. Lead-in taxiway to Runway 21. Taxiway connection to V-shaped runways. Short distance from ramp to runway. Potential wrong runway events.

Mitigation: With surface painting, decoupled runways and removed lead-in taxiway to Runway 21.

TULSA INTERNATIONAL AIRPORT (TUL)

Issue: Angled taxiway to runway. Wide expanse of taxiway pavement. Direct access from ramp to runway. Short distance from ramp to runway. Non-standard markings and/or signage.

Mitigation: Remove crossing and angled taxiways.

CORPUS CHRISTI INTERNATIONAL AIRPORT (CRP)

Issue: Taxiway connection to V-shaped runways. Runway thresholds in close proximity. Crossing runway safety areas.

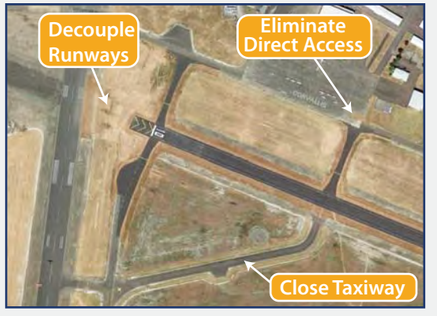
Mitigation: Shift Runway 13-31 and construct 90-degree threshold taxiway. Shift Runway 18-36 and construct new threshold taxiway. Close and remove Y-shaped taxiway.

DALLAS LOVE FIELD AIRPORT (DAL)

Issue: Wide expanse of pavement.

Mitigation: Add no-taxi island to eliminate issues with wide expanse of pavement.

CORVALLIS MUNICIPAL AIRPORT (CVO)



Issues: Runway thresholds in close proximity. No threshold taxiway to Runway 9 (now Rwy 10). Taxiway C crossing runway in high-energy portion. Direct access from apron to runway.

Mitigation: Remove apron pavement and remark apron to eliminate direct access. Close Taxiway C to eliminate high-energy crossing. Shorten crosswind runway to decouple runway and provide threshold taxiway.

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Corvallis Municipal Airport (CVO): The Runway 9 (now Rwy 10) threshold was located next to Runway 17-35 and within the RSA of the primary runway. There was no threshold taxiway to Runway 9 requiring back-taxiing maneuvers. Taxiway C provided direct access from the main apron to the high-energy portion of Runway 9-27.

Several geometry projects were undertaken to improve safety at Corvallis. The Runway 9 end was relocated so that back-taxiing was no longer needed. Taxiway C, which crossed Runway 9-27 at the high-energy portion of the runway, was determined to be redundant and was closed. Finally, a small portion of the terminal apron was removed, forcing pilots to route around the no-taxi-island, prior to proceeding onto the parallel taxiway.

Portland-Hillsboro Airport (HIO): Exhibit GS6 presents a planning level examination of the possibility of building a taxiway between parallel runways. While planning for a taxiway between parallel runways was once common, today's emphasis on better/safer taxiway geometry has led to a re-examination of taxiways between parallel runways. This example is from the 2018 Portland-Hillsboro Airport (HIO) Master Plan. This is a busy reliever general aviation airport with FBO operations on both sides of the parallel runway system. There are frequent aircraft ground movements across the airfield which, it was thought, may benefit from a parallel taxiway between the runways.

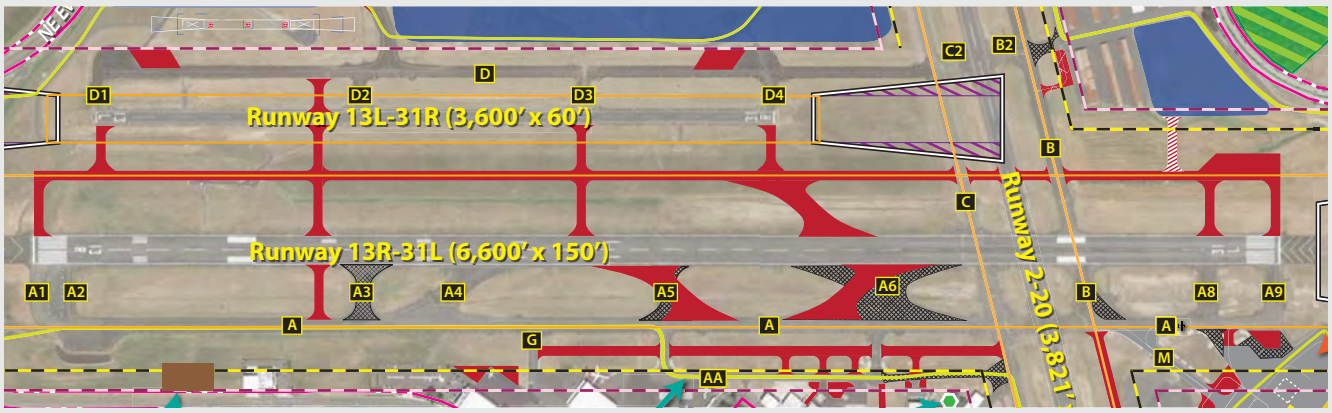
The potential for a wrong surface landing is very dangerous and, thus, automatically planning for taxiways between parallel runways is no longer the norm. The planners for HIO examined the possibility of accomplishing the same taxiway movement efficiency without planning for a full-length taxiway between the runways. The bottom half of the exhibit shows the result of that examination. As can be seen, the final plan for the taxiway between the parallel runways is very different than the initial alternative of a full-length taxiway between the runways. The final plan includes only one cross-field taxiway and two threshold taxiways. With this geometry, the efficiency of movement is preserved while avoiding a taxiway pavement that could lead to wrong surface landings.

TOWER PROCEDURES

As previously detailed, the ATCT at CNO is open from 7:00 a.m. to 9:00 p.m. During these times, control tower personnel direct arriving and departing aircraft. Tower personnel are also witness to runway events and often the reporting agency. To reduce the potential for runway events, tower personnel direct aircraft in specific ways. For example, when feasible, controllers will direct aircraft to utilize Taxiway J rather than Taxiway K when exiting the northside hangar area. Since Taxiway J terminates at Taxiway A, pilots are forced to make a turn onto Taxiway A and cannot inadvertently continue straight into the runway environment, like they can when using Taxiway K.

Operationally, controllers have made a change to how they handle aircraft that land on Runway 26L and exit at Taxiway L. Local control (118.5 MHz) used to continue to handle these aircraft as they taxi to the north; however, this proved challenging as occasionally some pilots would not follow instructions. To address this, ground control (121.6 MHz) now takes over communication with pilots when exiting on Taxiway L and directs them to their desired location on the north side of the airfield. This action appears to have resolved most of the communication issues for aircraft landing Runway 26L and exiting at Taxiway L.

Original development alternative for a full-length taxiway between parallel runways.



Due to concerns that a parallel taxiway could lead to pilot confusion and potential taxiway landings, the final recommended alternative includes only those taxiway segments to provide runway threshold access and cross field capability.

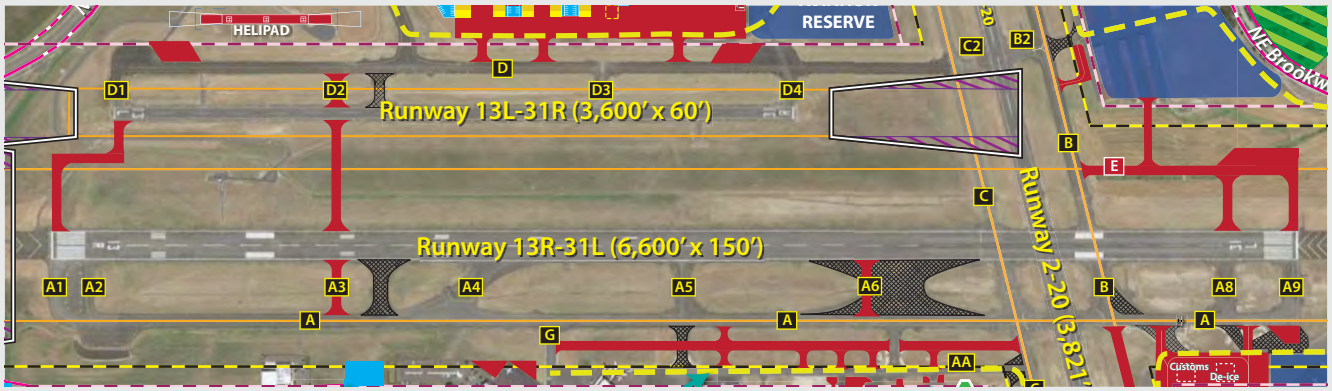


Exhibit G6
MIDFIELD TAXIWAY EXAMPLE

Tower controllers identified a recurring problem at the intersection of Taxiway L and Runway 3-21, where pilots on Taxiway L, south of Runway 3-21, would be instructed to cross Runway 3-21 and turn north of Taxiway K. There was a centerline lead-in line from Taxiway L onto Runway 3-21 and some pilots inadvertently would follow this centerline and find themselves on Runway 3-21. Ultimately, this centerline was removed, and tower personnel indicate they have not had subsequent problems. **Figure GS2** shows this marking line change.

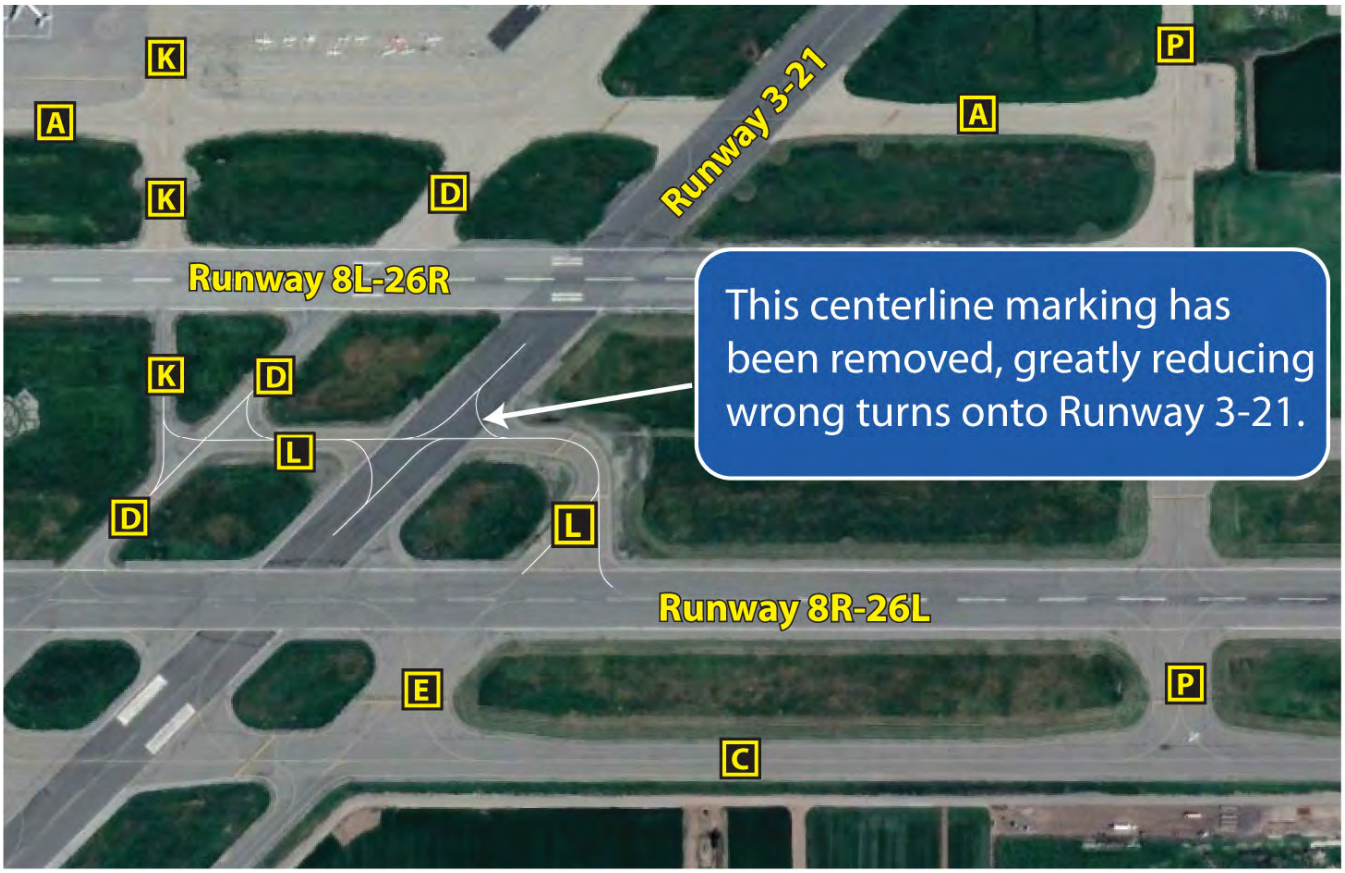


Figure GS2 – Taxiway Centerline Marking Change

APPLICABLE AGREEMENTS

It is common for airport management and ATCT to have various agreements in place which document procedures or responsibilities for each party. There are four such letters of agreement (LOA) in place for CNO, which are briefly described and included in **Appendix C.**

LOA Dated November 20, 2006 - Airport Ramp/Parking and Movement Jurisdictional Responsibilities: This LOA identifies the movement areas and the responsible party while the tower is open (7:00am-9:00pm). The control tower is responsible for the movement areas which include the runway and taxiways. Airport management is responsible for aircraft movements on ramps and parking areas.

LOA Dated March 20, 2012 – Operation of Airport Lighting Systems: This LOA delineates responsibilities for operation of the airport lighting systems when the tower is closed or non-operational. Prior to the tower closing all runway edge lights, taxiway lights, PAPI lights, and the beacon are to be set to the "on" position.

LOA Dated May 17, 2013 – Procedures for Opening and Closing Runways: This LOA establishes standard procedures for opening and closing runways. Only airport management can open or close a runway and several steps are required, including communication with the Air Traffic Manager and issuance of NOTAMS. ATCT personnel are responsible for updating the automatic terminal information service (ATIS) and understanding if any portions of the closed runway may be used for taxiing (i.e., runway crossings).

LOA Dated February 1, 2015 – Helicopter Operations in Non-Movement Areas: This LOA establishes areas of non-movement authorized for use by arriving and departing helicopters. The ATCT is responsible for helicopter operations to/from several ramp locations, helicopter fueling location, hot fueling locations, northwest corner of the commercial hangar ramp area, and other areas in the west ramp area. Airport management must brief airport users, tenants, and fuel providers on acceptable areas for helicopter operations. They must also maintain the yellow circles designating the Hot Fuel area.

TAXIWAY DESIGN

FAA AC 150/5300-13A, *Airport Design*, provides guidance on taxiway design that has a goal of enhancing safety by providing a taxiway geometry that reduces the potential for runway incursions. A runway incursion is defined as, "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation.

1. **Taxi Method**: Taxiways are designed for "cockpit over centerline" taxiing, with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate judgmental over-steering, which is when the pilot must intentionally steer the cockpit outside the marked centerline to assure the aircraft remains on the taxiway pavement.

2. **Steering Angle**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.

3. **Three-Node Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right- and left-angle turns and a continuation straight ahead.

4. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.

5. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three node" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences and through a reduction in air traffic controller workload.
   - *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
   - *Increase Visibility*: Right-angle intersections, both between taxiways and runways, provide the best visibility. Acute-angle runway exits provide for greater efficiency in runway usage but should not be used as runway entrances or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
   - *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
   - *Indirect Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
   - *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

6. **Runway/Taxiway Intersections**:
   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs, so they are visible to pilots.
   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.
   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

7. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and makes lighting and marking more difficult.
   - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout that forces pilots to make a conscious decision to turn.
   - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

FAA AC 150/5300-13A, *Airport Design,* states that, "existing taxiway geometry should be improved whenever feasible, with emphasis on designated hot spots. To the extent practicable, the removal of existing pavement may be necessary to correct confusing layouts."

PREVIOUS MITIGATION EFFORTS

Management at the Chino Airport has been working closely with FAA to identify problem areas on the airfield and to put together a strategy to mitigate those areas.

Enhanced Pavement Markings

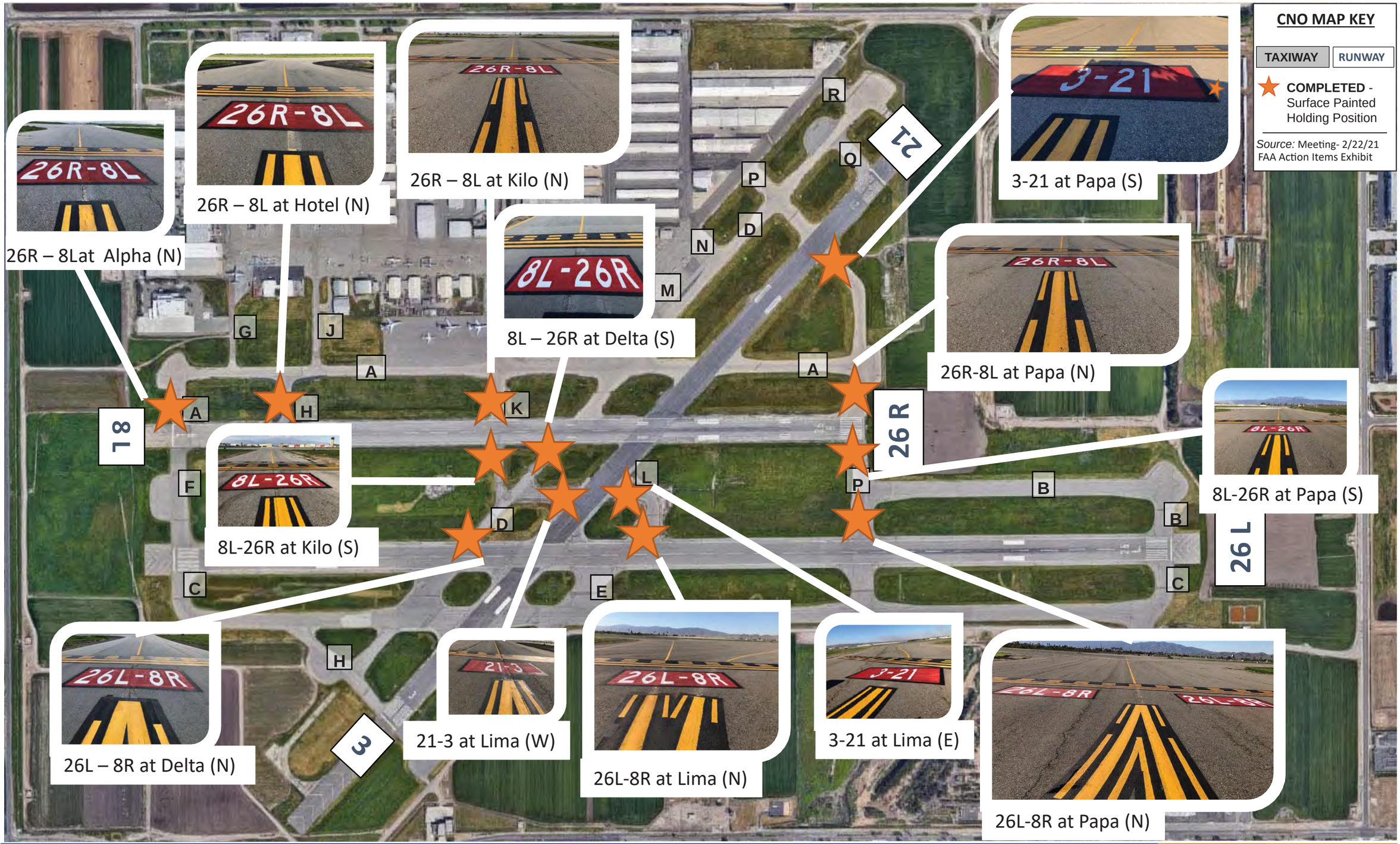
One of the strategies recommended and implemented was to update the on-pavement markings on most taxiways.

Exhibit GS7 shows the updated markings at the Airport. Several surface-painted holding positions have been installed. These new markings identify the holding position and the runway to which the pilot is approaching. In addition, enhanced lead-in lines have been installed on most taxiways leading to the hold position markings. Enhanced lead-in lines have been shown to improve pilots' situational awareness.

The Airport is also in the process of examining options to prevent aircraft from traversing from the north side apron and hangar area directly across Taxiway A and into the runway environment. One option is to install a "no-taxi island" on Taxiway K, on the north side of Taxiway A. The purpose of a "no-taxi island" is to force pilots to make a turn onto a parallel taxiway before making another turn toward the runway.

Taxiway K "No-Taxi Island"

Exhibit GS8 shows the first of two options for installing a "no-taxi island" on Taxilane K and rerouting it around the island, thus forcing pilots to turn onto Taxiway A before turning to the runway. The idea on this option is to make the turn in Taxilane K to be fully parallel to Taxiway A, and then it turns back to Taxiway A to intersect at a right angle. While these angles to the taxiway are in a somewhat tight space, the purpose is to give pilots full peripheral views.


CNO MAP KEY
TAXIWAY
RUNWAY
COMPLETED - Surface Painted Holding Position
Source: Meeting- 2/22/21 FAA Action Items Exhibit
26R – 8Lat Alpha (N)
26R – 8L at Hotel (N)
26R – 8L at Kilo (N)
8L – 26R at Delta (S)
3-21 at Papa (S)
26R-8L at Papa (N)
8L-26R at Papa (S)
8L-26R at Kilo (S)
26L – 8R at Delta (N)
21-3 at Lima (W)
26L-8R at Lima (N)
3-21 at Lima (E)
26L-8R at Papa (N)
18
21
26 R
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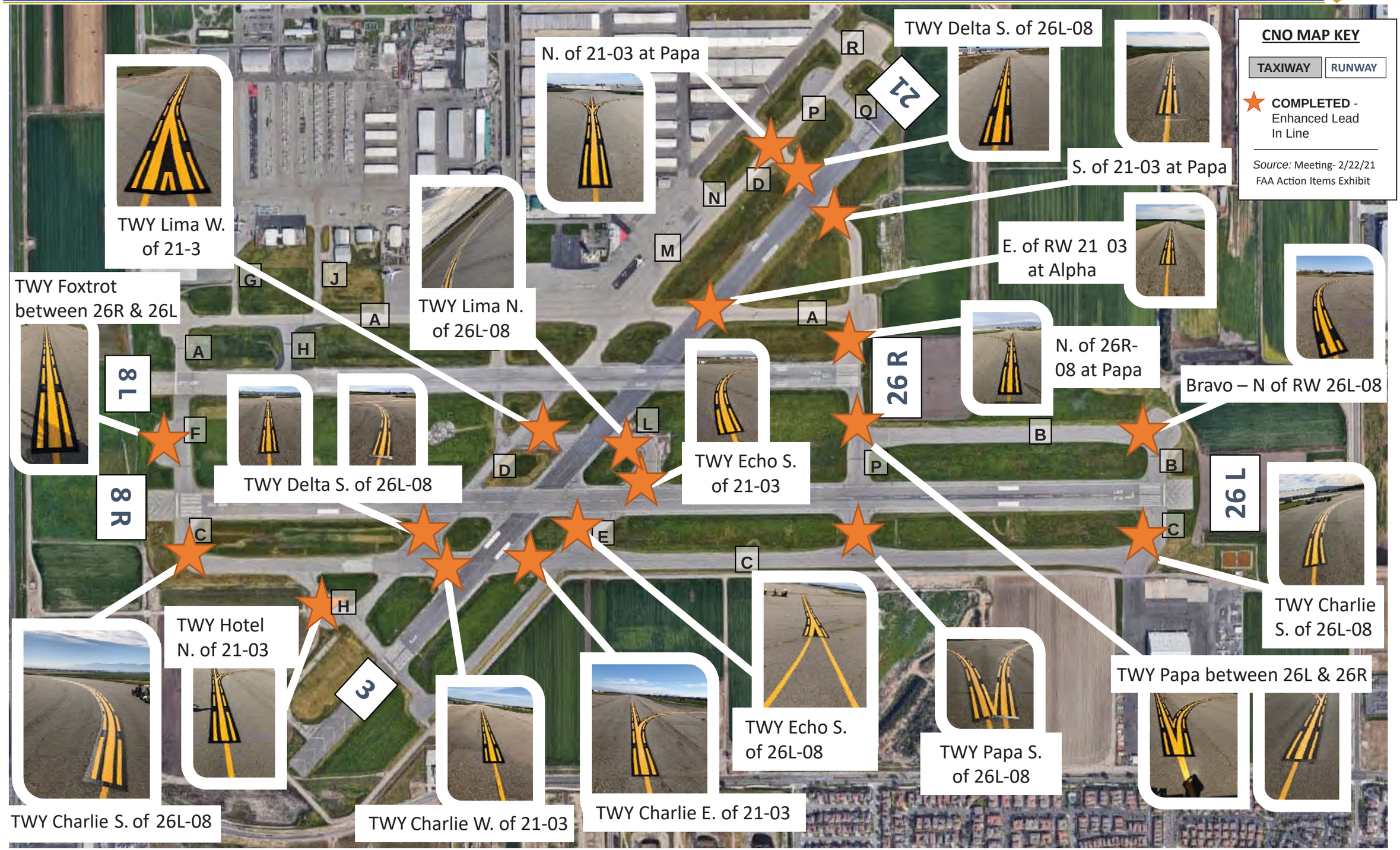
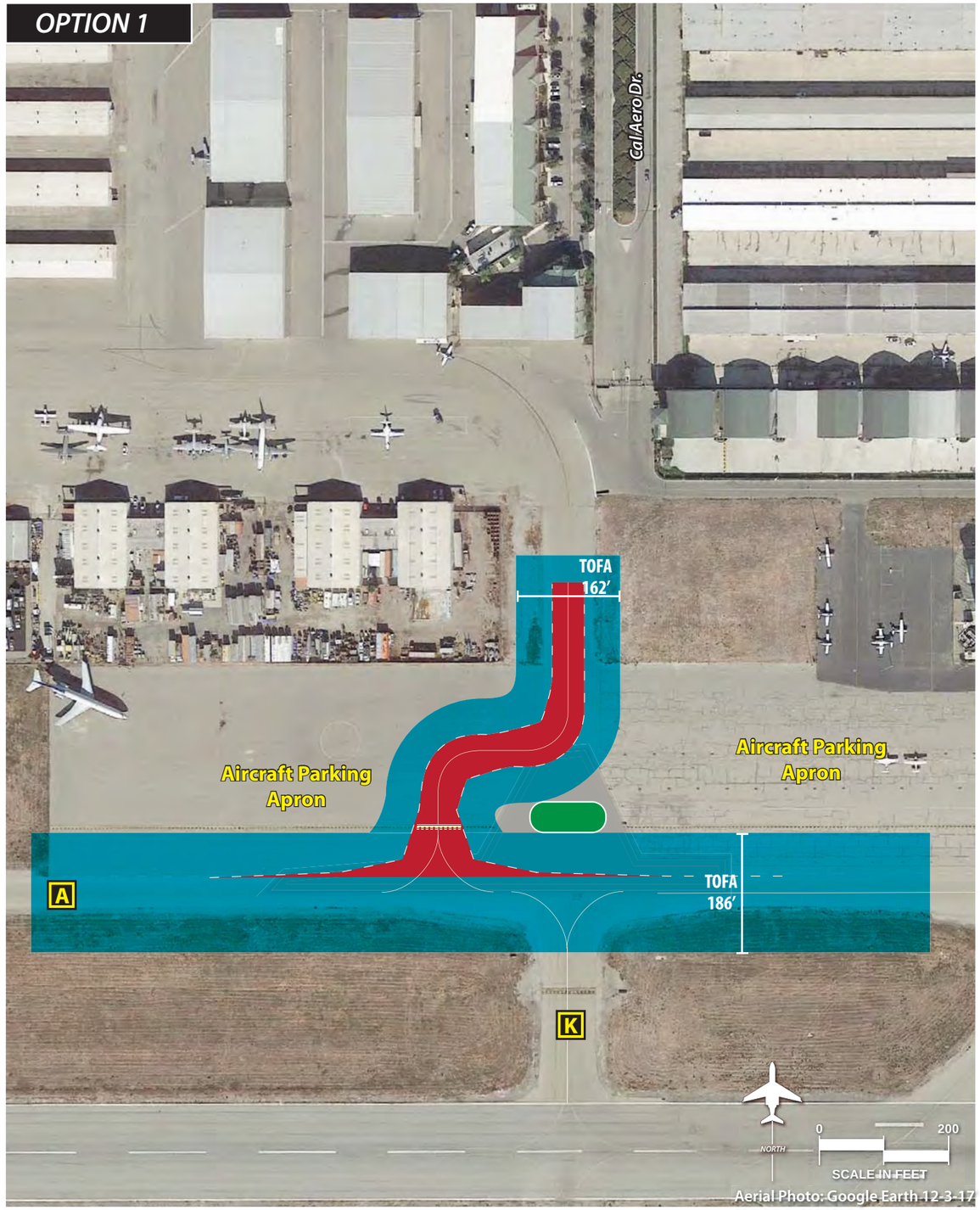

CNO MAP KEY
TAXIWAY
RUNWAY
COMPLETED - Enhanced Lead In Line
Source: Meeting- 2/22/21 FAA Action Items Exhibit
TWY Delta S. of 26L-08
N. of 21-03 at Papa
S. of 21-03 at Papa
TWY Lima W. of 21-3
TWY Lima N. of 26L-08
E. of RW 21 03 at Alpha
TWY Foxtrot between 26R & 26L
N. of 26R-08 at Papa
Bravo – N of RW 26L-08
TWY Delta S. of 26L-08
TWY Echo S. of 21-03
TWY Charlie S. of 26L-08
TWY Hotel N. of 21-03
TWY Papa between 26L & 26R
TWY Charlie S. of 26L-08
TWY Charlie W. of 21-03
TWY Charlie E. of 21-03
TWY Echo S. of 26L-08
TWY Papa S. of 26L-08
21
26 R
26 L
8 L
8 R
3

OPTION 1



Aerial Photo: Google Earth 12-3-17

OPTION 2

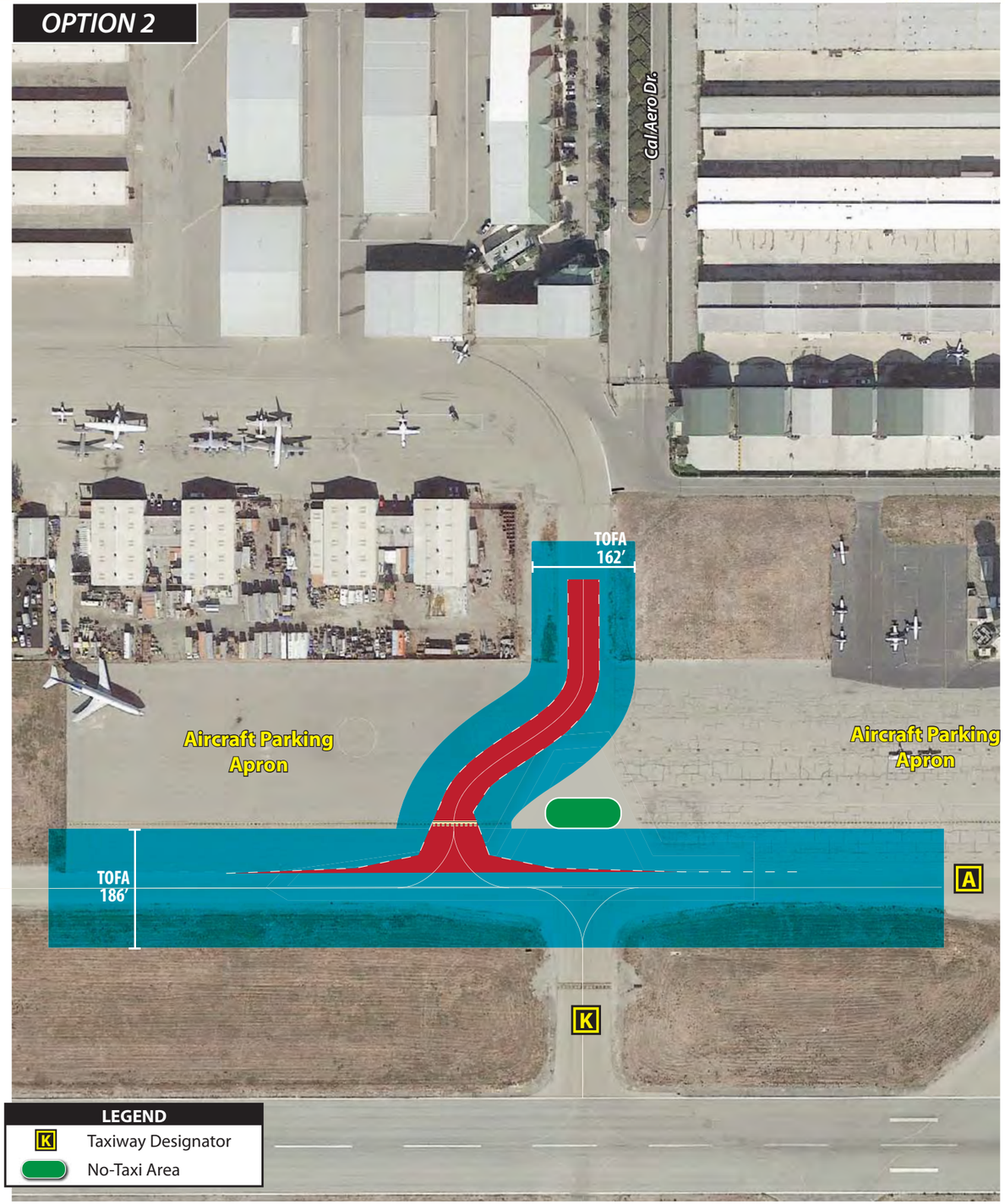


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Exhibit GS8 shows the second "no-taxi island" option where Taxilane K is rerouted at a more gradual curve until it intersects with Taxiway A.

Airport management is moving forward with a pavement marking project that will reflect relocating Taxilane K consistent with Option 2 shown on **Exhibit GS8**. This project will involve remarking the centerline of Taxilane K, installing a white dashed taxiway edge line and a "no-taxi island" to alert pilots to the need to make a turn.

Taxiway D Double Signs

To fully alert pilots taxiing on Taxiway D that they are approaching Runway 8L-26R, the runway identification signage was adjusted in 2017. A second sign was added on the north side of the runway resulting in two signs on either side of Taxiway D. These two runway identification signs were elevated to make them more visible. There is also a third runway designation sign on the south side of the runway adjacent to Taxiway D.

The purpose of these signage adjustments is to reinforce to pilots that they are approaching a runway and to, thus, mitigate the possibility of a pilot inadvertently entering the runway environment.

Surface-Painted Taxiway/Taxilane Directional Signs

These signs have a yellow background with a black inscription and are provided when it is not possible to provide the traditional taxiway directional sign at an intersection, or when necessary to supplement such signs. These markings are located adjacent to the taxiway centerline with signs indicating turns to the left being on the left side of the centerline and turns to the right being on the right side of the centerline.

Currently (June 2021), the airport is planning to install a surface-painted taxiway directional sign on Taxiway D, north of Taxiway A. A second surface-painted directional sign was planned on Taxilane K, north of Taxiway A; however, that plan has been changed to putting a jog in Taxilane K, north of Taxiway A.

Consideration has been given to adding several directional aids to Taxilane J, north of Taxiway A, to enhance pilots situational awareness when using Taxilane J. **Exhibit GS9** presents this concept. Two surface-painted taxilane directional signs were considered, as well as a surface-painted taxiway location marking on Taxilane J. A traditional raised and illuminated taxilane location sign was also planned. In addition, an enhanced taxilane hold position marking was considered immediately north of Taxiway A.

In August 2021, surface taxiway/taxilane markings were installed on taxilane J and Taxiways A and D. **Exhibit GS10** depicts these completed surface markings. These surface markings will quickly alert pilots to the taxiway/taxilane that they are on and the direction of the taxiway/taxilane.

ONGOING MITIGATION EFFORTS

The FAA and San Bernardino County have engaged in a productive partnership and RSAT (Runway Safety Action Team) program to identify safety concerns on the airfield and to implement projects to improve safety. This program has been ongoing since 2017. San Bernardino County airports staff and FAA meet monthly and hold a formal RSAT meeting twice a year. Throughout this process, safety issues and potential solutions are documented and implemented. The tracking system is updated after each meeting. **Appendix D** presents the RSAT Action Items summary tracking table updated as of March 29, 2021. The items related to airfield geometry are discussed in this report.

There are several areas on the airfield that are included in the FAA's RSAT program for Chino Airport. While resolution of some of the items on the RSAT list have been deferred until completion of this Airfield Geometry Study, some have already been resolved or are in process. All items in the master RSAT list in **Appendix D** are discussed in this narrative and are presented only as a snapshot of actions taken as of April 29, 2021.

ALTERNATIVES ANALYSIS

It is in the alternatives analysis where this study analyzes various viable methods to make the airfield safer and more intuitive to pilots. When one synthesizes the runway incursion data, the hot spot and RIM locations, and the areas where problems seem to recur, there are three focus areas:

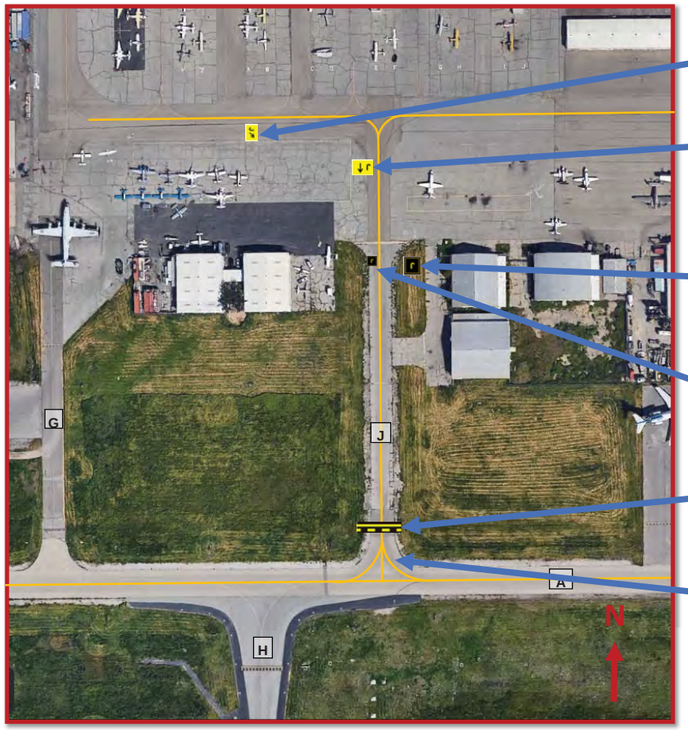
- Lining up to land on the wrong runway
- Taxiway P
- Taxiways D, K, and L between the runways

LINING UP TO LAND ON THE WRONG RUNWAY

For obvious reasons, it can be dangerous for a landing aircraft to line-up on the wrong runway. This has happened at CNO several times but only once did an approaching aircraft actually land on the wrong runway. All other times, the ATCT was able to intercept the approaching aircraft and provide instructions. One of the issues for pilots appears to be that they have difficulty distinguishing between the parallel runways.

There are several available navigational aids that have the effect of providing a distinction between runways. The following is a discussion of those that should be considered for installation at CNO.

Runway End Identifier Lights (REIL): REILs are strobe lights that are set to the sides of the runway landing threshold to allow pilots to quickly identify the runway end. The REIL lights can be seen up to 20 miles away. REILs are typically installed at airports without a control tower. They are also recommended for runways that accommodate regular use by business jets.



J ↗ SURFACE PAINTED TAXIWAY DIRECTION MARKING'S

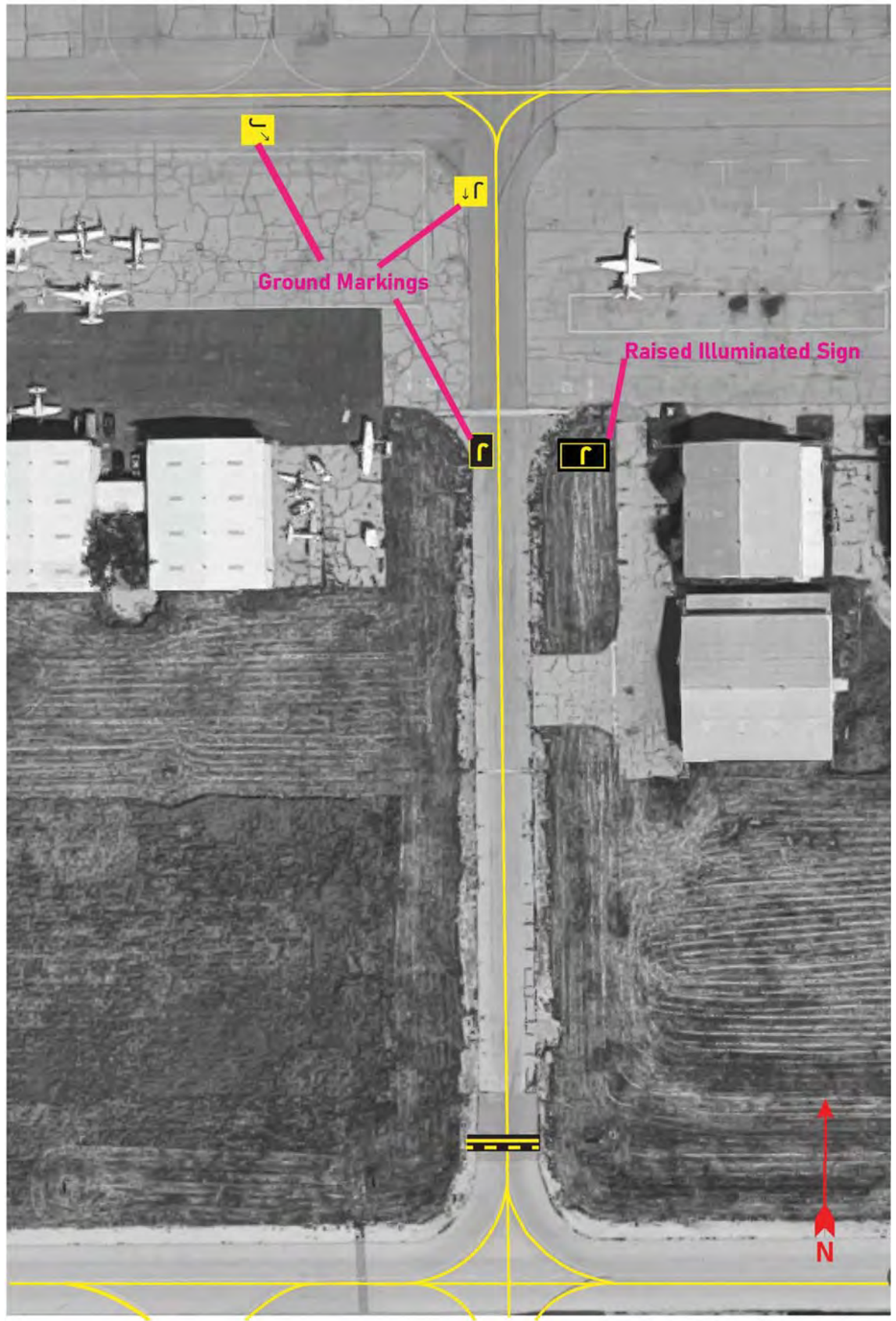
J ↑

J RAISED ILLUMIATED TAXIWAY LOCATION SIGN

J SURFACE PAINTED TAXIWAY LOCATION MARKING

ENHANCED TAXIWAY HOLD POSITION MARKING

REFRESHED LEAD IN LINES



Source: FAA Review 3-29-21

TWY Juliet
TWY Juliet
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TWY Delta (Alpha)
TWY Alpha (Delta)
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CNO MAP KEY
TAXIWAY
RUNWAY
COMPLETED – Surface Painted Holding Position
Chino Airport (CNO)
Meeting: August 9, 2021
FAA Action Items Exhibit

At present, both ends of Runway 3-21 are equipped with REILs. This is unusual since Runway 3-21 is the least used runway at the airport and the least likely to be utilized by business jet operators since these aircraft have faster approach speeds and can overcome crosswinds that may force smaller piston-powered aircraft to use the crosswind runway.

Installation of REILs to both ends of the parallel runways would be beneficial to the airport as it would be easier for pilots to quickly identify which runway they are aligned.

Approach Lighting System (ALS): Approach lighting systems (ALS) provide rapid pilot recognition of the proper runway alignment and runway end. An ALS is required if instrument approach visibility minimums are lower than ¾-mile and are recommended for visibility minimums below 1-mile. Runway 26R has an ILS approach with visibility minimums of ¾-mile, thus an ALS is not required but recommended.

As documented previously, there have been several incidents where pilots on approach have lined up to the wrong runway. It is, therefore, recommended that an ALS be considered for Runway 26R. Ideally, a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) would be installed, which provides both a runway alignment grid and threshold identification lighting. A MALSR is required for visibility minimums of lower than ¾-mile; however, the visibility minimums to Runway 26R are planned to be maintained at ¾-mile; therefore, other ALS types can be considered. For example, an Omni-Directional Approach Lighting System (ODALS) provides a linear sequence of light stands leading to the runway threshold and the flashing lights are sequenced to roll toward the threshold. A Medium Intensity Approach Lighting System (MALR) is an abbreviated MALSR that does not include the RAIL portion.

Change Runway Designations: One method for further distinguish parallel runways is to provide distinct runway designations. At Chino Runway 8L-26R would become simple Runway 8-26 and Runway 8R-26L would become Runway 9-27. Implementation of this method is rare and typically reserved for some of the busiest commercial service airports. Chicago O'Hare International Airport (ORD), Las Angeles International Airport (LAX), and Hartsfield-Jackson Atlanta International Airport (ATL) have distinct runway designations for parallel runways.

RUNWAY/TAXIWAY INTERSECTION ENHANCEMENTS

Runway Guard Lights (RGL): Often referred to as Wig-Wags, when provided, RGLs are installed at taxiway/runway intersections. They are primarily used to enhance the conspicuity of taxiway/runway intersections during low visibility conditions but may be used in all weather conditions. The system consists of a pair of unidirectional yellow lights which flash continuously and are positioned to each side of the taxiway at the marked and signed hold position. RGLs are most commonly found at commercial service airports but they can be beneficial at general aviation airports as an added measure of safety. Currently, there are no RGLs at CNO.

For general aviation airports, it could be beneficial to install RGL at historically problematic intersections. At CNO, the following intersections might be considered for RGL installation:

- Taxiway P on both sides of all three runways
- Taxiway K at all runway intersections
- Taxiway L at all runway intersections

Stop Bar Lights: A lighted stop bar consists of a row of unidirectional lights embedded in the pavement and spaced equally across the taxiway at the hold point. The lights will show red towards an approaching aircraft.

Stop bar lights may be considered in addition to RGL as an added measure of safety to enhance pilots' awareness and to reinforce that they are approaching a runway intersection.

AIRFIELD GEOMETRY ALTERNATIVES

As discussed, there are three particular locations on the airfield that have accounted for most of the runway events at CNO. They are:

- The complex intersection of Taxiways D, K, and L between the parallel runways -- an area that includes the crosswind Runway 3-21.
- The length of Taxiway P which crosses three runways.
- The direct access issue from Taxilane K, north of Taxiway A, where pilots can inadvertently proceed from the apron, across Taxiway A, and into the active runway environment.

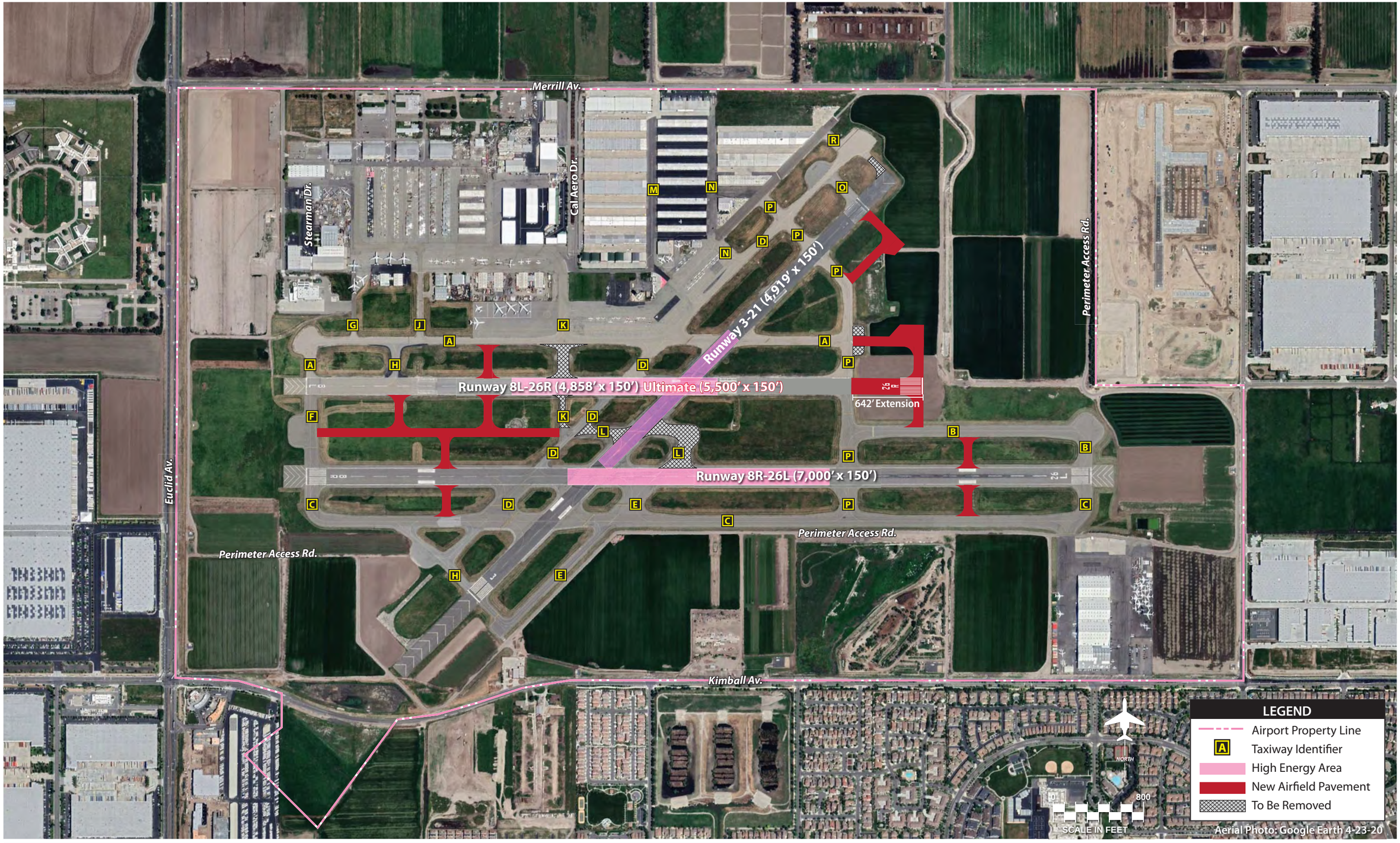
Airfield Geometry Alternative 1

Exhibit GS11 – Airfield Geometry Alternative 1 presents several taxiway geometry changes to address the areas that have proved to be confusing and problematic in the past. The following summarizes the potential geometry changes:

- Taxiway K is closed (removed) between Taxiway A and Taxiway L.
- Taxiway L is closed (removed) between Taxiway D and Runway 8R-26L.

A new set of taxiways is constructed to the west of Taxiway D to provide cross-field access:

- A partial parallel taxiway is extended between Taxiways D and F.
- Taxiway H is extended across Runway 8L-26R (outside the high-energy portion of Runway 8L-26R) and terminates at the new midfield partial parallel taxiway.
- A new taxiway extending from Taxiway A, across Runway 8L-26R, and terminating at the planned partial parallel taxiway between the runways (outside the high-energy portion of Runway 8L-26R), is added approximately 600 feet to the west of Taxiway K.
- A new taxiway connects the new partial parallel taxiway to Taxiway C, crossing Runway 8R-26L (outside the high-energy portion of Runway 8R-26L).


Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
642' Extension
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier
High Energy Area
New Airfield Pavement
To Be Removed
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Aerial Photo: Google Earth 4-23-20

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On the eastern end of the runway/taxiway system, the following improvements are considered:

- A new taxiway is depicted providing access to the Runway 21 threshold and connecting to Taxiway P. This taxiway will provide additional options for controllers to direct ground movements.
- Taxiway A is extended 642 feet to the east in conjunction with an extension of Runway 26R. This will provide additional options for controllers to direct ground movements.
- A new taxiway is planned to extend from Taxiway B to Taxiway C, across Runway 8R-26L (outside the high-energy portion of Runway 8R-26L). This taxiway is equidistant between Taxiway P and the Runway 26L threshold. This taxiway provides additional ground movement options for controllers and an additional exit for aircraft landing Runway 8R.

Airfield Geometry Alternative 2

Exhibit GS12 – Airfield Geometry Alternative 2 presents several taxiway geometry changes to address the areas that have proved to be confusing and problematic in the past. The following summarizes the potential geometry changes:

- Taxiway K is closed (removed) between Taxiway A and Taxiway L.
- That portion of Taxiway L running parallel to the runways is closed (removed). The remaining portion of Taxiway L is to remain in place.

A new set of taxiways is constructed to the west of Taxiway D to provide cross-field access.

- A partial parallel taxiway is extended from Taxiway F for a length of approximately 1,500 feet. This partial parallel taxiway does not connect to Taxiway D.
- Taxiway H is extended across Runway 8L-26R (outside the high-energy portion of Runway 8L-26R) and terminates at the new midfield partial parallel taxiway.
- A new taxiway extending from Taxiway A, across Runway 8L-26R, and terminating at the planned partial parallel taxiway between the runways (outside the high-energy portion of Runway8L-26R), is added approximately 800 feet to the west of Taxiway K.
- A new taxiway connects the new partial parallel taxiway to Taxiway C, crossing Runway 8R-26L (outside the high-energy portion of Runway 8R-26L).

The difference between Alternative 2 and Alternative 1 in this area is that the partial parallel taxiway does not extend to Taxiway D in an effort to avoid an angled intersection with Taxiway D.

On the eastern end of the runway/taxiway system, the following improvements are considered:

- Taxiway E is extended to the Runway 21 threshold, creating a full-length parallel taxiway on the east side of the crosswind runway. That portion of Taxiway L extending north from Runway 8R-26L would become part of Taxiway E.

- Taxiway Q is planned to be extended through the Runway 21 threshold and onto the Runway 26R threshold.
- Taxiway P is planned to be closed (removed) from the intersection with Taxiway D to Taxiway B. Removal of this portion of Taxiway P would force pilots to use new threshold Taxiway Q, thus providing greater situational awareness.
- Taxiway A is extended 642 feet to the east in conjunction with an extension of Runway 26R. This will provide additional options for controllers to direct ground movements.
- A new taxiway is planned to extend from Taxiway B to Taxiway C, across Runway 8R-26L (outside the high-energy portion of Runway 8R-26L). This taxiway is equidistant between Taxiway P and the Runway 26L threshold. This taxiway provides additional ground movement options for controllers and an additional exit for aircraft landing Runway 8R.

Airfield Geometry Alternatives Summary

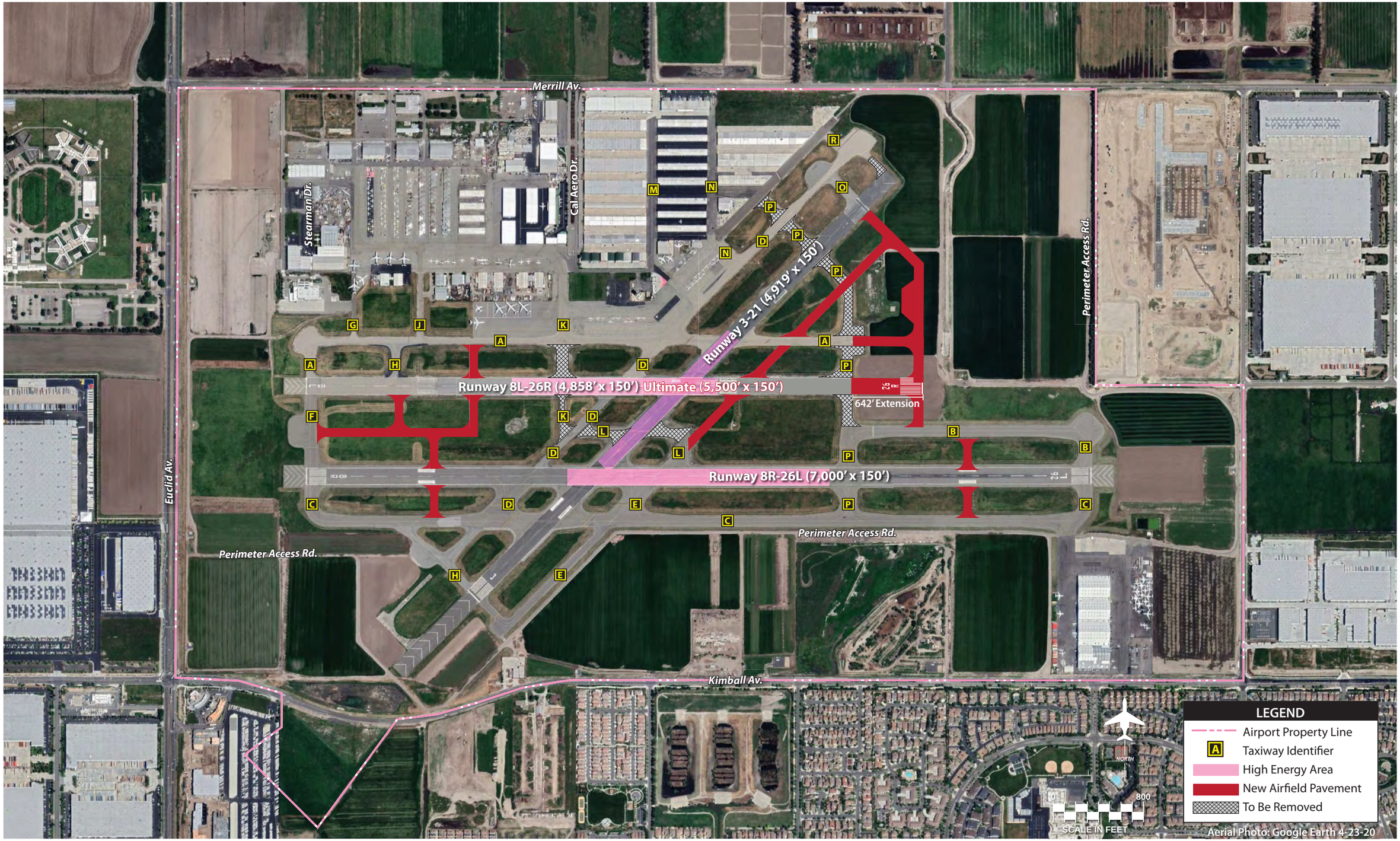
Two exhibits have been presented showing potential geometry changes to consider which would improve the safety of ground movements on the airfield. The most problematic area on the airfield is the complex interchange of Taxiways K, L, D, and Runway 3-21. The alternatives consider closing Taxiways L and K and adding new taxiways to the east and west to provide the necessary taxiway circulation. Closing Taxiway K would eliminate the direct access issue and a runway crossing in the high-energy portion of Runway 8L-26R. Taxiway L is also closed (removed), which would also eliminate a taxiway crossing of the high-energy portion of Runway 3-21.

It is noted that neither of the alternatives considers construction of a full-length parallel taxiway between the parallel runways. Full-length parallel taxiways between runways have led to an increase in wrong surface landing alignment and occasional landings to a taxiway at other airports. It is believed that the appropriate taxiway circulation can be provided without the need for such a full-length parallel taxiway between runways.

On the east end, the potential extension of Runway 26R could prove beneficial to reducing runway incursions because Taxiway P would no longer also serve as the threshold taxiway to the runway. Controllers could use the new threshold taxiways to route pilots around the problematic Taxiway P intersection. One of the alternatives considers closing (removing) portions of Taxiway P, thus forcing additional pilot turns and improving situational awareness.

POTENTIAL PAVEMENT MARKING IMPROVEMENTS

There are large portions of the north side apron that abut Taxiways A and D. In some cases, this geometry can lead to aircraft entering the movement area (the taxiways) directly from the apron without tower authorization. There is a Non-Movement Area Boundary marking on the apron, which is a solid yellow and a dashed yellow on a black background.


Merrill Av.
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Cal Aero Dr.
Perimeter Access Rd.
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
642' Extension
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier
High Energy Area
New Airfield Pavement
To Be Removed
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If there is a persistent problem of pilots crossing the non-movement boundary without tower clearance, then one option is to paint "no-taxi" islands as depicted on **Figure GS3**. While the figure shows completed green islands from the edge of Taxiways A and D to the edge of the TOFA, often this marking is only along the outer edge for a depth of two feet (see examples on exhibit GS5) and includes taxiway edge lighting or reflectors. This marking is somewhat invasive as it forces pilots to taxi to a taxilane to enter the taxiways and it would reduce options available to controllers to authorize pilots to proceed to the taxiways from the apron directly.

Figure GS3 – Apron Island Marking Alternative

SUMMARY LIST OF ACTIONS/ALTERNATIVES FOR CONSIDERATION

Table GS7 presents a summary of potential actions that the airport could take to improve pilot situational awareness and reduce runway incursions. Each of these was presented in greater detail previously in this study. The table also summarizes certain potential taxiway closures to achieve the same objectives.

Consideration of closing any taxiways should be undertaken in conjunction with the necessity of maintaining or improving ground movements by constructing alternate taxiways. The closure of any taxiway segment must include a discussion of what new taxiways to add to maintain that efficiency. For example, the alternatives include closure of both Taxiway K and Taxiway L, which are those taxiways passing through the mid-field where there have been persistent issues with runway incursions. Closing these taxiways would significantly reduce the current flexibility that tower personnel have to route aircraft off the runway quickly, thus increasing runway capacity. If these taxiways are closed, then replacement taxiways should be constructed to the east and west of this mid-field area.

The same issue applies to Taxiway P, which is shown to be closed at certain areas to reduce runway incursions. Several options were presented to construct new taxiways (extension of Taxiway E to Runway 21 threshold and extension of Taxiway Q through the Runway 21 threshold and onto the threshold of Runway 26R [as extended]). These issues should be coordinated so that the closure of any segment of Taxiway P does not inadvertently create undue airfield congestion.

TABLE GS7 | Summary of Mitigation Methods
Chino Airport

Location	Description	Proposed Mitigation
Taxilane J	Increase usage of Taxilane J over Taxilane K because it terminates at Taxiway A where Taxilane K does not terminate at Taxiway A, allowing for inadvertent encroachment of the runway environment.	Install surface-painted and elevated taxilane signage to support Taxilane J. (**Exhibit GS9**)
Runway 26R	Aircraft occasionally line up for landing to the wrong runway.	Install approach lighting system on the approach to Runway 26R.
Runway 8L-26R & Runway 8R-26L	Aircraft occasionally line up for landing to the wrong runway.	Install runway end identification lights (REILs) to provide quick identification of the runway ends.
Taxiway P	Taxiing pilots inadvertently cross hold bars, thus entering the runway environment without clearance.	Install runway guard lights (RGL) and/or stop bar lights.
Taxiway K	Taxiing pilots inadvertently cross hold bars, thus entering the runway environment without clearance.	Install runway guard lights (RGL) and/or stop bar lights.
Taxiway L	Taxiing pilots inadvertently cross hold bars, thus entering the runway environment without clearance.	Install runway guard lights (RGL) and/or stop bar lights.
Taxiway A&D/ North Apron	Pilots sometimes inadvertently cross the non-movement area boundary line on the north apron.	Paint area between Taxiway A/D and apron as non-movement.
GEOMETRY SOLUTIONS[1]		
Taxiway K	Taxiing pilots inadvertently cross hold bars, thus entering the runway environment without clearance.	Close Twy K south of Twy A.
Taxiway L	Taxiing pilots inadvertently cross hold bars, thus entering the runway environment without clearance.	Close Twy L completely.
Taxiway P	Taxiing pilots inadvertently cross hold bars, thus entering the runway environment without clearance.	Close Taxiway P between Taxiways A and B.

[1]Closure of any taxiways may require construction of other taxiways to maintain ground movement efficiency.

The feasibility of adding a full-length parallel taxiway between the parallel runway was presented. While this type of geometry was common in the past, today the concern is that such parallel taxiways may cause confusion for pilots, causing them to line up to land on the taxiway. Therefore, it is recommended that a full-length parallel taxiway between the parallel runway be avoided and only those segments of a parallel taxiway be considered to provide for efficient ground movements and to replace efficiency lost if other taxiways (e.g., Taxiways K and L) are closed.

The plan includes a 642-foot extension of Runway 8L-26R for a total length of 5,500 feet. Analysis in the master plan (being undertaken concurrently with this study) indicated that this is the minimum recommended length for this runway to accommodate the critical aircraft. The runway extension should also be considered a safety project because it would create more differentiation between the runways and would separate taxiing aircraft onto different taxiways so that not everyone has to use Taxiway P.

Runway end identifier lighting (REIL) consists of two synchronized flashing unidirectional lights, one on each side of the threshold. REILs provide rapid and positive identification of the end of the runway. REILs are considered for both ends of the parallel runways (crosswind Runway 3-21 is already equipped with REILs) to further differentiate the runways.

To further differentiate the Runway 26 ends of the parallel runway, an approach lighting system is considered for Runway 26R. This is the ILS approach end and would benefit from an ALP also.

The airport has undertaken an extensive pavement marking regiment to further identify various taxiway segments to pilots. Additional pavement marking and signage is considered for Taxilane J as more aircraft movements are anticipated on this taxilane as controllers use it more to relieve Taxilane K.

Currently, the north apron abuts Taxiways A and D. Current design standards promote a distinct separation between aprons and taxiways so that pilots can't easily and inadvertently proceed from the apron into the movement area without tower clearance.

Taxilane K on the north apron is currently planned to be shifted with a jog before its intersection with Taxiway A. This will be a paint-only project. If that portion of Taxiway K south of Taxiway A is closed, then Taxilane K can be returned to the more traditional "T-shape" intersection with Taxiway A.

Finally, the analysis to be conducted in this study falls into the following four broad categories:

1. Physical reconfiguration of airfield pavement and facilities;
2. New or revised pavement markings, signage, and lighting;
3. New or revised operational procedures; and
4. New or revised MOS.

Alternatives for categories 1 and 2 have been presented. In regard to categories 3 and 4, the planning consultant does not see a need for any revised operational procedures beyond what the tower is currently doing or any new or revised Memorandum of Understanding between the tower and the airport.

IMPLEMENTATION PLAN AND ENVIRONMENTAL ANALYSIS

The previous elements of this study were reviewed by airport staff in consultation with the airport planning consultant and a preliminary airfield geometry plan has been developed, which is presented on **Exhibit GS13 – Preliminary Airfield Geometry Plan**. The preliminary plan includes elements from both Airfield Geometry Alternative 1 and 2 previously presented on Exhibits GS11 and GS12.

The preliminary airfield geometry plan addresses both the Hot Spots and the RIM locations (reference Exhibit GS3) in the following manner:

Hot Spot 1: Pilots taxiing south on Taxiway D sometimes fail to turn onto Taxiway A and inadvertently proceed into the Runway 8L-26R environment. The airport administration has addressed this issue by installing surface-painted taxiway signage on both Taxiway D and Taxiway A (reference Exhibit GS10). Airport management and tower personnel will continue to monitor movements in this area to see if issues persist.

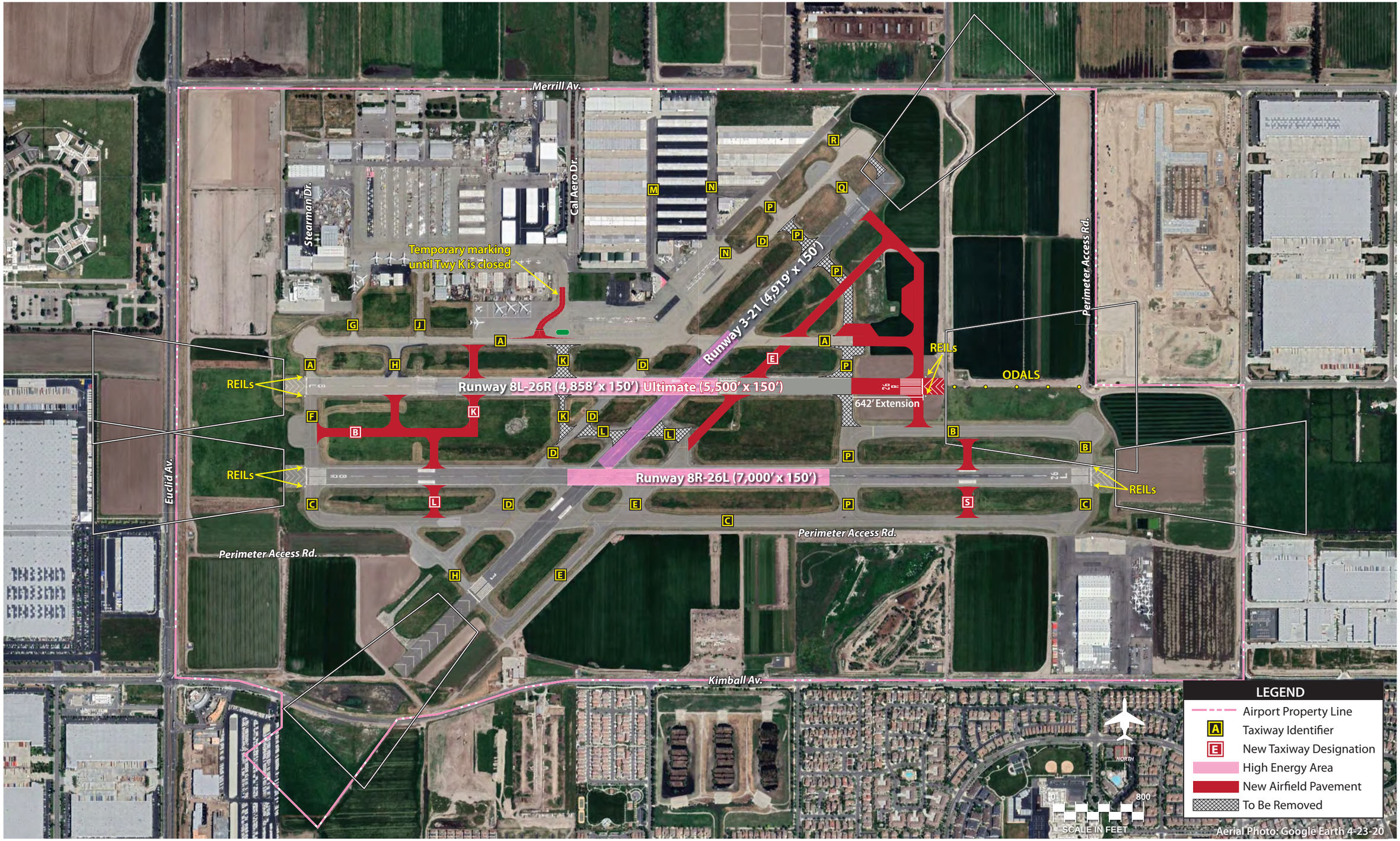
Hot Spot 2: Pilots taxiing west of Taxiway L sometimes turn onto Runway 3-21 by mistake. The issue here is that occasionally a pilot taxiing on Taxiway L (east side of Runway 3-21) would turn north on to Runway 3-21 when instructed to turn north onto Taxiways D or K. The airport has taken action by removing the taxiway centerline that curved from Taxiway L north onto Runway 3-21. Feedback from tower personnel is that this simple action has greatly reduced the number of occasions when pilots inadvertently make this turn onto the runway.

Hot Spot 3: Pilots taxiing south on Taxilane K (north of Taxiway A) sometimes fail to turn onto Taxiway A and proceed into the Runway 8L-26R environment, potentially causing a runway incursion. Because this is a persistent issue, both a short-term and long-term solution have been developed. First, airport administration is currently planning to implement Option 2 from Exhibit GS8. This option re-routes Taxilane K so that the intersection with Taxiway A will force pilots to turn onto Taxiway A. Ultimately, Taxiway K, south of Taxiway A, is planned to be removed from service completely, which will also force pilots to turn onto Taxiway A.

Hot Spot 4: This is a complex intersection where pilots sometimes turn onto the wrong taxiway, proceed across hold markings, and enter the runway environment inadvertently. Ultimately, Taxiways K and L between the runways are planned to be removed from service thus eliminating the potential confusion.

RIM 1 and 2: There have been persistent issues with Taxiway P as pilots sometimes inadvertently proceed into the runway environment without clearance. Tower personnel have indicated that the geometry of Taxiway P, providing a "straight shot" to the runways, contributes to pilot confusion. Several mitigating options were considered, including the installation of Runway Guard Lights (Wig-Wags) and Stop Bar Lights. While these options would raise pilot awareness of their approach to a runway and may be considered as a shorter-term solution, ultimately Taxiway P is planned to be removed between Taxiway A and Taxiway B eliminating the crossing of both runways.

RIM 3: On occasion pilots will line up to land on the wrong runway, which is a persistent problem at CNO. Several mitigating options have been considered, including installing Runway End Identification Lights (REILs), changing the runway designations, and installing an approach lighting system on one of the runways. It is recommended that REILs be installed on both ends of Runway 8R-26L and on the Runway 8L end. An approach lighting system is planned to be installed on the Runway 26R end. These navigational lighting systems will provide pilots with rapid recognition of the runway ends and with only one runway having an approach lighting system, rapid identification of the correct runway. Runway 26R was selected to have the approach lights because this runway currently provides the only instrument approaches to the airport and the most sophisticated approach is the ILS approach with visibility minimums of ¾-mile. Approach lighting systems are recommended by the FAA (reference FAA AC 150/5300-13A, *Airport Design*, Table 3-4) when visibility minimums are below 1-mile and are required


Merrill Av.
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Temporary marking until Twy K is closed
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Taxiway Identifier
New Taxiway Designation
High Energy Area
New Airfield Pavement
To Be Removed
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when visibility minimums are lower than ¾-mile. Several approach lighting system types will provide the necessary rapid recognition of the proper runway alignment, including a simple Lead-in Lighting System (LDIN), Omnidirectional Airport Lighting System (ODALS), and the more sophisticated Medium Intensity Approach Lighting System (MALS) or a MALSR (a MALS with additional Runway Alignment Indicator Lights – RAILs). Since visibility minimums are planned to remain no lower than ¾-mile, the ODALS is recommended (lower than ¾-mile visibility minimums require the MALSR). The ODALS system includes REILs. A MALS is not considered because of the proximity of the Taxiway B object free area which would be encroached by one of the light stands.

RIM 4: The geometry of Taxiway L between Runways 3-21 and Runway 8R-26L can cause pilot confusion and lead to inadvertent entry into the runway environment. This area coincides with Hot Spot 2 as well. The removal of the taxiway centerline leading from Taxiway L to Runway 3-21 has reduced inadvertent turns onto the runway. The geometry solution recommended is to remove Taxiway L from service (only a small portion of Taxiway L connecting to Runway 8R-26L will remain, and it will be converted to Taxiway E and serve as the full-length parallel taxiway to Runway 3-21 to improve ground movement efficiency when Taxiways K and L are closed.

RIM 5: The geometry at the convergence of Taxiways K, L, and D can cause pilot confusion and lead to inadvertent entry into the runway environment. This RIM location coincides with Hot Spot 4 as well. The geometry solution recommended is to remove Taxiways K and L in this area, leaving the more familiar parallel taxiway configuration of Taxiway D.

RUNWAY EXTENSION CONSIDERATION

Previous airport planning efforts, including the current master plan project, have long indicated that Runway 8L-26R is shorter than recommended. Runway length analysis in the master plan indicates that the minimum recommended runway length is 5,500 feet. The current ALP for CNO depicts a runway extension to the east that will bring the total length to 5,500 feet. Consideration of taxiway geometry improvements must consider the possibility that Runway 8L-26R will be extended.

TAXIWAY CONFIGURATION CONSIDERATIONS

Several new taxiways are planned to improve the efficiency of aircraft ground movements, reduce the potential for runway incursions, and to replace taxiways that are planned to be removed from service (Taxiways K, L, and portions of P).

Consideration was given to extending Taxiway B west to Taxiway F, creating a full-length parallel taxiway between the parallel runways. Often this concept is implemented to improve ground movement efficiency; however, it can also lead to pilots lining up and landing on taxiways. As a result, more extensive analysis was undertaken to determine which segments of the parallel taxiway between the runways would achieve the same movement efficiency, while not creating the potential hazard of taxiway landings.

To the west of Taxiway K, several new taxiways are planned to allow for rapid exit from the runways (improving airfield capacity) and to provide options for crossing the runways. All new runway crossings are strategically located outside the high-energy portion of the runways (the middle third of the runway), where aircraft are typically operating at higher speeds and less capable of avoiding a collision. A parallel taxiway segment is planned to extend from Taxiway F for a length of approximately 1,300 feet. From this taxiway segment, two taxiways are planned to connect to Taxiway A and one taxiway segment is planned to connect to Taxiway C. This taxiway geometry will replace runway crossing movements that currently utilize Taxiways K and L.

Taxiway E is planned to be extended to the Runway 21 threshold, providing a full-length parallel taxiway to Runway 3-21. Parallel taxiways are a familiar geometry for pilots, which should reduce the potential for pilot confusion when taxiing.

Taxiway P is planned to be closed between Taxiways A and B. Most runway incursions and runway events at the airport have been associated with Taxiway P. A new taxiway geometry will replace the functionality of Taxiway P. Taxiway Q is planned to be extended across the threshold of Runway 21 and then continue onto the new threshold of Runway 26R. By locating the primary runway crossing taxiways at the runway thresholds, pilots will see the runway designation markings and quickly realize they are approaching a runway. Consideration may also be given to installing Wig-Wags on the new taxiway segment leading to the Runway 8L-26R threshold, but that is not a specific recommendation at this time.

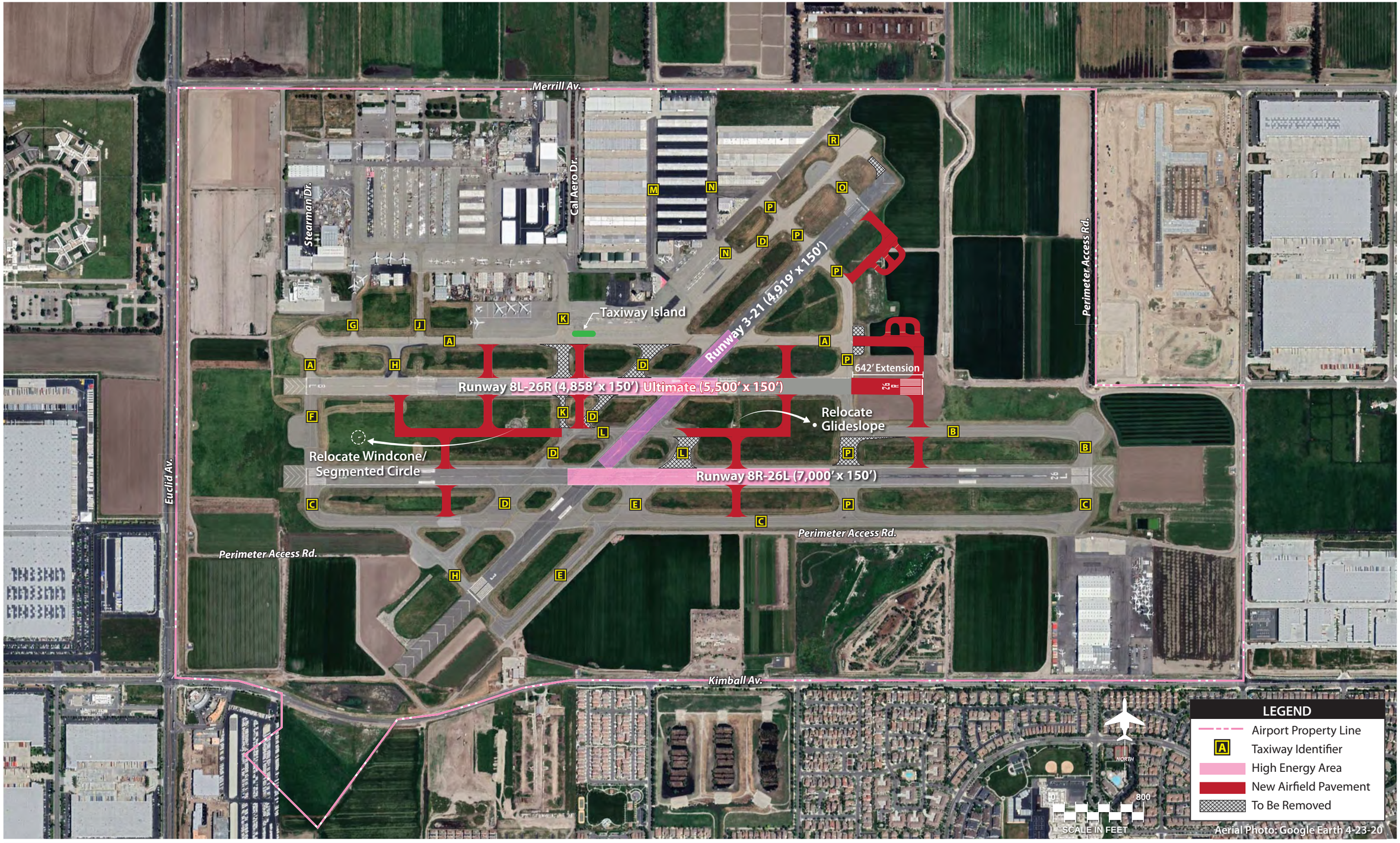
The distance from the Runway 26L threshold to the first taxiway exit is approximately 2,100 feet. This is a long distance between exits as aircraft will remain on the runway, reducing overall capacity of the airfield. A new taxiway exit is planned midway between Taxiway P and the Runway 26L threshold.

FINAL AIRFIELD GEOMETRY PLAN

In August 2021, a draft of this study was provided to FAA for review and comment. In early August 2022, a Zoom call was held in which FAA provided a detailed presentation of their review. Later in August 2022, FAA summarized their comments in written form and included a sketch of their geometry recommendations (See **Appendix E**).

Exhibit GS14 – Final Airfield Geometry Plan, incorporates the FAA recommendations. The following describes the reasoning behind each planned taxiway improvement.

1. That portion of Taxiway L that extends from Runway 8R-26L to the midfield partial parallel taxiway (also designated Taxiway L) is a wide expanse of pavement and is not a uniform and standard width. This taxiway segment is to be removed and replaced with a new taxiway positioned to the east. The new taxiway would extend from Taxiway C, through Runway 8R-26L and connect with an easterly extension of the midfield partial parallel taxiway (Taxiway L). This new taxiway will provide an appropriate exit from Runway 8R-26L; however, it is not to be used for crossings of Runway 8R-26L when this runway is in use.


Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Taxiway Island
Runway 3-21 (4,919' x 150')
642' Extension
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
Relocate
• Glideslope
Relocate Windcone/
Segmented Circle
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier
High Energy Area
New Airfield Pavement
To Be Removed
NORTH
0
800
SCALE IN FEET
Aerial Photo: Google Earth 4-23-20

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2. That portion of Taxiway D that extends form the intersection with Taxiway L to Taxiway A is planned to be removed. This will address Hot Spots 1, 3, and 4.
3. The midfield partial parallel taxiway (Taxiway L) is planned to be extended to the east. The new taxiway described in #1 above will connect to this extension. The midfield partial parallel taxiway will extend slightly further to the east and connect with a new north/south taxiway that crosses Runway 8L-26R at a 90-degree angle and connects with Taxiway A. the midfield partial parallel taxiway extension will not connect with Taxiway B. This geometry will add needed traffic flow options to prevent bottlenecks at several locations and the middle third Runway 26R crossings.
4. Add a new taxiway, just east of and parallel to current Taxiway K. This new taxiway will extend from midfield partial parallel Taxiway L north to Taxiway A. This taxiway is critical for exiting Runway 8L-26R and for taxi route for Runway 3 operations. Without this new taxiway, Runway 8L-26R occupancy times would increase causing go-arounds and adding other complexities to the operation. This proposed taxiway is important to reducing taxi complexity and workload for both ATCT personnel and pilots.

These first four recommendations include two new taxiways that will cross the middle third of both parallel runways. While FAA acknowledges that this is not desired, it is necessary due to the critical operational need by ATCT personnel. Hence, these two crossing taxiways are a compromise between the ATCT personnel and the FAA Airports District Office (ADO) that is responsible for implementing standards for airfield geometry.

The ADO and ATCT have agreed to this new taxiway geometry contingent upon implementation of the following mitigation strategies:

- Currently all aircraft exiting Runway 8R-26L cross Runway 8L-26R at Taxiways K and D (Hot Spots 1,3, 4) primarily due to Taxiway P being restricted per SOP for Runway 3-21 crossing and no taxiway connectors available east of Runway 3-21 between the parallel runways. The first mandated mitigation is to allow the use of Taxiway P for Runway 3-21 crossings which will require updating the SOP.
- The second mandated mitigation is for ATCT personnel to change to use the other proposed Runway 8L-26R taxiway crossings to the maximum extent possible to avoid crossing at the middle third of the runways.
- The third mandated mitigation is to install a “no-taxi island” immediately north the proposed taxiway that is immediately east of current Taxiway K. This will remove direct access from the ramp to Runway 8L-26R.
- The fourth mandated mitigation is to install both in-ground and elevated runway guard lights on both sides of Runway 8L-26RL on the new taxiway planned immediately east of existing Taxiway K.
- The fifth mandated mitigation is to install stop bar lights on both sides of Runway 8L-26R on this taxiway.
- Remove that portion of Taxiway P between Taxiway B and Runway 26L. This removes the potential RSA violation that may occur from aircraft missing the left turn onto Taxiway B while southbound on Taxiway P (also addresses an existing RIM location – CNO-05).

- Addition of taxiway from the approach end of Runway 26R southbound across Taxiway B to Runway 26L. This planned taxiway is a critical need for operational efficiency. This pavement will only be used for aircraft that RY 26R LC will pre-coordinate a departure from RY26L with. It will be used strictly for aircraft that are holding short of RY 26R and need to be crossed for immediate departure on RY 26L at that intersection.
- Removal of new proposed taxiway south of Taxiway Bravo across Runway 26L between Taxiway C and P (reference Exhibit GS13). This taxiway addition is not operationally needed.
- Removal of the portion of the proposed extension to Taxiway Lima West of Taxiway H (reference Exhibit GS13). It was determined that the addition of this taxiway would not be beneficial for the flow of traffic and is hoped the removal will lesson wrong surface confusion by pilots incorrectly identifying it as Runway 8R.

TAXIWAY NAMING CONVENTION

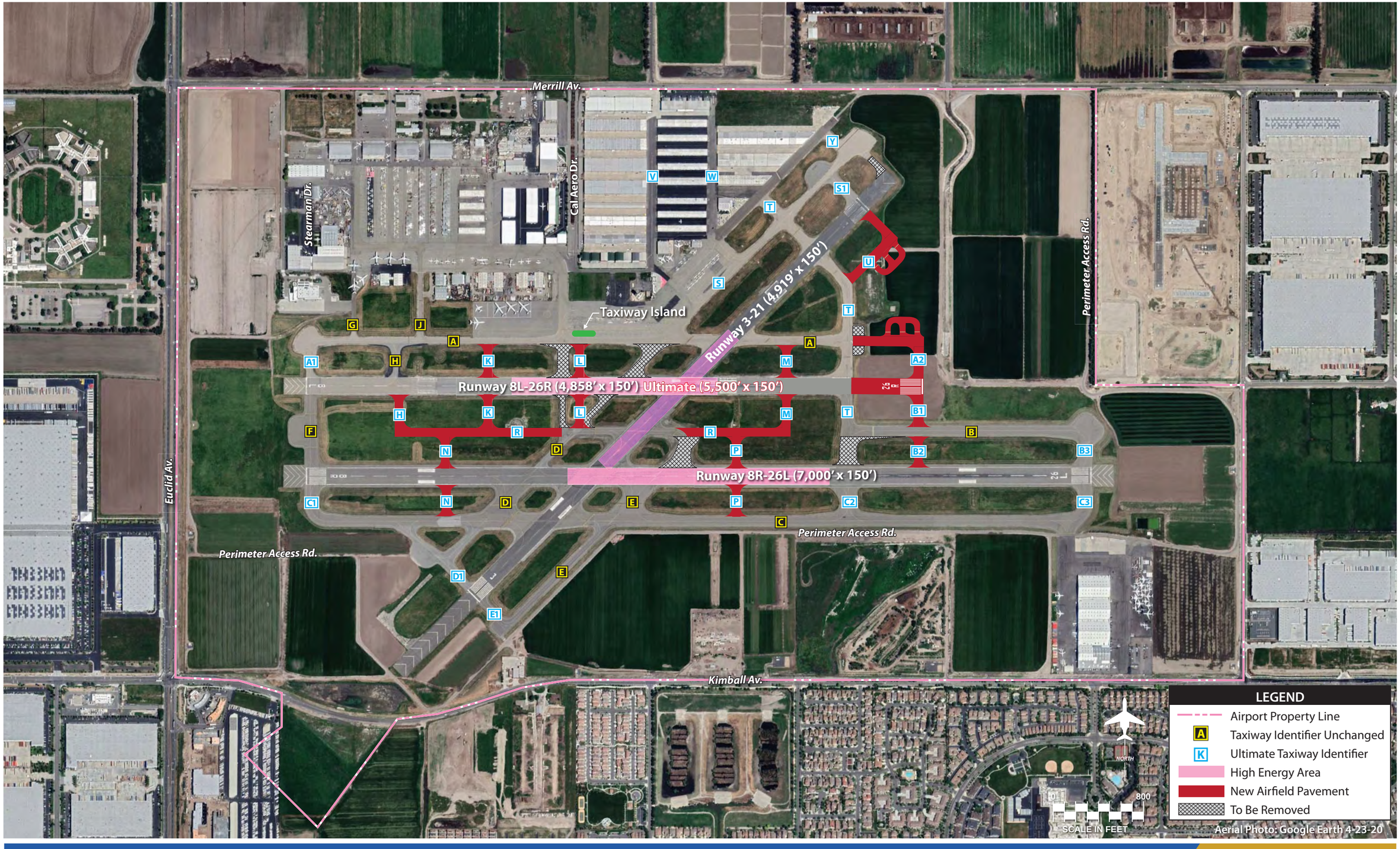
The current taxiway designations at CNO are not consistent with taxiway designation guidelines outlined in FAA AC 150/5340-18G, *Standards for Airport Sign Systems*. Per the standards, a runway with a parallel taxiway, should use alphanumeric designators at the entrance and exit taxiways located at the ends and along the runway. Apply an increasing, sequentially numbered pattern from one runway end to the other runway end, such as A1, A2, A3, A4, and A5. (Reference: FAA Advisory Circular (AC) 150/5340-1G, 1.4). High activity taxiways, including taxiways parallel to runways and certain runway-crossing taxiways, should have a dedicated alphabet letter. **Exhibit GS15 – Potential Taxiway Designations**, is one example of a taxiway naming convention that meets standard. There may be other taxiway naming conventions but this one would meet the standards.

RUNWAY 26R EXTENSION

The FAA noted in their recommendations (**Appendix E**) that the planned extension of Runway 26R may introduce obstacles to the RSA. They indicate that any proposed extension will require an RSA determination and detailed alternatives review. The current draft Master Plan (2022) and the previous Master Plan, vetted alternatives related to the proposed extension of Runway 26R. The planned solution is to provide an RSA that meets design standards by removing any obstacles.

PROJECT LIST

The final element of this geometry study is to develop a list of projects to accomplish the goal of reducing runway incursions and runway events at Chino Airport. The following describes each project that is recommended for implementation at the Airport. All cost estimates are approximate and should be refined prior to project implementation.


Merrill Av.
Stearman Dr.
Cal Aero Dr.
Perimeter Access Rd.
Taxiway Island
Runway 3-21 (4,919' x 150')
Runway 8L-26R (4,858' x 150') Ultimate (5,500' x 150')
Runway 8R-26L (7,000' x 150')
Euclid Av.
Perimeter Access Rd.
Perimeter Access Rd.
Kimball Av.
LEGEND
Airport Property Line
Taxiway Identifier Unchanged
Ultimate Taxiway Identifier
High Energy Area
New Airfield Pavement
To Be Removed
NORTH
0
800
SCALE IN FEET
Aerial Photo: Google Earth 4-23-20

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Project Name: Environmental Assessment (EA) for Runway Extension and Threshold Taxiways
Description: Prior to extending Runway 8L-26R, an EA will be required. The EA will document justification for the runway extension and address each of the resource categories defined in the *National Environmental Policy Act* (NEPA) impact categories. The EA includes the extension of Taxiway A to the new runway threshold, the extension of a southside threshold taxiway that extends across Taxiway B to Runway 26L, and closure of a portion of Taxiway P between Taxiway B and Runway 26L.
Cost Estimate: $500,000
Environmental Consideration: Planning document.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: **Runway Extension**
Description: This project will extend Runway 8L-26R to the east approximately 642 feet, bringing the total length of the runway to 5,500 feet. The extension is the minimum recommended for the aircraft that use the runway; therefore, this is a safety-related project. This project includes relocation of the California Edison above-ground pipeline infrastructure that is currently just east of the Runway 26R threshold. This project includes the extension of Taxiway A to the new runway end, an aircraft hold apron on the north side of Taxiway A, and a threshold taxiway connecting to Taxiway B. It also includes closure of Taxiway P between Taxiway B and Runway 8R-26L and construction of a new crossing taxiway between the same, that is aligned with the south threshold taxiway to Runway 26R. Project includes relocation of glideslope antenna to the east.
Cost Estimate: $8,056,000
Environmental Consideration: Included as part of the east end EA. *California Environmental Quality Act* (CEQA) Initial Study will be required.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: Medium Intensity Approach Lighting System (MALS) – Runway 26R
Description: The MALS will assist pilots in determining which runway they are lining up to land. It should have the effect of reducing or eliminating wrong runway landings.
Cost Estimate: $1,200,000
Environmental Consideration: To be included as part of the east end EA. *California Environmental Quality Act* (CEQA) Initial Study will be required.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: Runway End Identification Lights (REILs)
Description: REILs are planned to be installed on each end of the parallel runways to provide rapid identification of the runway ends for pilots. The REILs may help reduce incidents of pilots lining up to land on the wrong runway.
Cost Estimate: $200,000
Environmental Consideration: Categorical Exclusion. *California Environmental Quality Act* (CEQA) Initial Study will be required.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: Environmental Assessment (EA) for New Taxiway Construction
Description: An environmental assessment will be necessary prior to construction of the taxiway improvements. Closure of Taxiways D, K and L is included in this EA.
Cost Estimate: $500,000
Environmental Consideration: Planning document.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: West Taxiway Construction
Description: This project is the construction of new taxiways west of Runway 3-21. This includes closure and removal of Taxiways K and Taxiways D between Taxiway A and L (the midfield taxiway). This project includes a new taxiway immediately east of existing Taxiway K between Taxiway A and L. Extension of the midfield partial parallel taxiway (Taxiway L) to the west to connect with Taxiway H. It also includes a new taxiway crossing Runway 8L-26R between Taxiway H and K (existing). Finally, a taxiway crossing Runway 8R-26L is included.
Cost Estimate: $7,447,000
Environmental Consideration: Environmental Assessment. *California Environmental Quality Act* (CEQA) Initial Study will be required.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: In-Ground and Elevated Runway guard Lights – New Taxiway K
Description: This project will enhance pilot awareness that then are approaching Runway 8L-26R. Both in-ground and elevated guard lights are planned on the new taxiway that is planned immediately east of Taxiway K on both sides of the runway.
Cost Estimate: $340,000
Environmental Consideration: Included in the EA required for taxiway construction west of Runway 3-21.
Funding Eligibility: This project is eligible for 90% FAA funding. Project likely to be included as part of the overall taxiway construction west of Runway 3-21.

Project Name: East Taxiway Construction
Description: This project is the construction of new taxiways east of Runway 3-21, between Taxiways A and C. The midfield partial parallel taxiway (existing Taxiway L) to the east. This new portion of the midfield partial parallel taxiway will not connect with Taxiway B to reduce the potential of pilots lining up or landing on the midfield parallel taxiway. Two new runway crossing taxiways will connect with the midfield parallel taxiway, one extending north to Taxiway A and one to the south connecting to Taxiway C.
Cost Estimate: $4,005,000
Environmental Consideration: Environmental Assessment. *California Environmental Quality Act* (CEQA) Initial Study will be required.
Funding Eligibility: This project is eligible for 90% FAA funding.

Project Name: Runway 21 Threshold Taxiway
Description: This project will construct a new taxiway that extends from the Runway 21 threshold to an intersection with existing Taxiway P. An aircraft hold apron is included in this project. This projects includes closing and removing that portion of Taxiway P that extends from Taxiway D to the new threshold taxiway on the south side of Runway 21.
Cost Estimate: $2,708,000
Environmental Consideration: To be included as part of the EA addressing east end improvements. *California Environmental Quality Act* (CEQA) Initial Study will be required.
Funding Eligibility: This project is eligible for 90% FAA funding.

The projects listed have been sequenced in a preferred order; however, the order and priority can change based on various factors, such as funding availability and environmental clearance. The projects have been grouped to save money on design and mobilization. For example, the ideal implementation would consider all east side projects together and all west side projects together.

SUMMARY

The Chino Airport has had a persistent problem with runway incursions, runway events, and pilot deviations. There are four recognized Hot Spots and five RIM locations on the airfield. This study is intended to examine possible taxiway geometry solutions that will mitigate, if not eliminate, the complex and confusing taxiway geometry.

This study begins by defining what runway incursions and runway events are, and then providing historical evidence of these incidents at Chino Airport. The airport, in consultation with the FAA, has already taken numerous actions to mitigate these issues, including applying enhanced taxiway centerline markings, surface-painted directional markings, removing confusing markings, and implementing various tower operating procedures. These actions have helped improve the safety of the airfield.

This study goes one step further by examining the taxiway geometry and navigational aid improvements that could further improve safety. The midfield confluence of Taxiways K, L, D, and Runway 3-21 has been the location of numerous runway incursions and runway events. This study recommends closing both Taxiways K and L and constructing additional taxiways on both the east and west ends of the airport to replace the efficiency of movement and to provide a more typical taxiway geometry.

Taxiway P has also been the center of numerous runway incursions and runway events. This study recommends closing two sections of Taxiway P and constructing replacement taxiways to provide a more typical taxiway geometry system that is intended to reduce pilot confusion.

This study takes into consideration the long-planned extension of Runway 26R. This extension will not only benefit the current critical aircraft operations, but also serve an important safety improvement function by allowing the construction a more logical and efficient taxiway system. In short, the extension of the runway is integral to improving the taxiway system and reducing runway incursions and runway events.

Several new navigational aids are planned to help pilots rapidly recognize the proper runway ends and to reduce or eliminate occasions when pilots line up to land on the wrong runway. A MALS approach lighting system is planned for the approach to Runway 26R. This lighted grid system will clearly distinguish the parallel runway thresholds. REILs are planned for all four ends of the parallel runways. This, too, will enhance pilot awareness of the runways. In addition, Runway Guard Lights and Stop Bar Lights are planned on the relocated Taxiway K on both sides of Runway 8L-26R.

Several potential enhancements were discussed, but ultimately not included in these initial recommendations, including changing the designation of one of the parallel runways. If issues persist after the geometry solutions have been implemented, then the Airport and the FAA can revisit these other potential improvements.

Chino Airport Geometry Study

APPENDIX A

Glossary of Terms

(See *Appendix A* from the Chino Airport Master Plan for Glossary of Terms.)

Chino Airport Geometry Study

APPENDIX B

CNO Runway Event History

(As of August 10, 2021)

Event ID	Incident Type	Event Date	Severity Rank	Airport ID	Airport Name	Aircraft 1	Aircraft 2	Aircraft 1 Flight	Aircraft 2 Flight	Weather Condition Description	Event Description
31621	PD	30-Mar-21	C	CNO	CHINO AIRPORT	EXP	P28A	91	91	KCNO 302053Z VRB03KT 8SM CLR 26/06 A2993 RMK AO2 SLP132 T02610056 58013	RWY 26R
31616	PD	29-Mar-21	C	CNO	CHINO AIRPORT	C310	C172	91	91	KCNO 291953Z 28008KT 10SM CLR 28/01 A2988 RMK AO2 SLP114 T02780011	RWY 26R
31571	PD	19-Mar-21	D	CNO	CHINO AIRPORT	C172		91	N/A	KCNO 191753Z 00000KT 10SM CLR 17/07 A3016 RMK AO2 SLP213 T01720072 10172 20056 58001	RWY 26R
31497	PD	27-Feb-21	C	CNO	CHINO AIRPORT	C150	PA32	91	N/A	KCNO 271753Z VRB03KT 10SM CLR 14/01 A2996 RMK AO2 SLP145 T01390006 10139 20022 51006	TWY K AT RWY 26R
31344	PD	4-Jan-21	D	CNO	CHINO AIRPORT	SR22		91	N/A	KCNO 042350Z 24008KT 5SM HZ BKN250 18/09 A3014	RWY 26L
31214	OI	17-Nov-20	C	CNO	CHINO AIRPORT	P28A	P28A	91	91	KCNO 172153Z 25008KT 10SM SCT200 30/M04 A3000 RMK AO2 SLP155 T03001044	RWY 26L
31199	PD	12-Nov-20	D	CNO	CHINO AIRPORT	C185		91	N/A	KCNO 122153Z 00000KT 10SM BKN250 24/M02 A2999 RMK AO2 SLP152 T02391017	RWY 26R
31054	PD	30-Aug-20	D	CNO	CHINO AIRPORT	C337		91	N/A	KCNO 301653Z 24004KT 6SM HZ CLR 22/14 A2991 RMK AO2 SLP122 T02170144	RWY 26R
31038	PD	19-Aug-20	D	CNO	CHINO AIRPORT	LJ31		91	N/A	KCNO 192253Z 25017KT 8SM SCT120 38/17 A2977 RMK AO2 SLP074 T03830167	RWY 26R
30823	OI	1-Jun-20	C	CNO	CHINO AIRPORT	BCAT	PA27	91	91	KCNO 012053Z 26010G19KT 230V290 10SM BKN200 33/11 A2990 RMK AO2 SLP119 T03280111 58015	RWY 26L
30818	PD	30-May-20	D	CNO	CHINO AIRPORT	SR22		91	N/A	KCNO 302053Z 30005KT 10SM FEW050 SCT200 28/10 A2995 RMK AO2 SLP136 T02780100 58016	RWY 26R
30518	PD	24-Jan-20	D	CNO	CHINO AIRPORT	C172	P28A	91	91	KCNO 242153Z 26006KT 10SM SCT250 23/07 A2995 RMK AO2 SLP141 T02330067	RWY 26R
30517	PD	24-Jan-20	C	CNO	CHINO AIRPORT	CH7B	P28B	91	91	KCNO 241753Z 00000KT 10SM SCT250 16/06 A3006 RMK AO2 SLP176 T01560061 10156 20044 51009 $	RWY 26R
30375	PD	13-Dec-19	C	CNO	CHINO AIRPORT	MOTORGLIDE		91	N/A	KCNO 131953Z 00000KT 8SM CLR 21/08 A3011 RMK AO2 SLP193 T02060083	RWY 26L
30139	PD	16-Oct-19	C	CNO	CHINO AIRPORT	P28A		91	N/A	KCNO 161853Z 34004KT 10SM SCT250 32/07 A2992 RMK AO2 SLP127 T03220067	RWY 26R
30030	PD	23-Sep-19	C	CNO	CHINO AIRPORT	C172	P28A	91	91	KCNO 231653Z 00000KT 10SM CLR 26/13 A2997 RMK AO2 SLP145 T02560133	RWY 26R
30024	PD	22-Sep-19	D	CNO	CHINO AIRPORT	RV-6	P28A	91	91	KCNO 221453Z 00000KT 10SM BKN200 20/09 A2990	RWY 26R
29778	PD	30-Jul-19	C	CNO	CHINO AIRPORT	SR22	C172	91	91	KCNO 302153Z 25013KT 10SM SCT200 32/17 A2989 RMK AO2 SLP115 T03170167	RWY 26L
29700	PD	17-Jul-19	D	CNO	CHINO AIRPORT	P28A		91	N/A	KCNO 172353Z 27015KT 10SM CLR 28/16 A2992 RMK AO2 SLP125 T02830156 10328 20278 58005	RWY 26L
29645	PD	8-Jul-19	D	CNO	CHINO AIRPORT	P28R	DA2	91	91	KCNO 081653Z 00000KT 6SM HZ OVC020 19/15 A3003 RMK AO2 SLP164 T01890150	RWY 26R
29492	PD	5-Jun-19	C	CNO	CHINO AIRPORT	P28A	UNK	91	N/A	KCNO 051953Z COR 21005KT 6SM HZ FEW110 28/16 A2992	RWY 26L
29476	PD	1-Jun-19	D	CNO	CHINO AIRPORT	PT17	UNK	91	N/A	KCNO 012253Z 26012KT 10SM SCT035 SCT110 21/12 A2985	RWY 21
29291	PD	23-Apr-19	C	CNO	CHINO AIRPORT	P28A		91	N/A	KCNO 231553Z COR 17003KT 10SM FEW100 FEW200 16/13 A2999 RMK AO2 SLP151 T01610128 $	RWY 26L
29082	PD	1-Mar-19	D	CNO	CHINO AIRPORT	GLAS		91	N/A	KCNO 012353Z 23007KT 8SM BKN090 OVC200 17/11 A3004 RMK AO2 SLP169 T01670106 10178 20150	RWY 26L
29078	PD	27-Feb-19	D	CNO	CHINO AIRPORT	C172	C172	91	91	KCNO 271953Z COR 30005KT 6SM SCT040 15/08 A3019 RMK AO2 SLP220 T01500083	RWY 26L
29014	PD	8-Feb-19	D	CNO	CHINO AIRPORT	C172	RV6	91	91	KCNO 082153Z AUTO A3006 RMK AO2 SLPNO PWINO $	RWY 26R
29008	PD	6-Feb-19	D	CNO	CHINO AIRPORT	C152		91	N/A	KCNO 062153Z VRB05KT 10SM SCT070 14/M04 A3009 RMK AO2 SLP189 T01391044	RWY 26L
28823	OI	21-Dec-18	D	CNO	CHINO AIRPORT	C172	P28A	91	91	KCNO 211853Z 00000KT 10SM SCT150 BKN250 19/06 A3004 RMK AO2 SLP170 T01940061	RWY 26L
28800	PD	15-Dec-18	D	CNO	CHINO AIRPORT	HXB	C172	91	91	KCNO 152253Z 29007KT 10SM CLR 24/02 A3003 RMK AO2 SLP167 T02440022	RY26R AT FOXTROT
28799	PD	15-Dec-18	C	CNO	CHINO AIRPORT	RV8	ERCO	91	91	KCNO 152153Z 00000KT 10SM CLR 24/00 A3003 RMK AO2 SLP164 T02440000	RWY 26R
28789	PD	13-Dec-18	D	CNO	CHINO AIRPORT	HELO	P28A	91	91	KCNO 131953Z 12011KT 10SM CLR 26/M02 A3022 RMK AO2 SLP230 T02561022 $	RY8R
28748	VPD	5-Dec-18	D	CNO	CHINO AIRPORT			VEH	N/A	KCNO 051653Z 00000KT 7SM -RA BKN070 OVC095 09/06 A3000 RMK AO2 SLP160 P0001 T00940061 $	RWY 26R
28749	VPD	5-Dec-18	D	CNO	CHINO AIRPORT			VEH	N/A	KCNO 051653Z 00000KT 7SM -RA BKN070 OVC095 09/06 A3000 RMK AO2 SLP160 P0001 T00940061 $	RWY 21
28657	PD	17-Nov-18	D	CNO	CHINO AIRPORT	C182		91	N/A	KCNO 172153Z 23006KT 10SM SCT250 24/01 A3000 RMK AO2 SLP158 T02440011	RWY 26R
23177	PD	3-Sep-18	C	CNO	CHINO AIRPORT, CA	C150	P28B	91	91	25013KT 10SM FEW120 32/16 A2983	NA
23127	VPD	27-Aug-18	D	CNO	CHINO AIRPORT, CA			VEH	N/A	10003KT 3SM HZ OVC013 21/17 A2998	NA
23128	VPD	27-Aug-18	D	CNO	CHINO AIRPORT, CA			VEH	N/A	10003KT 3SM HZ OVC013 21/17 A2998	NA
23126	VPD	27-Aug-18	D	CNO	CHINO AIRPORT, CA			VEH	N/A	10003KT 3SM HZ OVC013 21/17 A2998	NA
22855	OI	5-Jul-18	C	CNO	CHINO AIRPORT, CA	CH7A	C310	91	91	VRB03KT 10SM SCT100 34/11 A3004	RWY26R
22757	PD	16-Jun-18	D	CNO	CHINO AIRPORT, CA	RV6		91	N/A	24011G19KT 10SM SCT030 24/12 A2984	RWY 26L
22574	PD	15-May-18	C	CNO	CHINO AIRPORT, CA	C206	BE35	91	91	24015KT 10SM CLR 26/09 A3002	NA
22531	OI	8-May-18	D	CNO	CHINO AIRPORT, CA	C177	C120B (HEL	91	91	29007KT 10SM SCT200 27/09 A3002	NA
22368	PD	3-Apr-18	D	CNO	CHINO AIRPORT, CA	DA42		91	N/A	33003KT 6SM HZ BKN027 21/10 A3000	NA
22336	PD	26-Mar-18	D	CNO	CHINO AIRPORT, CA	C210	R22 (HELO)	91	91	VRB05KT 10SM FEW060 17/03 A3003	NA
22323	PD	24-Mar-18	D	CNO	CHINO AIRPORT, CA	BE35		91	N/A	00000KT 10SM SCT030 BKN040 17/09 A3005	NA
22277	PD	14-Mar-18	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	21015G23KT 10SM BKN050 19/08 A2999	TAXI RUNWAY 21
22251	PD	6-Mar-18	C	CNO	CHINO AIRPORT, CA	P28A	C172	91	91	07005KT 10SM SCT200 27/M11 A2999	RUNWAY 8R
22135	PD	9-Feb-18	D	CNO	CHINO AIRPORT, CA	C210	C172	91	N/A	00000KT 10SM FEW250 19/00 A3004	RUNWAY 26L
22128	PD	8-Feb-18	C	CNO	CHINO AIRPORT, CA	P28R	AS50 (HELO	91	91	30003KT 10SM CLR 30/00 A3000	NA
22129	PD	8-Feb-18	D	CNO	CHINO AIRPORT, CA	REMOS GX		91	N/A	00000KT 10SM CLR 24/M03 A3014	RUNWAY 26R
22062	VPD	24-Jan-18	C	CNO	CHINO AIRPORT, CA	P28A		VEH	91	00000KT 10SM FEW150 12/02 A3018	NA
22060	VPD	24-Jan-18	D	CNO	CHINO AIRPORT, CA			VEH	N/A	00000KT 10SM FEW150 12/02 A3018	NA
22061	VPD	24-Jan-18	D	CNO	CHINO AIRPORT, CA			VEH	N/A	00000KT 10SM FEW150 12/02 A3018	N/A
22006	PD	13-Jan-18	D	CNO	CHINO AIRPORT, CA	P28A		91	N/A	VRB06KT 10SM SCT200 29/M01 A3010	RUNWAY 8L
21945	PD	28-Dec-17	D	CNO	CHINO AIRPORT, CA	C510		91	N/A	00000KT 10SM CLR 24/00 A3006	NA
21889	VPD	13-Dec-17	C	CNO	CHINO AIRPORT, CA	C172		PED	91	00000KT 10SM FEW200 24/M05 A3003	NA
21886	PD	11-Dec-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	29004KT 10SM SCT200 21/M06 A3019	RWY 26R
21832	PD	2-Dec-17	D	CNO	CHINO AIRPORT, CA	HXB (EXP)		91	N/A	00000KT 10SM SCT200 25/07 A2998	NA
21778	PD	18-Nov-17	C	CNO	CHINO AIRPORT, CA	C172	C182	91	91	17004KT 10SM SCT200 27/M04 A3006	NA
21776	PD	17-Nov-17	C	CNO	CHINO AIRPORT, CA	C172		91	91	23010KT 10SM FEW080 SCT150 22/13 A3003	NA
21745	PD	12-Nov-17	D	CNO	CHINO AIRPORT, CA	SR22		91	N/A	19003KT 4SM HZ BKN150 19/12 A3005	NA
21735	OI	11-Nov-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	00000KT 5SM HZ FEW120 FEW200 21/11 A2999	RUNWAY 26L
21611	PD	21-Oct-17	D	CNO	CHINO AIRPORT, CA	C150		91	N/A	29004KT 10SM FEW030 21/11 A3008	NULL
21509	PD	30-Sep-17	C	CNO	CHINO AIRPORT, CA	C172	C172	91	91	00000KT 10SM SCT200 24/11 A2993	NA
21470	PD	27-Sep-17	D	CNO	CHINO AIRPORT, CA	P28A		91	N/A	03003KT 10SM CLR 16/11 A2990	RUNWAY 26R
21439	PD	23-Sep-17	D	CNO	CHINO AIRPORT, CA	P28A		91	N/A	27011G17KT 230V290 10SM FEW047 26/10 A2985	NA
21432	PD	22-Sep-17	C	CNO	CHINO AIRPORT, CA	C150	P28A	91	91	VRB06KT 10SM SCT050 23/08 A2988	RUNWAY 26R

Event ID	Incident Type	Event Date	Severity Rank	Airport ID	Airport Name	Aircraft 1	Aircraft 2	Aircraft 1 Flight	Aircraft 2 Flight	Weather Condition Description	Event Description
21260	PD	26-Aug-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	00000KT 3SM HZ CLR 26/18 A2996	NA
21204	VPD	20-Aug-17	D	CNO	CHINO AIRPORT, CA			VEH	N/A	10SM FEW060 33/15 A2989	NA
20944	PD	16-Jul-17	D	CNO	CHINO AIRPORT, CA	C182		91	N/A	VRB06KT 10SM SCT200 35/17 A2988	NA
20928	VPD	14-Jul-17	N/A	CNO	CHINO AIRPORT, CA	B25		VEH	91	27012KT 10SM FEW090 36/12 A2998	NA
20819	PD	29-Jun-17	N/A	CNO	CHINO AIRPORT, CA	AC90		91	N/A	26011G15KT 7SM CLR 31/12 A2991	
20814	PD	28-Jun-17	D	CNO	CHINO AIRPORT, CA	C172	N/A	91	VEH	24014KT 10SM CLR 30/14 A2984	
20790	PD	25-Jun-17	D	CNO	CHINO AIRPORT, CA	C182		91	N/A	00000KT 10SM CLR 33/17 A2991	RWY 26R
20678	OTH	11-Jun-17	N/A	CNO	CHINO AIRPORT, CA	ST75		91	N/A	19005KT 10SM SCT024 BKN031 BKN045 20/13 A2994	
20520	PD	23-May-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	00000KT 6SM HZ FEW250 31/12 A2993	
20466	PD	16-May-17	N/A	CNO	CHINO AIRPORT, CA	R22 (HELO)		91	N/A	VRB05KT 10SM OVC040 17/08 A3006	RWY 21
20425	VPD	11-May-17	N/A	CNO	CHINO AIRPORT, CA			VEH	N/A	22004KT 6SM HZ FEW150 19/12 A3013	
20139	PD	4-Apr-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	00000KT 10SM CLR 20/11 A3002	RWY 26L
20121	PD	2-Apr-17	D	CNO	CHINO AIRPORT, CA	M20P		91	N/A	00000KT 10SM CLR 22/07 A3003	RWY 26L
20120	PD	2-Apr-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	00000KT 10SM CLR 22/07 A3003	RWY 26L
20097	VPD	29-Mar-17	N/A	CNO	CHINO AIRPORT, CA			PED	N/A	24008KT 10SM FEW250 29/04 A3004	
20006	PD	14-Mar-17	D	CNO	CHINO AIRPORT, CA	PA31		91	N/A	25009KT 10SM BKN200 31/11 A3002	NONE
19978	PD	11-Mar-17	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	23010KT 10SM FEW200 28/12 A2998	RWY 26L
19960	PD	7-Mar-17	N/A	CNO	CHINO AIRPORT, CA	C182		91	N/A	25005KT 10SM SCT250 18/08 A3011	
19912	PD	28-Feb-17	C	CNO	CHINO AIRPORT, CA	PA30	C172	91	91	11005KT 6SM HZ FEW012 SCT050 14/08 A3011	
19913	PD	28-Feb-17	N/A	CNO	CHINO AIRPORT, CA	BE36		91	N/A	11005KT 6SM HZ FEW012 SCT050 14/08 A3011	RUNWAY 26R
19881	PD	23-Feb-17	D	CNO	CHINO AIRPORT, CA	C425		91	N/A	VRB03KT 10SM FEW080 13/01 A3007	
19800	PD	12-Feb-17	D	CNO	CHINO AIRPORT, CA	BE23		91	N/A	27006KT 10SM SCT080 22/08 A3002	
19737	PD	2-Feb-17	C	CNO	CHINO AIRPORT, CA	S108	P28A	91	91	02003KT 10SM FEW100 BKN200 19/03 A3010	RWY 26R
19713	PD	29-Jan-17	N/A	CNO	CHINO AIRPORT, CA	P28A		91	N/A	KCNO 292353Z 12014KT 10SM CLR 24/M01 A3019	RY 8R
19701	PD	28-Jan-17	D	CNO	CHINO AIRPORT, CA	BE20		91	N/A	00000KT 10SM CLR 16/01 A3038	N/A
19673	PD	24-Jan-17	N/A	CNO	CHINO AIRPORT, CA	P28R	C172	91	N/A	22009KT 10SM BKN050 12/04 A3002	RY 26R
19656	VPD	22-Jan-17	N/A	CNO	CHINO AIRPORT, CA			VEH	N/A	00000KT 10SM FEW050 OVC075 10/08 A3012	N/A
19623	OTH	16-Jan-17	N/A	CNO	CHINO AIRPORT, CA	P28A				30005KT 8SM FEW040 19/07 A3001	
19569	OTH	6-Jan-17	N/A	CNO	CHINO AIRPORT, CA	C82R				09008KT 10SM SCT030 SCT250 17/04 A3010	
19571	VPD	6-Jan-17	N/A	CNO	CHINO AIRPORT, CA			VEH	N/A	12007KT 10SM FEW040 SCT150 18/06 A3005	NA
19480	PD	21-Dec-16	D	CNO	CHINO AIRPORT, CA	C210		91	N/A	36003KT 10SM BKN080 OVC100 12/07 A3007	NONE
19467	PD	18-Dec-16	D	CNO	CHINO AIRPORT, CA	P28A		91	N/A	06004KT 10SM CLR 13/M01 A3019	RY 8R
19466	PD	18-Dec-16	D	CNO	CHINO AIRPORT, CA	C182		91	N/A	05010G19KT 10SM CLR 18/M10 A3014	
19465	PD	18-Dec-16	D	CNO	CHINO AIRPORT, CA	P28R		91	N/A	VRB05KT 10SM CLR 18/M11 A3015	
19442	PD	14-Dec-16	D	CNO	CHINO AIRPORT, CA	BE35	B12 (HELO)	91	91	00000KT 2SM BR SCT250 12/11 A3013	
19439	VPD	14-Dec-16	N/A	CNO	CHINO AIRPORT, CA			VEH	N/A	00000KT 2SM BR SCT250 12/11 A3013	
19413	PD	10-Dec-16	C	CNO	CHINO AIRPORT, CA	YK55	C150	91	91	27006KT 6SM HZ FEW150 18/12 A3010	
19351	PD	30-Nov-16	C	CNO	CHINO AIRPORT, CA	C182	C172	91	91	30004KT 10SM FEW120 20/M03 A2998	
19338	PD	28-Nov-16	D	CNO	CHINO AIRPORT, CA	M20P		91	N/A	24011G17KT 10SM SCT075 BKN200 18/06 A2986	
19322	OTH	25-Nov-16	N/A	CNO	CHINO AIRPORT, CA					10004KT 10SM CLR 19/M03 A3013	
19324	PD	25-Nov-16	A	CNO	CHINO AIRPORT, CA	P28A	RV7	91	91	00000KT 10SM CLR 26/M10 A3005	N/A
19258	OTH	16-Nov-16	C	CNO	CHINO AIRPORT, CA	C421	C82R	91	91	25007KT 10SM SCT180 22/12 A2983	RWY 26R
19255	PD	15-Nov-16	D	CNO	CHINO AIRPORT, CA	TBM7		91	N/A	25009KT 10SM BKN200 27/07 A2998	RY 26R
19133	PD	26-Oct-16	D	CNO	CHINO AIRPORT, CA	C172		91	N/A	00000KT 10SM SCT180 24/13 A3006	NA
18971	PD	4-Oct-16	D	CNO	CHINO AIRPORT, CA	C210	AS50 (HELO	91	91	24007KT 10SM FEW050 26/10 A2989	RY 26R
18881	PD	21-Sep-16	N/A	CNO	CHINO AIRPORT, CA	C172	R22 (HELO)	91	91	00000KT 10SM SCT040 SCT120 31/18 A2991	TY J
18837	VPD	13-Sep-16	N/A	CNO	CHINO AIRPORT, CA			VEH	N/A	00000KT 10SM FEW038 BKN055 20/11 A2998	N/A
18784	PD	5-Sep-16	C	CNO	CHINO AIRPORT, CA	AA5	P28A	91	91	00000KT 10SM FEW040 24/11 A2983	RY 26L
18399	VPD	13-Jul-16	D	CNO	CHINO AIRPORT, CA			PED	N/A	00000KT 10SM CLR 28/16 A2999	N/A
18400	VPD	13-Jul-16	D	CNO	CHINO AIRPORT, CA			PED	N/A	00000KT 10SM CLR 28/16 A2999	N/A
18097	PD	24-May-16	C	CNO	CHINO AIRPORT, CA	P28A	BE36	91	91	23015G20KT 10SM BKN055 BKN200 24/09 A2999	NONE
17961	OTH	4-May-16	N/A	CNO	CHINO AIRPORT, CA	B18T		91	N/A	24018G24KT 10SM FEW040 FEW200 24/12 A2988	RUNWAY 26R
17908	PD	26-Apr-16	N/A	CNO	CHINO AIRPORT, CA	R22 (HELO)		91	N/A	VRB03KT 10SM FEW080 BKN200 19/07 A3000	
17876	PD	22-Apr-16	D	CNO	CHINO AIRPORT, CA	RV6	SR22	91	91	22004KT 10SM FEW030 FEW200 19/11 A2997	
17755	PD	1-Apr-16	N/A	CNO	CHINO AIRPORT, CA	R22 (HELO)		91	N/A	VRB05KT 10SM FEW100 23/07 A3010	RWY 21
17524	PD	25-Feb-16	C	CNO	CHINO AIRPORT, CA	C172	C172	91	91	00000KT 10SM CLR 23/M02 A3011	RWY 8L
17499	OTH	21-Feb-16	N/A	CNO	CHINO AIRPORT, CA	L8		91	N/A	27007KT 10SM CLR 25/06 A3004	
17501	PD	21-Feb-16	D	CNO	CHINO AIRPORT, CA	M20P		91	N/A	00000KT 10SM HZ CLR 17/08 A3012	
17481	PD	18-Feb-16	C	CNO	CHINO AIRPORT, CA	C182	AC90	91	91	15004KT 10SM FEW030 SCT050 BKN150 19/12 A2997	
17430	PD	11-Feb-16	N/A	CNO	CHINO AIRPORT, CA	BE9L		91	N/A	19003KT 10SM CLR 31/M01 A3007	
17407	PD	6-Feb-16	D	CNO	CHINO AIRPORT, CA	P28A		91	N/A	VRB03KT 10SM CLR 22/M04 A3028	
17395	PD	4-Feb-16	C	CNO	CHINO AIRPORT, CA	C210		91	N/A	32004KT 10SM FEW200 21/M03 A3022	
17388	PD	3-Feb-16	C	CNO	CHINO AIRPORT, CA	C182	S365 (HELO	91	91	11006KT 10SM FEW200 17/M03 A3031	RWY 8L
17305	OI	19-Jan-16	C	CNO	CHINO AIRPORT, CA	PC12		VEH	91	00000KT 4SM BR SCT029 OVC034 15/13 A3018	RWY 26R
17312	VPD	19-Jan-16	C	CNO	CHINO AIRPORT, CA	AS32 (HELO)		VEH	91	00000KT 4SM BR SCT029 OVC034 15/13 A3018	RWY 21
17303	PD	18-Jan-16	C	CNO	CHINO AIRPORT, CA	P28R	P28A	91	91	06004KT 3SM HZ FEW020 BKN028 BKN033 17/12 A3016	RWY 26R
17254	OTH	9-Jan-16	N/A	CNO	CHINO AIRPORT, CA	P28A				N/A	

Event ID	Incident Type	Event Date	Severity Rank	Airport ID	Airport Name	Aircraft 1	Aircraft 2	Aircraft 1 Flight	Aircraft 2 Flight	Weather Condition Description	Event Description
17225	PD	2-Jan-16	A	CNO	CHINO AIRPORT, CA	C172	BE36	91	91	25008KT 10SM SCT180 18/00 A3002	
17206	PD	29-Dec-15	D	CNO	CHINO AIRPORT, CA	HXA (EXP)		91	N/A	13005KT 10SM CLR 13/M02 A3004	RWY 8L
17040	VPD	23-Nov-15	N/A	CNO	CHINO AIRPORT, CA			PED	N/A	26011KT 10SM FEW200 28/M02 A2991	N/A
16950	OI	9-Nov-15	C	CNO	CHINO AIRPORT, CA	C172		91	VEH	22011KT 10SM SCT032 BKN050 19/11 A2996	
16942	PD	7-Nov-15	D	CNO	CHINO AIRPORT, CA	P28A		91	N/A	09009KT 10SM FEW200 26/M05 A2999	RWY 8L
16715	OTH	2-Oct-15	N/A	CNO	CHINO AIRPORT, CA					N/A	
16624	PD	12-Sep-15	C	CNO	CHINO AIRPORT, CA	C310	M20P	91	91	31007KT 10SM SCT080 BKN150 32/17 A2993	RWY 26L
16616	PD	11-Sep-15	D	CNO	CHINO AIRPORT, CA	LNC4	N/A		91	28004KT 10SM FEW200 34/17 A2993	RWY 26R
16620	VPD	11-Sep-15	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A		VEH	28004KT 10SM FEW200 34/17 A2993	
16598	PD	7-Sep-15	C	CNO	CHINO AIRPORT, CA	C414	C150	91	91	23013KT 10SM FEW090 37/16 A2982	RWY 26L
16586	PD	5-Sep-15	D	CNO	CHINO AIRPORT, CA	C172	N/A		91	24006KT 10SM CLR 32/11 A2988	RWY 26R
16405	PD	1-Aug-15	C	CNO	CHINO AIRPORT, CA	C172	TRIN	91	91	29008KT 10SM SCT100 33/16 A2994	
16279	VPD	12-Jul-15	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A		VEH	VRB04KT 10SM FEW180 SCT250 25/14 A3002	
16220	PD	2-Jul-15	C	CNO	CHINO AIRPORT, CA	C172	C414	91	91	24011KT 10SM BKN140 BKN200 31/14 A2989	RWY 26R
16162	PD	20-Jun-15	D	CNO	CHINO AIRPORT, CA	M20P	N/A		91	VRB04KT 10SM CLR 32/11 A2986	RWY 26L
16097	VPD	7-Jun-15	D	CNO	CHINO AIRPORT, CA	N/A	N/A		VEH	26010KT 10SM FEW120 22/13 A2987	
16096	VPD	7-Jun-15	D	CNO	CHINO AIRPORT, CA	N/A	N/A		VEH	26010KT 10SM FEW120 22/13 A2987	
16095	VPD	7-Jun-15	D	CNO	CHINO AIRPORT, CA	N/A	N/A		VEH	26010KT 10SM FEW120 22/13 A2987	
16040	PD	28-May-15	C	CNO	CHINO AIRPORT, CA	C172	C140	91	91	VRB03KT 5SM HZ BKN200 24/13 A2999	RWY 26R
15911	PD	29-Apr-15	C	CNO	CHINO AIRPORT, CA	AA5	P28A	91	91	24011G19KT 10SM BKN250 35/M02 A2982	RWY 21
15846	PD	18-Apr-15	C	CNO	CHINO AIRPORT, CA	BE36	C182	91	91	23012G18KT 10SM CLR 29/01 A2996	RWY 26R
15786	PD	6-Apr-15	D	CNO	CHINO AIRPORT, CA	C172	N/A		91	23007KT 10SM SCT050 15/05 A2998	RWY 26R
15437	PD	22-Jan-15	C	CNO	CHINO AIRPORT, CA	HXB (EXP)	C172	91	91	00000KT 10SM BKN180 22/01 A3020	RWY 26R
15281	VPD	8-Dec-14	D	CNO	CHINO AIRPORT, CA	N/A	N/A		VEH	34003KT 10SM BKN250	
15197	PD	17-Nov-14	D	CNO	CHINO AIRPORT, CA	R22 (HELO)	N/A		91	08011G17KT 10SM FEW200 24/M12 A3013	RWY 3
15099	PD	31-Oct-14	C	CNO	CHINO AIRPORT, CA	C172	P28A	91	91	24006KT 10SM SCT170 30/06 A2994	RWY 26R
15038	PD	20-Oct-14	D	CNO	CHINO AIRPORT, CA	C172	N/A		91	4010KT 10SM SCT150 23/16 A2986	RWY 26R
14918	VPD	23-Sep-14	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 10SM CLR 24/16 A3001	
14883	VPD	14-Sep-14	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	23010KT 10SM SCT120 42/12 A2970	
14818	OI	28-Aug-14	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 10SM SKC 25/11 A3002NOM201408280001	
14769	PD	19-Aug-14	D	CNO	CHINO AIRPORT, CA	C182	N/A	N/A	91	26011G17KT 10SM FEW100 SCT200 39/14 A2974	RWY 26L
14774	PD	19-Aug-14	D	CNO	CHINO AIRPORT, CA	AS365 (HELO)	N/A	N/A	91	27010KT 10SM SCT120 SCT180 29/14 A2987.	RWY 26R
14699	VPD	5-Aug-14	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 10SM CLR 24/14 A3004	
14637	PD	21-Jul-14	N/A	CNO	CHINO AIRPORT, CA	DC3	N/A	N/A	91	VRB04G14KT 7SM CLR 31/16 A3002	RWY 26L
14600	PD	16-Jul-14	C	CNO	CHINO AIRPORT, CA	C182	R44 (HELO)	91	91	24015G20KT 10SM CLR 28/16 A2996	RWY 26R
14203	VPD	2-May-14	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 10SM FEW200 23/05 A3002	
14205	VPD	2-May-14	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 10SM FEW200 23/05 A3002	
14202	VPD	2-May-14	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 10SM FEW200 23/05 A3002	
13868	OTH	13-Feb-14	N/A	CNO	CHINO AIRPORT, CA	C340	N/A	N/A	91	00000KT 10SM SCT250 26/03 A3005	
13852	VPD	9-Feb-14	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	07005KT 6SM HZ BKN030 17/09 A3011	
13821	PD	1-Feb-14	N/A	CNO	CHINO AIRPORT, CA	ST75	N/A	N/A	91	00000KT 10SM FEW060 17/M06 A3000	
13577	PD	23-Nov-13	D	CNO	CHINO AIRPORT, CA	BE33	N/A	N/A	91	09012KT 10SM FEW050 SCT090 BKN180 18/04 A3003	RWY 8L
13555	PD	19-Nov-13	D	CNO	CHINO AIRPORT, CA	C152	N/A	N/A	91	24007KT 10SM BKN044 BKN100 18/09 A3000	RWY 26R
13520	PD	9-Nov-13	C	CNO	CHINO AIRPORT, CA	PA32	AA5	91	91	00000KT 10SM CLR 15/03 A3008	RWY 26L
13362	PD	7-Oct-13	N/A	CNO	CHINO AIRPORT, CA	P46T	N/A	N/A	91	00000KT 10SM BKN200 21/00 A3000	RWY 26L
13267	PD	17-Sep-13	D	CNO	CHINO AIRPORT, CA	HXC (EXP)	N/A	N/A	91	27012G18KT 10SM CLR	RWY 26R
13235	PD	10-Sep-13	C	CNO	CHINO AIRPORT, CA	P28A	P28A	91	91	29007KT 10SM FEW100 30/14 A2988	RWY 26
13168	VPD	25-Aug-13	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	00000KT 10SM CLR 28/14 A2991	
13136	VPD	21-Aug-13	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	28011KT 10SM FEW120	
13026	PD	23-Jul-13	N/A	CNO	CHINO AIRPORT, CA	AS50 (HELO)	N/A	N/A	91	28011KT 10SM FEW120 SCT200 32/15 A2994	
13001	OI	16-Jul-13	D	CNO	CHINO AIRPORT, CA	HXB (EXP)	N/A	N/A	91	25012KT 10SM FEW200 33/02 A2990	RWY 26R
12914	PD	2-Jul-13	C	CNO	CHINO AIRPORT, CA	PA17	S365 (HELO	91	91	021653Z 00000KT 10SM SCT150 29/15	RWY 26R
12604	VPD	1-May-13	N/A	CNO	CHINO AIRPORT, CA	N/A	P51	PED	91	VRB03KT 10SM CLR 28/09 A2997	
12521	VPD	12-Apr-13	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	35003KT 5SM HZ OVC011 13/10 A2984	
12484	PD	29-Mar-13	C	CNO	CHINO AIRPORT, CA	AA5	C340	91	91	26004KT 7SM FEW100 SCT200 23/09 A3010	RWY 26R
12421	PD	16-Mar-13	N/A	CNO	CHINO AIRPORT, CA	ST75	N/A	N/A	91	26010KT 10SM CLR 23/08 A2989	
12335	PD	26-Feb-13	D	CNO	CHINO AIRPORT, CA	C172	N/A	N/A	91	00000KT 10SM CLR 13/01 A3006	RWY 26L
12251	PD	2-Feb-13	C	CNO	CHINO AIRPORT, CA	HXA (EXP)	RV4	91	91	00000KT 10SM BKN150 BKN200 21/07 A3018	RWY 26R/26L
12192	PD	18-Jan-13	D	CNO	CHINO AIRPORT, CA	C172	BE36	91	91	09010KT 10SM FEW200	RWY 8L
11883	PD	19-Oct-12	C	CNO	CHINO AIRPORT, CA	C150	C182	91	91	00000KT 7SM CLR 23/15 A2999	RWY 26R
11878	PD	18-Oct-12	D	CNO	CHINO AIRPORT, CA	RV7	N/A	N/A	91	19003KT 10SM BKN040 22/16 A3007	RWY 26R
11751	PD	15-Sep-12	D	CNO	CHINO AIRPORT, CA	M200	N/A	N/A	91	05007KT 10SM CLR 40/M01 A2997	RWY 8L
11747	VPD	15-Sep-12	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	230/10KT 10SM CLR 100/39 3002	
11716	VPD	5-Sep-12	C	CNO	CHINO AIRPORT, CA	N/A	M20P	PED	91	35003KT 10SM OVC150 25/16 A3000	RWY 26R
11637	PD	13-Aug-12	C	CNO	CHINO AIRPORT, CA	P28A	C172	91	91	29007KT 10SM FEW080 37/16	RWY 26R
11565	PD	27-Jul-12	C	CNO	CHINO AIRPORT, CA	UH80 (HELO)	P28A	MIL	91	00000KT 5SM HZ CLR	RWY 26R
11450	PD	28-Jun-12	D	CNO	CHINO AIRPORT, CA	CJ6A	N/A	N/A	91	25013KT 10SM CLR 25/12 A2998	RWY 21

Event ID	Incident Type	Event Date	Severity Rank	Airport ID	Airport Name	Aircraft 1	Aircraft 2	Aircraft 1 Flight	Aircraft 2 Flight	Weather Condition Description	Event Description
11331	OI	6-Jun-12	C	CNO	CHINO AIRPORT, CA	AA5	BL14A	N/A	91	26005KT 10SM C LP098 T02560078LR 26/08	RWY 26R
11308	PD	31-May-12	D	CNO	CHINO AIRPORT, CA	AC68	N/A	N/A	91	27007KT 6SM HAZ 86/54 2987	RWY 26L
11252	PD	19-May-12	C	CNO	CHINO AIRPORT, CA	P28A	RV7	91	91	29007G14KT 7SM CLR 27/13 A2991	RWY 26L
11229	PD	12-May-12	C	CNO	CHINO AIRPORT, CA	YAK18T	C172	91	91	25010KT 7SM SCT200 29/11 A3001	RWY 26R
11199	VPD	7-May-12	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	33004KT 6SM HZ CLR 26/13 A2995	N
11153	PD	25-Apr-12	D	CNO	CHINO AIRPORT, CA	C210	N/A	91	91	00000KT 10SM BKN130 29/12 A2982	RWY 21
11034	OI	28-Mar-12	D	CNO	CHINO AIRPORT, CA	PA27	N/A	N/A	91	22008KT 10SM BKN200	RWY 26R
11020	VPD	24-Mar-12	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	00000KT 6SM HZ FEW250	N/A
10945	OI	7-Mar-12	D	CNO	CHINO AIRPORT, CA	AC95	UH1 (HELO	91	91	00000KT 10SM CLR	RWY 21
10898	VPD	22-Feb-12	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	VRB03KT 10SM BKN250 07/02 A3013	
10839	PD	2-Feb-12	D	CNO	CHINO AIRPORT, CA	C172	N/A	91	N/A	28003KT 6SM HZ FEW250	RWY 26R
10750	PD	6-Jan-12	C	CNO	CHINO AIRPORT, CA	BE33	C172	91	91	00000KT 10SM FEW250	RWY 26L
10500	VPD	12-Oct-11	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM CLR 08003KT	UNK
10119	VPD	8-Aug-11	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	10 SM CLR 27006KT	UNK
9955	PD	15-Jun-11	C	CNO	CHINO AIRPORT, CA	AS50 (HELO)	P28A	91	91	7 SM CLR VRB05KT	RWY 26R
9951	VPD	13-Jun-11	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM CLR 24013KT	RWY 21
9932	PD	7-Jun-11	C	CNO	CHINO AIRPORT, CA	C182	B06 (HELO)	91	91	10 SM FEW050 VRB05KT	RWY 26R
9929	PD	6-Jun-11	D	CNO	CHINO AIRPORT, CA	AA5	N/A	91	N/A	10 SM BKN050 26006KT	RWY 21
9818	PD	30-Apr-11	D	CNO	CHINO AIRPORT, CA	P28A	N/A	91	N/A	10 SM CLR 36005KT	RWY 26L
9259	VPD	3-Nov-10	N/A	CNO	CHINO AIRPORT, CA	P28A	N/A	91	VEH	10 SM CLR CALM	RWY 8L
8999	VPD	15-Aug-10	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM FEW250 27009KT	RWY 26L
8828	VPD	5-Jul-10	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	7 SM CLR 26007G14KT	RWY 26R
8820	PD	3-Jul-10	C	CNO	CHINO AIRPORT, CA	GC1B	C150	91	91	10 SM CLR 24014KT	RWY 26R
8256	PD	20-Jan-10	B	CNO	CHINO AIRPORT, CA	PA22	AS50 (HELO	91	91	7 SM RA SCT045 BKN060 07010KT	RWY 3/8L
8075	VPD	7-Nov-09	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	5 SM HZ BKN200 24006KT	UNK
7995	PD	6-Oct-09	D	CNO	CHINO AIRPORT, CA	PA24	N/A	91	N/A	9 SM CLR 25015KT	RWY 26R
7905	PD	12-Sep-09	D	CNO	CHINO AIRPORT, CA	BE55	N/A	91	N/A	7 SM CLR CALM	RWY 26R
7657	VPD	1-Jul-09	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM SCT120 26013KT	RWY 21/26R/L
7504	OE	16-May-09	C	CNO	CHINO AIRPORT, CA	HXB (EXP)	P28A	91	91	8 SM FEW100 26015KT	RWY 26R
7497	VPD	14-May-09	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	4 SM HZ CLR CALM	UNK
7319	PD	13-Mar-09	D	CNO	CHINO AIRPORT, CA	P28R	N/A	91	N/A	10 SM FEW100 24012KT	RWY 26R
7183	VPD	25-Jan-09	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM BKN065	UNK
6076	VPD	25-Feb-08	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 21
5760	VPD	4-Nov-07	D	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	10 SM CLR	RWY 26L/R
5533	PD	19-Aug-07	N/A	CNO	CHINO AIRPORT, CA	M20P	N/A	91	N/A	N/A	RWY 8L
5212	PD	19-May-07	N/A	CNO	CHINO AIRPORT, CA	B47G (HELO)	N/A	91	N/A	N/A	UNK
5179	VPD	10-May-07	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	UNK
5051	PD	1-Apr-07	N/A	CNO	CHINO AIRPORT, CA	P28A	N/A	91	N/A	N/A	RWY 26R
4982	PD	6-Mar-07	N/A	CNO	CHINO AIRPORT, CA	R22 (HELO)	N/A	91	N/A	N/A	UNK
4814	VPD	28-Dec-06	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 26R
4290	VPD	27-Jun-06	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 26R
4253	PD	12-Jun-06	N/A	CNO	CHINO AIRPORT, CA	BE33	N/A	91	N/A	N/A	RWY 26R
4182	VPD	17-May-06	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 21
4141	PD	29-Apr-06	N/A	CNO	CHINO AIRPORT, CA	R22 (HELO)	N/A	91	N/A	N/A	RWY 8L
4045	VPD	23-Mar-06	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	UNK
3992	PD	7-Mar-06	N/A	CNO	CHINO AIRPORT, CA	C310	N/A	91	N/A	N/A	RWY 21
3888	PD	20-Jan-06	N/A	CNO	CHINO AIRPORT, CA	C305A	N/A	91	N/A	N/A	RWY 8L
3847	VPD	29-Dec-05	N/A	CNO	CHINO AIRPORT, CA	C340	N/A	91	VEH	7 SM CLR	RWY 26L
3808	VPD	8-Dec-05	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 26L
3742	VPD	10-Nov-05	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 21
3555	PD	3-Sep-05	N/A	CNO	CHINO AIRPORT, CA	C150	N/A	91	N/A	N/A	RWY 26R
3321	VPD	10-Jun-05	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	5 SM	RWY 26R
2590	PD	30-Jul-04	D	CNO	CHINO AIRPORT, CA	C210	BE17	91	91	N/A	RWY 26L/R
2297	PD	8-Apr-04	N/A	CNO	CHINO AIRPORT, CA	LJ25	N/A	91	N/A	N/A	RWY 26L
2298	PD	8-Apr-04	N/A	CNO	CHINO AIRPORT, CA	C182	N/A	91	N/A	N/A	RWY 26R
2289	VPD	5-Apr-04	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	4SM OVC 025	RWY 21
2200	PD	24-Feb-04	D	CNO	CHINO AIRPORT, CA	ERCO	P28A	91	91	N/A	RWY 26R
2051	VPD	3-Dec-03	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10SM CLEAR	RWY 26R
1902	PD	4-Oct-03	D	CNO	CHINO AIRPORT, CA	C172	PA32	91	91	N/A	RWY 26R
1641	OE	25-Jun-03	D	CNO	CHINO AIRPORT, CA	C172	C150	91	91	8 SM CLR	RWY 26R
1587	PD	1-Jun-03	D	CNO	CHINO AIRPORT, CA	C150	P46T	91	91	N/A	RWY 26R
1566	VPD	25-May-03	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	6 SM CLR	RWY 26R
1476	PD	16-Apr-03	D	CNO	CHINO AIRPORT, CA	C172	C172	91	91	N/A	RWY 26R
1423	PD	20-Mar-03	D	CNO	CHINO AIRPORT, CA	LJ24	AC11	91	91	N/A	RWY 26R
1239	VPD	31-Dec-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	7 SM BKN 045	RWY 31
1145	VPD	22-Nov-02	D	CNO	CHINO AIRPORT, CA	C172	N/A	91	VEH	N/A	RWY 26L
1037	VPD	7-Oct-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM CLR	UNK

Event ID	Incident Type	Event Date	Severity Rank	Airport ID	Airport Name	Aircraft 1	Aircraft 2	Aircraft 1 Flight	Aircraft 2 Flight	Weather Condition Description	Event Description
1008	VPD	24-Sep-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	5SM CLOUDY	N/A
1000	VPD	20-Sep-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM	RWY 21
874	VPD	13-Aug-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM	RWY 21
773	PD	5-Jul-02	N/A	CNO	CHINO AIRPORT, CA	HXB (EXP)	C172	91	91	6SM HAZE	RWY 26L
721	OD	17-Jun-02	N/A	CNO	CHINO AIRPORT, CA	P28A	N/A	91	N/A	10 SM SKC	RWY 21
678	VPD	4-Jun-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	6 SM	N/A
545	VPD	26-Apr-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 26R
522	VPD	19-Apr-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	N/A	UNK
457	VPD	28-Mar-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	10 SM	RWY 26L/R
422	VPD	17-Mar-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	PED	10 SM SCT 150	RWY 26
419	OE	16-Mar-02	D	CNO	CHINO AIRPORT, CA	HXA (EXP)	C175	91	91	10 SM BKN 055	RWY 26R
352	VPD	16-Feb-02	N/A	CNO	CHINO AIRPORT, CA	N/A	N/A	N/A	VEH	N/A	RWY 21/26R
44	OE	16-Oct-01	A	CNO	CHINO AIRPORT, CA	C150	C172	91	91	3 HZ OVC 180	RWY 26L

Source: FAA Aviation Safety Information Analysis and Sharing (ASIAS); https://www.asias.faa.gov/apex/f?p=100:28:::NO:28::

Chino Airport Geometry Study

APPENDIX C

CNO Letters of Agreement with ATCT

(As of August 10, 2021)

LETTER OF AGREEMENT

EFFECTIVE: May 17, 2013

SUBJECT: Procedures for Opening and Closing Runways

1. **PURPOSE:** To establish standard procedures for opening and closing the runways.

2. **SCOPE:** The procedures outlined herein establish the authority, responsibility and procedures to be used in the process of opening and closing the runways between Chino Airport Traffic Control Tower (ATCT) and San Bernardino County Department of Airports.

3. **RESPONSIBILITIES:** Each party to this agreement is responsible for compliance by personnel under their authority with the provisions contained herein. Training, both initial and recurrent, of involved personnel is also the responsibility of the signatories.

4. **PROCEDURES:**

   Note: *Only airport management can open or close a runway.*

   a. San Bernardino County Department of Airports must:

      (1) Contact Chino ATCT on frequency 121.6 or pre-coordinate via telephone and indicate the need to close a runway. The request should indicate the reason and an estimate for how long the runway will remain closed.

      (2) Coordinate with the Air Traffic Manager regarding extended airport construction projects and measures to be taken in order to mitigate safety risks.

      (3) Inform the Chino ATCT if approved barricades or runway closure X's will be used.

      (4) Issue appropriate NOTAMS.

   b. When the San Bernardino County Department of Airports has closed a runway, that surface is released to San Bernardino County for movement area access purposes. Any portion of a closed runway made available to ATC for aircraft movement (i.e., runway crossings), shall be treated as a taxiway in that all vehicles must contact ground control to cross or access those portions of the closed runway.

   c. Chino ATCT must:

      (1) Coordinate with airport operations, "Mobile 1", or their designee regarding runway openings/closings.

      (2) Utilize the Runway Opening/Closing Checklist located in the OS/CIC binder.

(3) Coordinate which portions of a closed runway can be used for crossings and taxiing aircraft and measures taken to mitigate risk.

(4) Update the ATIS to reflect current status of opened or closed runways.

Robert Cayce
Airport Maintenance Supervisor
San Bernardino County Department of Airports

Brian Childers
Air Traffic Manager
Chino ATCT

FLM/CIC Runway Opening/Closing Checklist

The FLM/CIC must ensure the following is accomplished prior to closing a runway or using a runway that has been closed and is reopening.

Coordination:

1) Coordinate with airport management/designee to verify runway status.
2) Ensure all positions of operation within the tower are aware of current runway availability.
3) Ensure airfield lighting and NAVAIDs are set appropriately.
4) Ensure status information board is updated.
5) Ensure updated ATIS is made.
6) Ensure SoCal TRACON, Empire Sector is advised of runway availability.
7) Make entry on 7230-4, Daily Events Log.

4/22/13

Chino Air Traffic Control Tower, Chino Airport, and County of San Bernardino

LETTER OF AGREEMENT

EFFECTIVE: March 20, 2012

SUBJECT: Operation of Airport Lighting Systems

1. **PURPOSE:** To provide procedures and delineate responsibilities for operation of the Chino Airport lighting systems during those hours when Chino Airport Traffic Control Tower is not in operation.

2. **CANCELLATION:** Subject: Operation of Airport Lighting Systems, dated June 15, 1998.

3. **SCOPE:** These Procedures outlined herein are for the operation of airport lighting systems at the Chino Airport when the Chino Air Traffic Control Tower is closed or non-operational.

4 **RESPONSIBILITY:** The airport owner/operator covenants and agrees to indemnify and save harmless the United States of America to the extent that it may be acting by and through the Federal Aviation Administration and its agents, employees, or designees of said agency against any and all loss, damage, costs, and expenses which it or they may hereafter incur, suffer, or pay by reason of its, or their negligence arising out of the operation of the runway lights at the airport during any period when the Airport Traffic Control Tower at Chino Airport is closed or non-operational. Runway lights must not be lighted by tower personnel if a NOTAM closing that runway is in effect.

5. **PROCEDURE:** Tower personnel must adjust the lighting panel to the indicated settings when closing the Airport Traffic Control Tower for the night.

   a. Runway 08L/26R lights "on" Step 3 setting.

   b. Runway 08R/26L lights "on" Step 1 setting.

   c. Runway 03/21 lights "on" Step 1 setting.

   d. Taxiway lights "on" Step 1 setting.

   e. PAPI's for all runways set to "on."

   f. When applicable, rotating beacon "on".

6. **TERM OF AGREEMENT:** This letter is in effect until canceled by any of the below noted signers or until superseded by a new agreement.

Brian Childers
Manager, Chino ATCT
Federal Aviation Administration

James Jenkins
Assistant Director
County of San Bernardino-Department of Airports

Chino Airport Traffic Control Tower and Chino Airport Manager

LETTER OF AGREEMENT

EFFECTIVE: 02/01/2015

SUBJECT: Helicopter Operations in Non-Movement Areas

1. **PURPOSE:** This letter of agreement establishes areas of the non-movement area authorized for use by arriving and departing helicopter.

2. **CANCELLATION:** Chino Airport Traffic Control Tower and Chino Airport Manager Letter of Agreement, subject: Helicopter Operations, dated December 20, 1998.

3. **SCOPE:** The procedures outlined herein define the location for arriving and departing helicopters on non-movement areas at the Chino Airport.

4. **DEFINITIONS:**

a. "North Hangars" This is the area located east of Cal Aero Drive, south of Merrill Avenue and west of the Taxiway D.

b. "Commercial Hangars" This area is located north of Kimball Avenue, south of Runway 26L/8R, and in the southeast corner of the airport.

c. "West Ramp" This area is located west of Cal Aero Drive, south of Merrill Avenue, and north of Taxiway A.

d. "SCE Ramp" This area is north of Taxiway A, west of Taxiway G and is confined to the Southern California Edison leasehold.

e. "Hot Fuel" This area is west of Taxiway K, east of Taxiway J, north of Taxiway A. Circles will be painted on the ground to indicate the areas designated for hot refueling operations.

5. **RESPONSIBILITIES:** Each Party to this agreement is responsible for compliance by personnel under their authority with the provisions contained herein. Training both initial and recurrent of involved personnel is also the responsibility of the signatories.

6. **PROCEDURES:**

a. CNO ATCT:

(1) Is authorized to conduct arrival/departure operations to/from:

(a) The ramp surrounding the base of the tower.

(b) The portion of the ramp adjacent to Taxiway D.

(c) The fuel pit in the northeast corner of the airport.

(d) The Commercial Hangars to the northwest corner of the Commercial Hangar ramp area.

(e). The West Ramp:

1) If deemed necessary inform helicopter operators of any known traffic or obstacles prior to authorizing departure/arrival operations.

2) If deemed necessary or requested by the pilot direct arrival/departures to safe areas away from parked aircraft and hangars that will cause "loss of lift" or damage to any stationary aircraft.

(2) Direct helicopters that request hot refueling operations toward the Hot Fuel area.

(3) Inform helicopter operators of any known traffic or obstacles prior to approving departure/arrival operations to any other non-movement area to include the SCE Ramp.

b. CNO Airport operations must:

(1) Brief airport users and tenants of the acceptable areas for helicopter operations.

(2) Inform pilots when arriving or departing to request safe areas away from parked aircraft and hangars that will cause "loss of lift" or damage to any stationary aircraft.

(3) Brief fuel providers of the appropriate area for hot refueling operations.

(4) Maintain the yellow circles designating the Hot Fuel area.

Brian Childers
Air Traffic Manager
Chino ATCT

Robert Cayce
Airport Operations Manager
Chino Airport Manager

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CHINO TOWER, CHINO AIRPORT, SAN BERNARDINO COUNTY
AIRPORTS DIVISION

LETTER OF AGREEMENT

EFFECTIVE: November 20, 2006

SUBJECT: AIRPORT RAMP/PARKING AND MOVEMENT JURISDICTIONAL RESPONSIBILITIES

1. PURPOSE: This Letter of Agreement defines the jurisdictional responsibilities for the ramp/parking and movement areas at Chino Airport, when the Airport Traffic Control Tower is operational.

2. DEFINITIONS:

a. Movement Areas. The runways, taxiways and other areas on the airport which are utilized for the taxiing, takeoff and landing of aircraft, exclusive of ramp/parking areas as depicted in Appendix A of this agreement.

b. Ramp/Parking Areas. All other paved surfaces on the airport.

c. Advisories. Advice and information provided by the tower to assist in the safe conduct of aircraft movement. These advisories do not imply control responsibilities.

3. RESPONSIBILITIES:

a. The Chino Airport Management is responsible for operations within all areas other than the movement areas when the Chino Airport Traffic Control Tower is operational.

b. The airport owner/operator covenants and expressly agrees that with regard to any liability which may arise from the operation within area(s), that party shall be solely and exclusively liable for the negligence of it's own agents, servants, and/or employees, in accordance with applicable law, and that neither party looks to the other to save or hold harmless for the consequences of any negligence on the part of one of it's own agents, servants, and/or employees.

c. The Chino Airport Traffic Control Tower is responsible for approval or disapproval for movement of aircraft, vehicles, equipment, or personnel in the movement areas when the tower is operational.

4. ACTION: The Chino Airport Management shall by agreement or regulation:

a. Require all aircraft/vehicle operators contact the Tower on Ground Control frequency 121.6 for approval to utilize the taxiways within the movement areas.

b. Require all aircraft/vehicle operators contact the Tower on Local Control frequency 118.5 to utilize active runways.

c. Recommend that all aircraft/vehicle operators contact the Tower on Ground Control frequency 121.6 for advisories prior to movement within the ramp/parking areas.

5. TERM OF AGREEMENT: This agreement is in effect until canceled by any of the below noted signers or until superseded by a new agreement.

Betty Herron
Manager, Chino Tower

John Frymyer
Chino Airport Manager

Chino Airport Geometry Study

APPENDIX D

CNO/RSAT List Airport Action Items

(As of August 10, 2021)

OPEN - San Bernardino County Action Items - Summary Table

CNO-2012-001 #2: PENDING GEOMETRY STUDY	Secure Contract and install, Runway guard lights, mandatory surface painted runway markings, Enhanced taxiway centerline markings and elevate left-side sign at Runway 8L/26R from Taxiway D at Hot Spot 1	2) Runway guard lights 3/30/21	PENDING: 2) Infrastructure improvement is a necessity to grab attn of pilots at hold bars. Analysis pending Geometry study (12/31/21) for possible grant funding (ACIP)
CNO-2014-003 PENDING ACIP SUBMITTAL	Relocate Taxiway K further west on ramp and remove Taxiway K between parallel Runway's (Hot Spot #3). See ARP #2 that request that San Bernardino County conduct a feasibility study and provide study results to the LA ADO. Study results must be incorporated in ALP and ACIP Plan.	"K" Actions 1) Remove Taxiway K between runways 12/31/22 2) Relocate Taxiway K south of 26R 12/31/22	Included in 2021 ACIP
CNO-2014-006 **#2:Pending Order**	Improve visibility and guidance for pilots to utilize Taxiway J. Install Surface painted location and direction signs near movement boundary lines. Add lead-in line from ramp to Taxiway. Repaint taxiway edge lines.	"J" Actions 2) Location signs near movement boundary lines (12/31/21)	ATCT is avoiding exiting ramp from Taxiway Kilo. Improve visibilty and guidance for pilots to utilize Taxiway Juliet. PENDING: 2) Marking Plan submitted to FAA Planner 9/14/20; Revised plan submitted 9/18/20. Emailed planner 1/22/21 requesting guidance for 1/25/21 meeting. **8/2/21 - Surface painted improvements completed; new elevated/lighted sign pending order (est. 12/31/21)**
CNO-2018-001 PENDING GEOMETRY STUDY	Study the feasibility of temporarily moving Taxiway K within the ramp area to Taxiway A temporarily and submit study results to the LA ADO.	1) 2020 ALP Update - Currently under contract with Coffman Associates, contract includes geometry analysis. APPROVED 2/28/21 (9/30/21) 2) Temporary relocation of Taxiway Kilo to the west is not feasilble due to drainage, relocation to the east requires pavement stress testing. 2/28/21	Issue is outbound from ramp. Re-alignment of Taxiway K, temporary re-alignment with a revisit in 90 days.
CNO-2019-007 PENDING GEOMETRY STUDY	Conduct a comprehensive airfield geometry study to validate and identify whole airfield geometry issues that contribute to runway incursions.	1) 2020 ALP Update - Currently under contract with Coffman Associates, contract includes geometry analysis. APPROVED 2/28/21	ACIP projects will be developed and included in the 2021 ACIP submittal as the geometry study progresses. (DRFT ALP - 8/31/21, GEO - 9/30/21)
ARP #1 PENDING ACIP SUBMITTAL	Complete and submit documents for Airports Capital Improvement Plan (ACIP) and Schedule Follow-up meeting with the LA ADO. Projects for Runway, Taxiway & Apron rehabilitation, marking, signs and lighting projects will receive priority.	1) ACIP Planning - C&S currently under contract 5/30/20	Runway repaving was discussed. HS2 was resolved with left directional sign west of Rnwy 21 (?). Move Glidescope and ILS to Runway 26L in future. ACIP planning currently under contract, Meeting w/ Darlene (7/2/20). 9/14/20 - Draft ACIP and attachments uploaded to FAA Shared Drive by Ortiz; Unable to discuss with FAA due to access restrictions. 10/ 13/20 - ACIP meeting held
ARP #2 PENDING ACIP SUBMITTAL	Runway Incursion Mitigation (RIM) - Conduct Feasibility Study to relocate Taxiway K and add recommendations and implementation dates to the ACIP submittal (RSAT Item CNO-2014-003). The study will analyze Taxiway L perpendicular markings, closure of Taxiway K.	1) ACIP Planning - C&S and Coffman currently under contract 2/28/21	Increase size of Left turn signs
ARP #3	Submit Runway Incursion Mitigation (RIM) Plan to design and constuct REIL's on Runways 3, 26L, 26R & ADD to project to ACIP.	1) ACIP Planning - To be included in 20/21 ACIP submittal, included in the ALP Geometry Study.	Discussed as part of CNO-2019-003

OPEN - San Bernardino County Action Items - Summary Table

ARP #4 PENDING ACIP SUBMITTAL	Submit Runway Incursion Mitigation (RIM) Plan to Install wig wags and Surface painted Part 139 on Taxiway K at A. Add project to ACIP submittal.	1) Modified Part 139 submitted in letter dated October 2018, was not accepted.	Resubmit Modified Part 139 to Al Richardson. Surface painted markers are acceptable. FAA to coordinate Caltrans 5010/FAA Inspection conflict as it relates to these markings.
ARP #5 #3: PENDING ALP	Install pull boxes to deactivate taxiway edge lights on closed Taxiway R at Runway 21 approach. Repaint Taxiway P to delineate run-up area north of Runway 26R. Add future ACIP project to relocate the run-up area farther north of Runway 26R.	3) 2020 ALP Update - Currently under contract with Coffman Associates, contract includes geometry analysis.	PENDING: 3) 2020 ALP Update 2/28/21 (DRFT ALP - 8/31/21)
ARP #9 #2: PENDING AOA UPDATE	Update and enhance County's Minimum Standards, Rules & Regulation and Driver Training documents for CNO. Coordinate with FAA & CALTRANS and provide the updated final documents for review.	2) Updates will commence at the conclusion of the ALP revision process 12/31/21	PENDING: 2) Airports approved contract on 2.3.2021 to commence update to AOA training module. Final phase of AOA revision based on new ALP Map 12/31/21.

COMPLETED - San Bernardino County Action Items - Summary Table

Action Item	Description	County Target Date(s)?	Meeting Updates/Notes	Exhibit -Item # reference
CNO #0 COMPLETE/REMOVE	Complete & Submit San Bernardino County Tasks Schedule of all the action items to the FAA LA ADO. The existing schedule submitted by San Bernardino County in July 2019 needs is out of date.	1) Task Schedule - 5/15/2020	COMPLETE: The summary table action items will be used in place of 2019 task schedule.	
CNO-2012-001 #1, 3-7: COMPLETE/REMOVE	Secure Contract and install, Runway guard lights, mandatory surface painted runway markings, Enhanced taxiway centerline markings and elevate left-side sign at Runway 8L/26R from Taxiway D at Hot Spot 1	1) Double signs 3) Mandatory surface painted runway markings 4) Taxiway centerline markings 5) Elevate left-side sign at Alpha and Delta. 6) Runway edge lines 7) Runway Touchdown Markers 26R	COMPLETE: 1) Double signs 7/17/17 COMPLETE: 3a) Enhanced Lead in lines and **COMPLETE: 3b) Surface Painted Holding Position Markers 3/10/21** COMPLETE: 3c) 26L Centerline; 26L/ 8R Thresholds; 26R Centerline; 26R/8L Thresholds COMPLETE: 4) Airfield Taxiway centerlines/lead-in lines. COMPLETE: 5) Elevate left-side sign at Alpha and Delta. Three signs were elevated. COMPLETE: 6) 26L AND 26R Edgelines COMPLETE: 7) 26R Runway Touchdown Markers	Exhibit – CNO-2012-001_01 Item 3) 26L Centerline Exhibit – CNO-2012-001_02 Item 3) 8L Threshold Exhibit – CNO-2012-001_03 Item 3) 8R Threshold Exhibit – CNO-2012-001_04 Item 4) Airfield Taxiway centerlines/lead-in lines. Exhibit – CNO-2012-001_05a Item 5) Elevate left-side sign at Alpha and Delta. Three signs were elevated. Exhibit – CNO-2012-001_05b Item 5) Elevate left-side sign at Alpha and Delta. Three signs were elevated. Exhibit – CNO-2012-001_05c Item 5) Elevate left-side sign at Alpha and Delta. Three signs were elevated. Exhibit – CNO-2012-001_06 Item 6) 26L AND 26R Edge lines Exhibit – CNO-2012-001_07 Item 7) 26R Runway Touchdown Markers
CNO-2014-006 #1, 3, 4: COMPLETE/REMOVE	Improve visibility and guidance for pilots to utilize Taxiway J. Install Surface painted location and direction signs near movement boundary lines. Add lead-in line from ramp to Taxiway. Repaint taxiway edge lines.	"J" Actions 1) Surface painted near movement boundary lines 9/30/20 3) Add lead in line from ramp to taxiway 4) Improve taxiway edge lines	ATCT is avoiding exiting ramp from Taxiway Kilo. Improve visibilty and guidance for pilots to utilize Taxiway Juliet. COMPLETE: 3) Lead in line from Alpha/Juliet to Kilo/Alpha 8/15/2020. REMOVED: *4) 11/09/20 - determined insufficient width to include edgelines.*	Exhibit – CNO-2014-006_01a Item 3) Lead in line from Alpha/Juliet to Kilo/Alpha Exhibit – CNO-2014-006_01b Item 3) Lead in line from Alpha/Juliet to Kilo/Alpha
CNO-2016-001 COMPLETE/REMOVE	Install surface painted directional signs on at Taxiway Delta and Kilo north of Taxiway Alpha.	1) Coordinate with consultant for one page plan for paint alignment. 2) Submit to FAA Planner for review and concurrence. 3) Install surface painted directional signage **(2/28/21)**	COMPLETE: 1) Enhanced Lead in lines at Painted 1/2021 *(*Copy Al Richardson and Sam Samad on FAA correspondence.)*	
CNO-2017-002 COMPLETE/REMOVE	Install airfield markings (all runways & taxiways), refresh runway edge markings including appropriate reflective beading and black borders to existing standards	1) Paint airfield markings and runway edge markings (Include reflective beading and black borders on differentiation of the runways) **SEE CNO 2012-001	COMPLETE **SEE CNO 2012-001	
CNO-2019-003 COMPLETE/REMOVE	Study the feasibility of installing REIL's, RAILs or ALS to aid pilots in correctly identifying their assigned runway and to avoid wrong surface landing. See ARP #3	1) 2020 ALP Update - Currently under contract with Coffman Associates, contract includes geometry analysis. **2/28/21**	Rnwy 3/21 were out of service due to public outcry and politics. % of use on runway is low. The lights are still servicable and shut off. COMPLETE: Verified REILS on/working 1/27/21 (videos uploaded to FAA DropBox); Confirmed 2-2-21 w/Sam San Bernardino County commits to participate in the outlined and upcoming, Runway End Identifier Light study. Runways 26L and 26R are the priority. REILs on the 8s can be a potential issue with Caltrans for Hghwy 83	
ARP #5 #1,2: COMPLETE/REMOVE	Install pull boxes to deactivate taxiway edge lights on closed Taxiway R at Runway 21 approach. Repaint Taxiway P to delineate run-up area north of Runway 26R. Add future ACIP project to relocate the run-up area farther north of Runway 26R.	1) Deactivation of taxiway edge lights 2) Re-Paint taxiway "P" 12/1/2020	COMPLETE: 1) Deactivaton of taxiway edge lights. COMPLETE: 2) Re-Painted Taxiway "P"	
ARP #6 ACCEPTED/REMOVE	Conduct Airport Layout Plan (ALP) update and incorporate Feasibility Study recommendations into the update	1) 2020 ALP Update - Currently under contract with Coffman Associates, contract includes geometry analysis. 2/28/21	Acceptable	

COMPLETED - San Bernardino County Action Items - Summary Table

Action Item	Description	County Target Date(s)?	Meeting Updates/Notes	Exhibit -Item # reference
ARP #7 COMPLETE/REMOVE	Provide POC for Airport Improvement Program (AIP) Grant Oversight.	Maureen A. Snelgrove Assistant Director Department of Airports Phone: 909-387-8810 Fax: 909-387-8815 777 E. Rialto Ave. San Bernardino, CA 92415-0831	COMPLETE	
ARP #8 COMPLETE/REMOVE	Hire a full-time Airport Manager and provide a Planner POC & Engineer POCs	1) CNO Airport Manager: Position is open, COVID-19 protocols delayed hiring process 2) Planner: Adrianna Ortiz, Airport Planner Phone: 909-387-8810 Fax: 909-387-8815 777 E. Rialto Ave. San Bernardino, CA 92415-0831	COMPLETE: Planner contact provided.	
ARP #9 #1: COMPLETE/REMOVE	Update and enhance County's Minimum Standards, Rules & Regulation and Driver Training documents for CNO. Coordinate with FAA & CALTRANS and provide the updated final documents for review.	1) Driver Training module is functional, annual testing remains in place.	COMPLETE: 1) Rules & Regs are part of the County Code. Specific plan effort is precursor to a minimum standards effort with tenant stakeholder involvement. Min. Standards are currently managed through leases, a min standards doc to be produced by end of 2022.	
CALTRANS #1 COMPLETE/REMOVE	Runway Safety Area (RSA) Runway 26R is obstructed by a well head located in the Runway Safety Area (RSA). Secure a work order or procurement process to remove the obstruction from the RSA.	1) RSA runway obstruction has been removed as outlined in Letter from Director, James E. Jenkins	COMPLETE: Discussion only. No impdiment in the RPZ/RSA	
CALTRANS #2 COMPLETE/REMOVE	Provide a Tasks schedule for Weed & Brush Control Program. Plan & Schedule work to repaint Runway 8L/26R & 3/21 Markings	1) Paint 2) Weed & Brush Control program is ongoing	COMPLETE: WRITTEN PLAN 7/10/20 1) COMPLETE: 10/2/20 2) Ongoing	
Support Item	**Description**	**Estimated County Target Dates**	**Meeting Updates/Notes**	**Exhibit -Item # reference**
CNO-2018-002 COMPLETE/REMOVE	Participate in the upcoming RSAT meeting to discuss adding a new hot spot at Runway 26 at Taxiway P	1) Scheduled for participation 5/13/20	Potential of moving runup area more to the north, long term ACIP fix. Painted hold lines have helped reduce PDs.	
CNO-2019-001 ARP #10 COMPLETE/REMOVE	Explore the reporting of off-airport lighting issues as a regulation with the County Board. There is the new construction warehousing nearby and a parking lot with bright lights under the final to Runway 26R. It is very disorienting and possible arriving aircraft to lose sight of the runway environment	1) Airports to coordinate with the City of Chino to review Conditions of Approval (hooded lighting)	COMPLETE: Chino Airport has avigation easements in place. City of Chino controls the entitlement process, therefore the development was conditioned by the City. Building owner confirmed compliance with his lighting engineer pursuant to the conditions of approval. Brian Childers informed there is no ongoing concern.	

Chino Airport Geometry Study

APPENDIX E

FAA Comments

(As of August 26, 2022)

The following is our comments and recommendations to the proposed Chino Airfield Geometry changes based on operational efficiency.

Two alternatives were presented in the proposed Geometry Study. Based on the operation conditions, we prefer *Alternative 1*. However, we recommend the following modification to the existing *Alternative 1* presented in the study.

- Add new standard width (currently has vast area of pavement) Taxiway L (primary artery) just east of the existing Taxiway L through Runway 8R/26L for exiting traffic from Runway 8R/26L (will not be used for crossing Runway 8R/26L while in use). This taxiway maybe used for crossings when Runway 3 is in use.
- Remove Taxiway D north of Taxiway L and south of Taxiway A. (HS 1, 3 and 4 addressed)
- Add an eastbound extension to Taxiway L to connect to a new northbound taxiway that crosses Runway 26R at a 90 degree angle and connects to Taxiway A, but does not connect to Taxiway B (we understand this may be restricted due to the localizer antenna). This addition will add needed traffic flow options to prevent bottlenecks at several locations and middle third Runway 26R crossings.
- Add new Taxiway just east of and parallel to the existing Taxiway K from the existing Taxiway Lima across Runway 26R. This taxiway is critical for Runway 26R/8L exiting and taxi route for Runway 03 operations. Without this taxiway, Runway 26R/8L occupancy time would increase causing go-arounds and other complexities to the operation. During Runway 03 operations, this proposed taxiway is critical to reducing taxi complexity and workload for ATC/pilots. Without it the taxi would become very complicated as coordination for opposite direction taxi for aircraft coming from Taxiways R, P, N, M, K would have to be sequenced with those coming from G and J.

Note: this Runway 26R/8L middle third crossing is not desired but is a concession due to the critical operational need by ATC. We have agreed with this change contingent to the following mandatory mitigations:

- Currently all aircraft exiting Runway 26L/8R cross Runways 26R/8L at Taxiways K and D (HS 1,3,4) primarily due to Taxiway P being restricted per SOP for Runway 21/03 crossing and no taxiway connectors available east of Runway 23/03 between parallel runways. The first mandated mitigation is to allow the use of Taxiway P for Runway 21/03 crossings (SOP change already started to comply with this mitigation).
- Second mandated mitigation is for facility culture to change to use the other proposed Runway 26R/8L taxiway crossings to the maximum extent possible to avoid this middle third crossing at this location. (NATCA FacRep and ATM have communicated this with facility and have received a positive response from facility employees and have committed to the change in culture/traffic flow)
- Third mandated mitigation is to break up pavement north of this proposed taxiway and Taxiway A in the ramp area to remove direct access from the ramp to Runway 26R/8L.
- Fourth mandated mitigation is to install both in-ground and elevated runway guard lights on both sides of Runway 26R/8L on this taxiway.
- Fifth mandated mitigation is to install stop bar lights on both sides of Runway 26R/8L on this taxiway.

- Remove Taxiway P between Taxiway B and Runway 26L. This removes the potential RSA violation that may occur from aircraft missing the left turn onto Taxiway B while southbound on Taxiway P (also addresses an existing RIM location – CNO-05).
- Addition of taxiway from the approach end of Runway 26R southbound across taxiway B to Runway 26L. Critical need for operational efficiency. This pavement will only be used for aircraft that RY 26R LC will pre-coordinate a departure from RY26L with. It will be used strictly for aircraft that are holding short of RY 26R and need to be crossed for immediate departure on RY 26L at that intersection.
- Removal of new proposed taxiway south of Taxiway Bravo across Runway 26L between Taxiway C and P. This taxiway addition is not operationally needed.
- Removal of the portion of the proposed extension to Taxiway Lima West of Taxiway Hotel. It was determined that the addition would not be beneficial for the flow of traffic and is hoped the removal will lesson wrong surface confusion by pilots incorrectly identifying it as Runway 8R.

Please see the attached revised Alternative 1 Exhibit GS11.

The preferred Airfield Geometry Alternative 2 presented in the proposed Geometry Study is the least preferred of the two Alternatives because of the following risks and concerns:

- The Runway 26R run-up area presented north of Taxiway A, presents a Wrong Surface Departure Risk with aircraft leaving the proposed run-up area and confusing Taxiway A with Runway 26R.
- The extension of Taxiways O and A to join the new proposed taxiway from the Runway 26R run-up area and removal of Taxiway P create choke point and opposite direction conflict into the proposed run-up area. This proposed change will add additional runway crossings that do not exist today, increased workload for ATC, loss of efficiency, increased taxi complexity.
    - Aircraft taxing east on Taxiway A for the proposed run-up area will have to turn north in conflict with aircraft leaving the proposed run-up area southbound for Runway 26R. This will cause ATC to focus attention to separate conflict where none exists at this time and distracting from other duties.
    - All aircraft from the north parking locations that will need to depart from Runway 26L will have to compete with this traffic to cross Runway 26R at the approach end or have to taxi an extended length on the proposed extension of Taxiway E across (additional runway crossing) Runway 26L and join Taxiway C to Runway 26L.
- The extension of Taxiway E from L to O will duplicate issues currently being addressed at HS1 and HS2. Aircraft moving north or south on the proposed extension of Taxiway E will have RSA violations on Runway 26R as currently occurs today on Taxiway D. This proposal does not connect to Runway 26R at a 90-degree angle and will be prone to RSA violations.

The other potential improvements such as Runway Guard Lights, Stop Lights, and enhanced markings are not addressed.

Some general comments and concerns:

- The current and proposed taxiway designations at CNO are not consistent with the taxiway designations guidelines and standards. The taxiway system should be re-designated as part of this project. Please reference the guidelines and standards in AC 150/5340-18 when developing or revising an airport signage plan. Per the standards, a runway with a parallel taxiway, use alphanumeric designators at the entrance and exit taxiways located at the ends and along the runway. Apply an increasing, sequentially numbered pattern from one runway end to the other runway end, such as A1, A2, A3, A4, and A5. (Reference: FAA Advisory Circular (AC) 150/5340-1G, 1.4).

- The geometry study proposes an extension of Runway 8L-26R to the east. As depicted the extension will result in the threshold of Runway 26R being located very close to a roadway and other landmarks. Any proposed extension will require an RSA determination and implementation of all practicable alternatives for meeting the RSA standards. The study should address RSA alternatives for this runway.

Runway 3-21 (4,919' x 150')
Runway RL-26R (4,858' x 150')
Runway 8R-26L (7,000' x 150')
Perimeter Access Rd.

APPENDIX D

ENVIRONMENTAL OVERVIEW

SAN BERNARDINO COUNTY

Appendix D
ENVIRONMENTAL OVERVIEW

An analysis of potential environmental impacts associated with proposed airport projects is an essential consideration in the Airport Layout Plan (ALP) update process. The primary purpose of this discussion is to review the recommended development concept plan and associated capital program at the airport to determine whether projects identified in the ALP update could, individually or collectively, significantly impact existing environmental resources. The information contained in this section was obtained from previous studies, official internet websites, and analysis by the consultant.

The *FAA Reauthorization Act of 2018* (Act) necessitates changes to how the FAA historically operates with respect to airport oversight. Section 163 of the Act limits the FAA's approval authority over certain projects. Pursuant to Section 163, when a sponsor submits a change to the ALP, requests a change in land use from aeronautical to non-aeronautical, or requests to dispose of airport-owned land, the FAA would need to determine if the proposal would be subject to the agency's approval authority. This approval is a two-step process. The FAA would exercise its regulatory authority consistent with the Act and separately examine and reach a determination regarding its authority under both steps. First, the FAA would determine if they had ALP approval authority under Section 163 of the Act. The second step is to determine how the land was acquired and if land release obligations are required. Projects depicted on the ALP approved prior to the Act must be evaluated to determine whether FAA retains their approval authority.

For projects not categorically excluded under FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, compliance with the *National Environmental Policy Act* (NEPA) is generally satisfied through the preparation of an Environmental Assessment (EA). In instances where significant environmental impacts are expected, as determined by the FAA, an Environmental Impact Statement (EIS) may be required. While this portion of the ALP update is not designed to satisfy the NEPA requirements, it provides a preliminary review of environmental issues that may need to be considered in more detail within the environmental review processes. It is important to note that the FAA is ultimately responsible for determining the level of environmental documentation required for airport actions.

The environmental inventory included in Chapter One provides baseline information about the airport environs. This section provides an overview of potential impacts to existing resources that could result from implementation of the planned improvements outlined on the recommended development concept plan.

POTENTIAL ENVIRONMENTAL CONCERNS

Table D1 summarizes potential environmental concerns associated with implementation of the recommended development concept plan for Chino Airport. Analysis under NEPA includes effects or impacts a proposed action or alternative may have on the human environment (see 40 Code of Federal Regulations [CFR] § 1508.1),[1] which can include:

- Construction of a facility or runway in a wetland which results in the loss of a portion of the habitat;
- Noise generated by the proposed action or alternative(s) which adversely affects noise-sensitive land uses; or
- Growth-inducing effects related to induced changes in the pattern of land use, population density or growth rate, and related impacts on air and water and other natural systems, including ecosystems.

TABLE D1 | Summary of Potential Environmental Concerns

<table>
<tr><th colspan="2">AIR QUALITY</th></tr>
<tr><td>FAA Order 1050.1F, Significance Threshold/Factors to Consider</td><td>Federal Threshold: The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the United States (U.S.) Environmental Protection Agency (EPA) under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.

Local Threshold: The airport is in the South Coast Air Quality Management District (AQMD), which has both construction and operational thresholds on all NAAQS pollutants.[2] The thresholds are as follows for both construction and operations:

<table>
<tr><th>Pollutant</th><th>Construction</th><th>Operational</th></tr>
<tr><td>NO_x</td><td>100 lbs./day</td><td>55 lbs./day</td></tr>
<tr><td>VOC/VOX</td><td>75 lbs./day</td><td>55 lbs./day</td></tr>
<tr><td>PM_{10}</td><td>150 lbs./day</td><td>150 lbs./day</td></tr>
<tr><td>$PM_{2.5}$</td><td>55 lbs./day</td><td>55 lbs./day</td></tr>
<tr><td>SO_x</td><td>150 lbs./day</td><td>150 lbs./day</td></tr>
<tr><td>CO</td><td>550 lbs./day</td><td>550 lbs./day</td></tr>
<tr><td>Pb</td><td>3 lbs./day</td><td>3 lbs./day</td></tr>
<tr><td colspan="3">Source: South Coast AQMD (April 2019), Air Quality Analysis Handbook
Notes: lbs. - pounds</td></tr>
</table>
</td></tr>
<tr><td>Potential Environmental Concerns</td><td>Potential Impact. The projected increase in operations over the 20-year planning horizon of the recommended development concept plan (Exhibit 5A) would likely result in additional emissions. The South Coast Air Quality Management District (AQMD) is in nonattainment for O_3 (extreme) and $PM_{2.5}$ (serious). The air district was previously a nonattainment CO, NO_2, and PM_{10}; however, it has been designated as a maintenance area. The federal de minimis threshold for CO, NO_2, and PM_{10} are 100 tons per year for each criteria pollutant.

Prior to the start of airport construction activities for improvements outlined on the recommended development concept plan, an air quality analysis may be required during the NEPA process to determine whether emissions would exceed de minimis thresholds established by NAAQS.

Prior to the start of construction, the airport would be required to obtain a Permit to Construct from the South Coast AQMD.</td></tr>
</table>

[1] *Effects* or *impacts* to the human environment from a proposed action or alternative are those actions which may be reasonably foreseeable and have a reasonably close causal relationship. Those effects could occur at the same time and place or include effects that are later in time or are farther removed in distance from a proposed action or alternative. Effects or impacts include those on the natural environment, aesthetic, historic, cultural, or socioeconomic, and may have a beneficial or detrimental effect. (Council of Environmental Quality *Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act*. July 16, 2020. Federal Register Volume 85, No. 137, Pages 43304 through 43376)

[2] South Coast Air Quality Management District (April 2019). *Air Quality Analysis Handbook*. Available at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook

BIOLOGICAL RESOURCES	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.** FAA has not established a significance threshold for non-listed species. However, factors to consider are if an action would have the potential for: • Long term or permanent loss of unlisted plant or wildlife species; • Adverse impacts to special status species or their habitats; • Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or • Adverse impacts on a species' reproductive rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.
Potential Environmental Concerns	Federally Listed Species **Potential Impact.** According to the biological information discussed in Chapter One, the airport has insufficient habitat to support most of the eight federally listed species (and one candidate species) which have the potential to occur at the airport.[3] However, three flowering plants listed in the *Endangered Species Act* for San Bernardino County, the San Diego ambrosia (*Ambrosia pumila*), slender-horned spineflower (*Dodecahema*)**,** and the thread-leaved brodiaea (*Brodiaea filifolia*), have a low potential to occur at the airport. Whether those plant species are currently present or if sufficient habitat is present to support these species would need to be determined by a qualified wildlife biologist during a field survey at a project-specific level. For designated critical habitat **No Impact.** Critical habitat for least Bell's Vireo is located 0.8 miles southwest of the airport. For non-listed species **Potential Impact.** Non-listed species of concern include those protected by the *Migratory Bird Treaty Act* and the *Bald and Golden Eagle Protection Act* or by the State of California as Species of Special Concern. The potential for impacts to migratory birds and eagles should be evaluated on a project-specific basis. Both burrowing owl (*Athene cunicularia*) and California horned lark (*Eremophila alpestris actia*) are known to occur at the airport. Avoidance measures may include pre-construction surveys or scheduling construction outside of nesting seasons for these species.
CLIMATE	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Climate; refer to FAA Order 1050.1F's, *Desk Reference*, for the most up-to-date methodology for examining impacts associated with climate change. The South Coast AQMD established both construction and operational thresholds on greenhouse gas (GHG) emissions for stationary industrial facilities. Airports are not considered a stationary source for air pollution or GHG emissions.[4] Guidelines set by the South Coast AQMD address stationary sources only.
Potential Environmental Concerns	**Potential Impact.** An increase in greenhouse gas (GHG) emissions could occur over the 20-year planning horizon of the recommended development concept plan. A project-specific analysis may be required per the FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, based on the parameters of the individual projects.
COASTAL RESOURCES	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significant threshold for Coastal Resources.
Potential Environmental Concerns	**No Impact.** The airport is not located within a coastal zone. California's coastal zone is located approximately 28 miles west of the airport.

[3] SWCA Environmental Consultants, Inc. *Biological Resources Survey Report for Chino Airport, San Bernardino County, California (October 2022)*

[4] South Coast Air Quality Management District (2008). *Greenhouse Gases*. Available at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; and publicly or privately owned land from an historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.**
Potential Environmental Concerns	**Potential Impact.** Table 1P in Chapter One identifies 11 Section 4(f) resources within one mile from the airport boundary, three of which are located less than 0.1 mile south (Evergreen Park, Founders Park, and Mulberry Park). The physical use of these properties is unlikely since these parks are off airport property. Additionally, the proposed land acquisition would not result in an impact as it does not include the park properties. However, due to the proximity of these resources to the airport, constructive use may need to be evaluated at the outset of projects outlined in the recommended development concept plan to determine whether improvements are not so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. The responsible FAA official would be required to consult with all appropriate federal, state, and local officials having jurisdiction over the affected Section 4(f) properties to determine whether project-related impacts would substantially impair the resource. Consultation would occur as part of the NEPA process as specific projects are initiated.
FARMLANDS	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The total combined score on Form AD-1006, *Farmland Conversion Impact Rating*," ranges between 200 and 260.** (Form AD-1006 is used by the U.S. Department of Agriculture, Natural Resources Conservation Service [NRCS] to assess impacts under the *Farmland Protection Policy Act* [FPPA].) FPPA applies when airport activities meet the following conditions: • Federal funds are involved; • The action involves the potential for the irreversible conversion of important farmlands to non-agricultural uses. Important farmlands include pastureland, cropland, and forest considered to be prime, unique, or statewide or locally important land; or • None of the exemptions to FPPA apply. These exemptions include: o When land is not considered "farmland" under FPPA, such as land already developed or already irreversibly converted. These instances include when land is designated as an urban area by the U.S. Census Bureau, or the existing footprint includes rights-of-way. o When land is already committed to urban development. o When land is committed to water storage. o The construction of non-farm structures necessary to support farming operations. o The construction/land development for national defense purposes.
Potential Environmental Concerns	**Potential Impact.** According to the NRCS Web Soil Survey, over 99 percent of the airport is classified as either "Prime Farmland if Irrigated" or "Farmland of Statewide Importance." Many of the proposed projects delineated on the recommended development concept plan are within areas of prime farmland. According to the U.S. Census Bureau 2010 Census, the airport is in a non-urbanized area.[5] The airport confirmed areas of the airport proposed for development south of Taxiway C and east of Runway 3-21 are actively used for agricultural purposes.[6] If federal funds are used for projects outlined on the recommended development concept plan, and those projects affect lands containing prime farmland soils and is in non-urbanized areas, FPPA may apply. As part of the NEPA process, new airport development may require coordination with the NRCS and the completion of Form AD-1006 to determine the *Farmland Conversion Impact Rating* score and establish the impact to farmland. The FAA would determine if a significant impact exists.

[5] U.S. Census Bureau – Los Angeles-Long Beach-Anaheim, CA, Panel 7 (2010) (https://www2.census.gov/geo/maps/dc10map/UAUC_RefMap/ua/ua51445_los_angeles--long_beach--anaheim_ca/)

[6] Ortiz, Adrianna. Airport Planner with San Bernardino County Department of Airports. June 17, 2021 email to Patrick Taylor, Principal, with Coffman Associates, Inc.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention. However, factors to consider are if an action would have the potential to: • Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management; • Involve a contaminated site; • Produce an appreciably different quantity or type of hazardous waste; • Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or • Adversely affect human health and the environment.
Potential Environmental Concerns	**Potential Impact.** As noted in Chapter One, fueling services at the airport are provided by the airport's fixed base operators (FBOs). Threshold Aviation Group FBO owns and operates a fuel farm consisting of two aboveground storage tanks (ASTs), including a 20,000-gallon of Jet A fuel and one AST split into two compartments, each 10,000 gallons for Jet A fuel and the other for 100LL. Encore Jet Center leases two fuel farms on the north side of the airport that provides 100LL self-service fueling. A third fuel farm is located adjacent to an aircraft parking apron long Taxiway N. Other operations at the airport provide opportunity for aircraft maintenance activities that could involve fossil fuels or other types of hazardous materials or wastes. These operations are regulated and monitored by the appropriate regulatory agencies, such as the U.S. EPA and California Department of Environmental Protection. The recommended development concept plan does not include land uses that would produce an appreciably different quantity or type of hazardous waste. However, should this type of land use be proposed, further NEPA review and/or permitting may be required. There are no known hazardous materials or waste contamination sites currently on airport property. The recommended development concept plan illustrates approximately 38 acres of land to be acquired west of Runways 8L-26R and 8R-26L, north and south of Runway 3-21, and east of Runway 8R-26L. Since land acquisition is proposed, an Environmental Due Diligence Audit (EDDA) would be required as part of the land acquisition process.
HISTORIC, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Historical, Architectural, Archaeological, and Cultural Resources. Factors to consider are if an action would result in a finding of "adverse effect" through the Section 106 process. However, an adverse effect finding does not automatically trigger preparation of an EIS (i.e., a significant impact).
Potential Environmental Concerns	**No Impact**. There are no properties listed on the National Register of Historic Places (NRHP) within two miles of the airport. In 2022 and 2023,historical and archaeological surveys were conducted at the airport. No cultural resources eligible for listing on the national, state, or local historic registers were noted. The airport has been heavily disturbed by grading, construction, and development of a controlled flood area, and the likelihood of "intact" archaeological resources being present is low.[7] However, not all areas of the airport were surveyed and with time, additional structures at the airport will become of historic age. Areas and structures not previously surveyed will be subject to additional surveys and analysis.

[7] SWCA Environmental Consultants, Inc. (April 2012). *Archaeological Resources Assessment for the Chino Airport, Chino, San Bernardino County, California* (August 2023)

LAND USE	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Land Use. There are also no specific independent factors to consider. The determination that significant impacts exist is normally dependent on the significance of other impacts.
Potential Environmental Concerns	**Potential Impact.** The recommended development concept plan includes approximately 38 acres of land acquisition west of Runways 8L-26R and 8R-26L, north and south of Runway 3-21, and east of Runway 8R-26L. These parcels are currently undeveloped.
NOISE AND NOISE-SENSITIVE LAND USE	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The action would increase noise by Day-Night Average Sound Level (DNL) 1.5 decibel (dB) or more for a noise-sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.** Another factor to consider is that special consideration needs to be given to the evaluation of the significance of noise impacts on noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in Title 14 CFR Part 150 are not relevant to the value, significance, and enjoyment of the area in question.
Potential Environmental Concerns	**No Impact.** As indicated on **Exhibit D1** and **D2**, the existing condition and ultimate 65 dB Community Noise Equivalent Level (CNEL) noise contours remain on airport property except for a portion that extends off airport property northeast of the approach end of Runway 26L. The land east of the airport is used for warehouses and agriculture, which are compatible when considering aircraft noise.
SOCIOECONOMIC, ENVIRONMENTAL JUSTICE, AND CHILDREN'S HEALTH AND SAFETY RISKS	
Socioeconomic	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Socioeconomics. However, factors to consider are if an action would have the potential to: • induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area); • disrupt or divide the physical arrangement of an established community; • cause extensive relocation when sufficient replacement housing is unavailable; • cause extensive relocation of community businesses that would cause severe economic hardship for affected communities; • disrupt local traffic patterns and substantially reduce the levels of service of roads serving the airport and its surrounding communities; or • produce a substantial change in the community tax base.
Potential Environmental Concerns	**Potential Impact.** The recommended development concept plan for the airport could potentially encourage economic growth for the City of Chino and San Bernardino County. Results include new construction jobs, new jobs at the airport and other non-aeronautical uses, new housing, and an increase in the local tax base. The recommended development concept plan does propose the acquisition of all of one parcel and a portion of three parcels west of Runways 8L-26R and 8R-26L. According to the San Bernardino County assessor's website, these properties are jointly owned by the State of California Prison Grounds and the California Institution for Women.[8] Two of these parcels are currently undeveloped. The other two parcels have light industrial uses, including a distribution center for Walmart. The proposed land acquisition would affect a portion of the access drive from Euclid Avenue and concrete wall screening the distribution center.

[8] San Bernardino County Assessor-Recorder-Clerk (June 2021). Available at: https://arcpropertyinfo.sbcounty.gov/

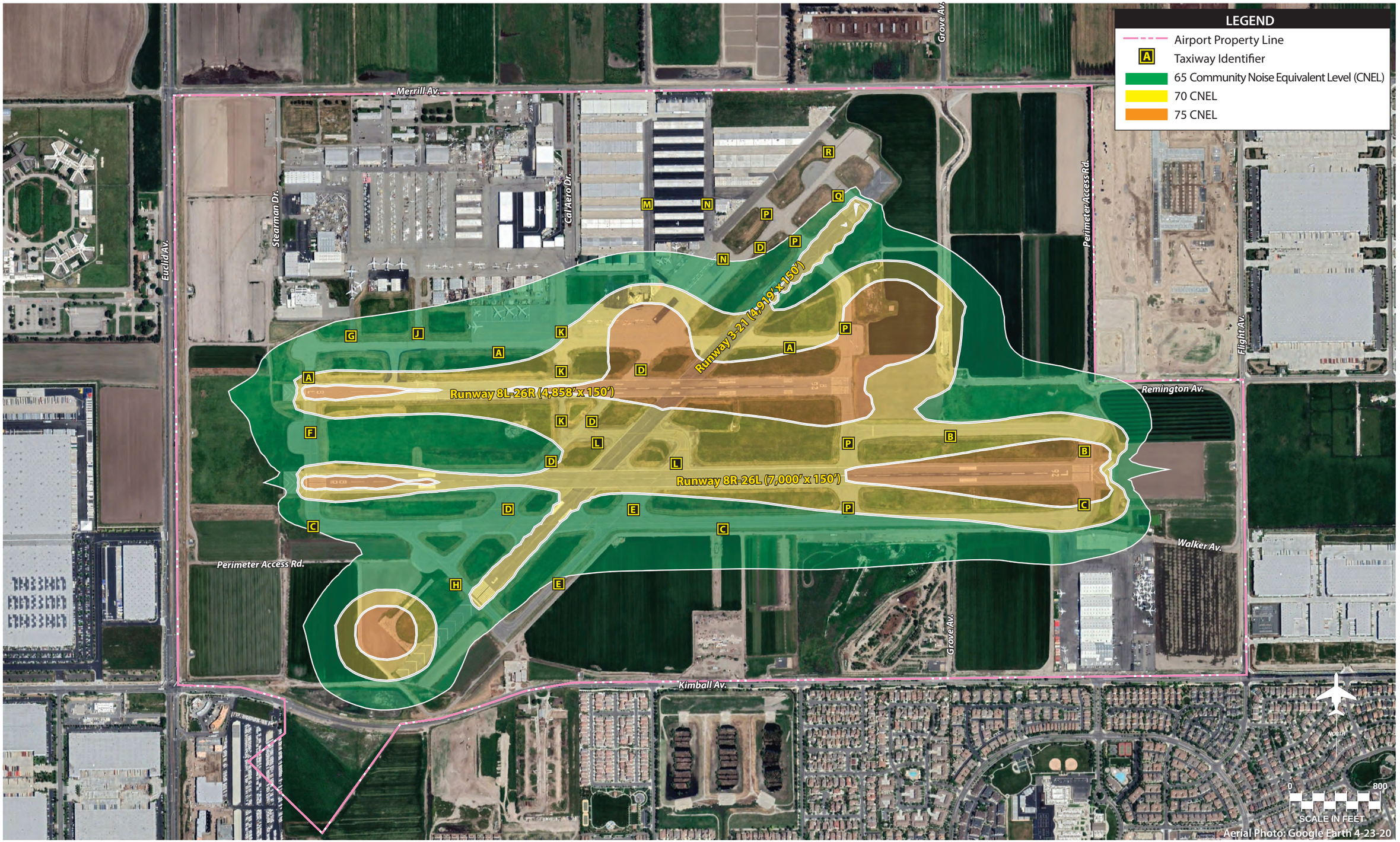

Exhibit D1
EXISTING NOISE CONTOURS

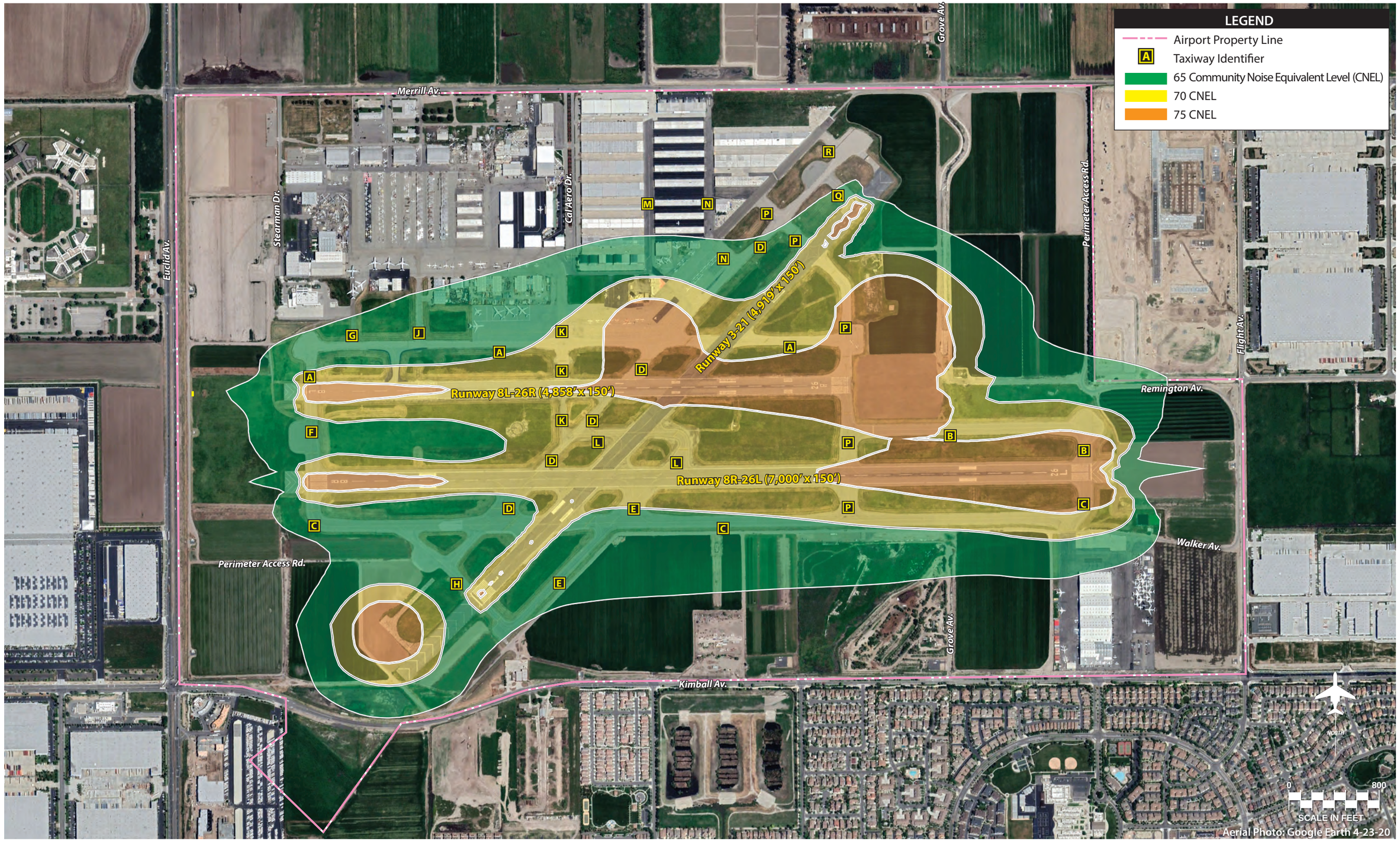

Exhibit D2
ULTIMATE NOISE CONTOURS

Environmental Justice	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Environmental Justice. However, factors to consider are if an action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population), due to: • Significant impacts in other environmental impact categories; or • Impacts on the physical or natural environment that affect an environmental justice population in a way that FAA determines is unique to the environmental justice population and significant to that population.
Potential Environmental Concerns	**Potential Impact.** Both low-income and minority populations have been identified in the vicinity of the airport. Executive Order (E.O.) 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*, and the accompanying Presidential Memorandum, and Order DOT 5610.2, *Environmental Justice*, require the FAA to provide for meaningful public involvement for minority and low-income populations, as well as analysis that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse. Environmental justice impacts may be avoided or minimized through early and consistent communication with the public and allowing ample time for public consideration. If disproportionately high or adverse impacts are noted, mitigation and enhancement measures and offsetting benefits can be taken into consideration.
Children's Health and Safety Risks	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. However, factors to consider are whether an action will have the potential to lead to a disproportionate health or safety risk to children.
Potential Environmental Concerns	**Potential Impact.** Per E.O. 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, federal agencies are directed to identify and assess environmental health and safety risks that may disproportionately affect children. These risks include those that are attributable to products or substances that a child is likely to encounter or ingest, such as air, food, drinking water, recreational waters, soil, or products to which they may be exposed. Within proximity of the airport, one school has been identified (Cal Aero Preserve Academy, identified on Exhibit 1M in Chapter One). Best management practices (BMPs) should be implemented to decrease environmental health risks to children. During construction of the projects outlined in the recommended development concept plan, appropriate measures should be taken to prevent access by unauthorized persons to construction project areas.
VISUAL EFFECTS	
Light Emissions	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	The FAA has not established a significant threshold for light emissions. However, a factor to consider is the degree to which an action would have the potential to: • Create annoyance or interfere with normal activities from light emissions; and • Affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resource.
Potential Environmental Concerns	**Potential Impact.** New lighting associated with the recommended development concept plan would remain on the airfield and other developed portions of the airport. Proposed lighting would most likely be associated with new development, such as wall pack lighting on new hangars and edge lighting for relocated taxiways. If nighttime work is needed, there may be temporary effects to neighboring residential properties associated with construction lighting. It may be necessary to evaluate whether new development proposed on the recommended development concept plan would include new lighting which could affect nearby parcels. New illumination fixtures may need to be evaluated to determine if shielding is necessary or angled to divert lighting away from sensitive land uses.

Visual Resources/Visual Character	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Visual Resources/Visual Character. However, a factor to consider is the extent an action would have on the potential to: • Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources; • Contrast with the visual resources and/ or visual character in the study area; and • Block or obstruct the views of the visual resources, including whether these resources would still be viewable from other locations.
Potential Environmental Concerns	**Potential Impact.** The development proposed in the recommended development concept plan could change the overall visual character of the airport with additional roads and structures planned on-site. New development associated with the aeronautical/non-aeronautical development south of the airport adjacent to Merrill Avenue, Euclid Avenue, and Kimball Avenue could be visible from residential land uses south of the highway.
WATER RESOURCES	
Wetlands	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The action would:** **1. Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;** **2. Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;** **3. Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);** **4. Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;** **5. Promote development of secondary activities or services that would cause the circumstances listed above to occur; or** **6. Be inconsistent with applicable state wetland strategies.**
Potential Environmental Concerns	**Potential Impact.** According to the National Wetland Inventory, riverines, freshwater emergent wetlands, and freshwater ponds were identified as wetlands at the airport. It is important to note that the definition of jurisdictional wetlands has recently been revised and potential wetland features noted at the airport may not be jurisdiction waters under federal law. Proposed aeronautical use and non-aeronautical revenue support south of Taxiway C, adjacent to Kimball Avenue, could affect wetlands. If projects outlined on the recommended development concept plan involve the relocation or removal of jurisdictional wetlands, consultation with the U.S. Army Corps of Engineers may be required to determine if a Section 404 permit under the *Clean Water Act* is warranted. A Section 404 permit regulates the discharge of dredged or fill material into jurisdictional waters and wetlands.

Floodplains	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of DOT Order 5650.2, *Floodplain Management and Protection.***
Potential Environmental Concerns	**Possible Impact.** Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) dated March 16, 2015 (panels 06071C9335H and 06071C9375H effective August 28, 2008), the western end of the airport is an area of undetermined flood hazard (Zone D), while the east end of the airport is classified as Zone X or is part of a 500-year floodplain. A Flood Zone of "D" is defined as areas where there is possible but undetermined flood hazards since no analysis of flood hazards have been conducted. For any project located within a 100-year floodplain, a development permit approved by the San Bernardino County Floodplain Administrator may be required. A development permit must be obtained prior to construction or other development occurring within a special flood hazard area.[9] In addition, federally funded projects must consider Federal Flood Risk Management Standards per one of the allowed methods under federal law. Pursuant to FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and DOT Order 5650.2, *Floodplain Management and Protection*, public agencies undertaking any project within the floodplain are required to provide the public an opportunity for early public review of the project. The public comment period occurs concurrently with the associated NEPA process.
Surface Waters	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The action would:** • **Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or** • **Contaminate public drinking water supply such that public health may be adversely affected.** Factors to consider are when a project would have the potential to: • adversely affect natural and beneficial water resource values to a degree that substantially diminishes or destroys such values; • adversely affect surface waters such that the beneficial uses and values of such waters are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or • present difficulties based on water quality impact when obtaining a permit or authorization.
Potential Environmental Concerns	**Potential Impact.** County of San Bernardino holds a current NPDES General Permit Number CAS618036 and is assigned Waste Discharge Identification number 8-36S0049096, which ensures that pollution control measures are in place at the airport. The airport also has a current Storm Water Pollution Prevention Program (SWPPP), which addresses potential pollution sources and describes practices to minimize and control pollutants. If a project would disturb more than one acre of soil, the airport would be required to obtain a Construction General Permit. FAA's Advisory Circular (AC) 150/5370-10G, *Standards for Specifying Construction of Airports, Item P-156, Temporary Air and Water Pollution, Soil Erosion and Siltation Control* should also be implemented during construction projects at the airport.

[9] City of Chino *Municipal Code* (2008). Chapter 8.60 – *Floodplain Management*. Available at: https://library.municode.com/ca/chino/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.60FLMA

Groundwater	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	**Threshold: The action would:** **1. Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies: or** **2. Contaminate an aquifer used for public water supply such that public health may be adversely affected.** Factors to consider are when a project would have the potential to: • Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values; • Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained, and such impairment cannot be avoided or satisfactorily mitigated; or • Present difficulties based on water quality impacts when obtaining a permit or authorization.
Potential Environmental Concerns	**Potential Impact.** In the 1980s groundwater contamination (i.e., trichloropropane, dichloroethene, and trichloroethylene) was associated with the airport's historic use as military training facility. Between 1990 and 2010, San Bernardino County completed three remediation activities at the airport, and as of 2017 cleanup was ongoing. In November 2020, the Santa Ana Regional Water Quality board approved the Interim Remedial Action Plan for groundwater remediation. According to the State Water Resources Control Board's website, no cleanup actions are underway.[10] The airport is considered a Category 1 site, which are sites with groundwater contamination that does not present an immediate threat to human health and does not extend off site. No impacts to sole source aquifers (SSAs) would result from airport projects outlined on the recommended development concept plan. The closest SSA is the Campo/Cottonwood Creek Aquifer, located approximately 96 miles southeast of the airport.
Wild and Scenic Rivers	
FAA Order 1050.1F, Significance Threshold/Factors to Consider	FAA has not established a significance threshold for Wild and Scenic Rivers. Factors to consider are when an action would have an adverse impact on the values for which a river was designated (or considered for designation) through: • Destroying or altering a river's free-flowing nature; • A direct and adverse effect on the values for which a river was designated (or under study for designation); • Introducing a visual, audible, or other type of intrusion that is out of character with the river or would alter outstanding features of the river's setting; • Causing the river's water quality to deteriorate; • Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor; or • Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) or a Section 5(d) river that is not included in the NRI from being included in the Wild and Scenic River System or causing a downgrade in its classification (e.g., from wild to recreational).
Potential Environmental Concerns	**No Impact.** The nearest designated Wild and Scenic River, the Bautista Creek, is located approximately 49 miles from the airport. The closest river on the NRI is a segment of Lytle Creek, which is located approximately 17 miles south of the airport. Projects delineated on the recommended development concept plan would not have adverse effects on these river's outstanding remarkable values (i.e., scenery, recreation, geology, fish, wildlife, and history).

Source: Coffman Associates, Inc. analysis

[10] State of California, State Water Resources Control Board GeoTracker (June 2021). Available at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL208634049

APPENDIX E

AIRPORT LAYOUT PLANS

SAN BERNARDINO COUNTY

Appendix E
AIRPORT PLANS

Airport Layout Plan and Narrative Report - Chino Airport

The Federal Aviation Administration (FAA) requires the development of several technical drawings detailing specific elements of an airport and its environs. The technical drawings are collectively referred to as the Airport Layout Plan (ALP) set. The drawings are created on a computer-aided drafting system (CAD) and serve as the official depiction of the current and planned condition of an airport. The drawings are delivered to the FAA for their review and approval. The FAA critiques the drawings from a technical perspective to be sure all applicable federal regulations are met.

The five primary functions of the ALP that define its purpose are:

1) An approved plan is necessary for the airport to receive financial assistance under the terms of the *Airport and Airway Improvement Act of 1982* (AIP), as amended, and to be able to receive specific Passenger Facility Charge funding. An airport must keep its ALP current and follow that plan, since those are grant assurance requirements of the AIP and previous airport development programs, including the *1970 Airport Development Aid Program* (ADAP) and *Federal Aid Airports Program* (FAAP) of 1946, as amended. While ALPs are not required for airports other than those developed with assistance under the federal programs, the same guidance can be applied to all airports.
2) An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP provides a guideline by which the airport sponsor can ensure that development maintains airport design standards and safety requirements and is consistent with airport and community land use plans.

3) The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.

4) The approved ALP enables the airport sponsor and the FAA to plan for facility improvements at the airport. It also allows the FAA to anticipate budgetary and procedural needs. The approved ALP will also allow the FAA to protect the airspace required for facility or approach procedure improvements.

5) The ALP can be a working tool for the airport sponsor, including its development and maintenance staff.

The FAA requires that any changes to the airfield (i.e., runway and taxiway system, etc.) be represented on the drawings. The landside configuration developed during this planning process is also depicted on the drawings, but the FAA recognized that landside development is much more fluid and often dependent upon specific developer needs. Thus, an updated drawing set is not typically necessary for future landside alterations provided the changes are consistent with what is depicted. In some cases, when a landside development is moving forward, the FAA may require an update to the ALP.

AIRPORT LAYOUT PLAN SET

The ALP set includes several technical drawings which depict various aspects of the current and future layout of the airport. The following is a description of the ALP drawings included with this ALP update.

AIRPORT LAYOUT PLAN DRAWING

An official Airport Layout Plan drawing has been developed for Chino Airport, a draft of which is included in this appendix. The ALP drawing graphically presents the existing and ultimate airport layout plan. The ALP drawing includes such elements as the physical airport features, wind data tabulation, location of airfield facilities (i.e., runways, taxiways, navigational aids), and existing general aviation development. Also presented on the ALP are the runway safety areas, airport property boundary, and revenue support areas.

The plan provides detailed information on existing and future facility layouts on multiple layers that permit the user to focus on any section of the airport at a desired scale. The plan can be used as base information for design and can be easily updated in the future to reflect new development and more detail concerning existing conditions as made available through design surveys.

14 CFR PART 77 AIRSPACE DRAWING

Title 14 Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*, was established for use by local authorities to control the height of objects near airports. The Part 77 Airspace Drawing included in the ALP set is a graphic depiction of this regulatory criterion. The Part 77 Airspace Drawing is a tool to aid local authorities in determining if proposed development could present a hazard to aircraft using the airport. The Part 77 Airspace Drawing can be a critical tool for the airport sponsor's use in reviewing proposed development near the airport.

Airport management should do all in their power to ensure development near the airport stays below the Part 77 surfaces to protect the role of the airport. The following discussion will describe those surfaces that make up the recommended FAR Part 77 surfaces at Chino Airport.

The FAR Part 77 Airspace Drawing assigns three-dimensional imaginary surfaces associated with the airport. These imaginary surfaces emanate from the runway centerline(s) and are based on the planned **future** condition for the airport. The Part 77 imaginary surfaces include the primary surface, approach surface, transitional surface, horizontal surface, and conical surface.

The dimensions of the FAR Part 77 surfaces are a function of the planned runway classification (utility or other-than-utility) and the planned instrument approach capability. Utility runways are those planned to accommodate regular use by aircraft weighing less than 12,500 pounds and other-than-utility runways support regular operations by aircraft weighing more than 12,500 pounds. All three runways are classified as other-than-utility at Chino Airport.

For Part 77, Runway 26R is planned for a non-precision instrument approach with ¾-mile visibility minimums. All other runway ends are planned for 1-mile visibility minimums. **Table E1** summarizes the runway classification, planned instrument approaches, and the approach surface dimensions.

TABLE E1 | Part 77 Approach Surface Dimensions
Chino Airport

			APPROACH SURFACE (ft)			
Runway End	**Utility (U) / Other-Than-Utility (OTU)**	**Planned IAP**	**Inner Width (Primary Surface)**	**Outer Width**	**Length**	**Slope Ratio**
Runway 8L	OTU	1-mile	1,000’	3,500’	10,000’	34:1
Runway 26R	OTU	¾-mile	1,000’	4,000’	10,000’	34:1
Runway 8R	OTU	1-mile	500’	3,500’	10,000’	34:1
Runway 26L	OTU	1-mile	500’	3,500’	10,000’	34:1
Runway 3	OTU	1-mile	500’	3,500’	10,000’	34:1
Runway 21	OTU	1-mile	500’	3,500’	10,000’	34:1
IAP: Instrument Approach Procedure						

Source: CFR Part 77, Objects Affecting Navigable Airspace

Primary Surface

The primary surface is an imaginary surface longitudinally centered on the runway, extending 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation along the nearest associated point on the runway centerline. The width of the primary surface is a function of the planned runway classification and the most capable instrument approach procedure planned for the runway, regardless of which end supports the approach. The width of the primary surface for each runway is as follows:

- Runway 8L-26R: 1,000 feet
- Runway 8R-26L: 500 feet
- Runway 3-21: 500 feet

Approach Surface

An approach surface is established for each runway end. The approach surface begins at the end of the primary surface and is the same width as the primary surface at this point. It extends upward and outward from the primary surface end and is centered along an extended runway centerline. The approach surface leading to each runway is based upon the type of instrument approach planned (instrument or visual).

The Part 77 approach surface for Runway 26R is 1,000 feet wide at its inner width and 4,000 feet wide at its outer width. It extends 10,000 feet at a 34:1 ratio. The Part 77 approach surface for all other runways ends is 500 feet wide at its inner width, 3,500 feet wide at its outer width. It extends 10,000 feet at a slope of 34:1.

Transitional Surface

Each runway has a transitional surface that begins at the outside edge of the primary surface at the same elevation as the runway. The surface rises at a slope of 7:1, to a height of 150 feet above the highest runway elevation. At that point, the transitional surface ends at the horizontal surface.

Horizontal Surface

The horizontal surface is established at 150 feet above the highest elevation of the runway surface. Having no slope, the horizontal surface connects the transitional and approach surfaces to the conical surface at 10,000 feet from the end of the primary surfaces of each runway.

Conical Surface

The conical surface begins at the outer edge of the horizontal surface. The conical surface then continues for an additional 4,000 feet horizontally at a slope of 20:1. Therefore, at 4,000 feet from the horizontal surface, the elevation of the conical surface is 350 feet above the highest airport elevation.

INNER PORTION/APPROACH SURFACE DRAWINGS

The inner portion of the runway approach surface drawing presents the inner portion of the Part 77 approach surface to the runway ends. It also depicts the runway centerline profile with elevations. This drawing provides details that the Part 77 drawing does not.

The inner portion/approach surface profile drawings include identified penetrations to the approach surface. Penetrations to the approach surface are considered obstructions. The FAA will determine if any obstructions are also hazards which require mitigation. The FAA utilizes other design criteria, such as the threshold siting surface (TSS) and various surfaces defined in FAA Order 8260.3B, *Terminal Instrument Procedures* (TERPS), to determine if an obstruction is a hazard.

If an obstruction is a hazard, the FAA can take many steps to protect air navigation. The mitigation options range from removing the hazard to installing obstruction lighting to adjusting the instrument approach minimums.

DEPARTURE SURFACE DRAWING

For runways supporting instrument operations, a separate drawing depicting the departure surface is required. The departure surface, when clear, allows pilots to follow standard departure procedures. The departure surface emanates from the departure end of the runway to a distance of 10,200 feet. The inner width is 1,000 feet and the outer width is 6,466 feet. The slope of the departure surface is 40:1.

Obstacles frequently penetrate the departure surface. Where object penetrations exist, the departure procedure can be adjusted by:

a) Non-standard climb rates, and/or
b) Non-standard (higher) departure minimums.

Therefore, it is important for the airport sponsor to identify and remove departure surface obstacles whenever possible. The airport sponsor should also prevent any new obstacles from developing. A departure surface drawing has been developed for all runways.

TERMINAL AREA DRAWING

The terminal area drawing is a larger scale plan view drawing of existing and planned aprons, buildings, hangars, parking lots, and other landside facilities. It is prepared in accordance with FAA Advisory Circular 150/5300-13A, *Airport Design*.

AIRPORT LAND USE DRAWING

The objective of the Airport Land Use Drawing is to coordinate uses of the airport property in a manner compatible with the functional design of the airport facility. Airport land use planning is important for the orderly development and efficient use of available space. There are two primary considerations for airport land use planning. The first is to secure those areas essential to the safe and efficient operation of the airport and the second is to determine compatible land uses for the balance of the property which would be most advantageous to the airport and community.

In the development of an airport land use plan for Buchanan Field Airport, the airport property was segmented into several large general tracts. Each tract was analyzed for specific site characteristics, such as tract size and shape, land characteristics, and existing land uses. The availability of utilities and the accessibility to various transportation modes were also considered. Limitations and constraints to development, such as height and noise restrictions, runway visibility zones, and contiguous land uses were analyzed next. Finally, the compatibility of various land uses in each tract was analyzed.

The depiction of on-airport land uses on this drawing has been developed, taking into consideration FAA land use compliance regulations. However, the depiction is only a recommendation and any plan to utilize any airport property for other than aviation purposes will require FAA review and approval on a case-by-case basis.

The Airfield Operations category includes the immediate runway and taxiway environment and includes the navaid critical areas, runway visibility zone, runway and taxiway safety areas, and the runway protection zones. The Airfield Operations area is reserved for facilities critical to the safe operations of aircraft on the runways and taxiways.

The Aviation-Related Development category reserves critical land area adjacent to the Airfield Operations area for aviation-specific activity. This activity includes all facilities necessary for aviation-related functions, including hangars, terminal buildings, and fuel farms. Essentially any facilities to be developed in the Aviation-Related Development area must be intended for a function that supports the need for access to the runway and taxiway system. It should be noted that other uses compatible with airport operations may be located in the Aviation-Related Development area on a temporary basis, usually considered five years or less. Certain concurrent uses are also permissible, such as farming or gravel extraction, within a runway protection zone (RPZ), provided the area can simultaneously serve its primary aviation function.

The last category is the Non-Aviation/Revenue Support area. This category can include aviation facilities and non-aviation facilities. Typically, the revenue support areas would be intended to accommodate businesses that are compatible with airport activity (i.e., not noise-sensitive) and do not require access to the runway and taxiway system. Any land use that is compatible with airport activities can be located in this area through a long-term ground lease (subject to FAA approval).

At Chino Airport, there are several tracts of land that are considered for non-aviation revenue support functions.

AIRPORT PROPERTY MAP

The Airport Property Map provides information on property under airport control and is, therefore, subject to FAA grant assurances. The various recorded deeds that make up the airport property are listed in tabular format. The primary purpose of the drawing is to provide information for analyzing the current and future aeronautical use of land acquired with federal funds.

FAA ALP DISCLAIMER

The preparation of the ALP set has been undertaken following FAA guidelines and is intended to support future grant funding requests. The contents do not necessarily reflect the official views or policy of the United States or FAA. Acceptance of the ALP update does not in any way constitute a commitment on the part of the United States or FAA to participate in any development depicted on the ALP drawing, nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws.

U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Los Angeles Airports District Office

777 S. Aviation Blvd., Suite 150
El Segundo, CA 90245

June 27, 2024

Brett Godown
Director of Airports
Chino Airport
268 W. Hospitality Lane, Suite 302
San Bernardino, CA 92408-0831

Dear Mr. Godown,

RE: Federal Aviation Administration (FAA) Conditional Approval for Chino Airport (CNO) Airport Layout Plan Drawing Set; Airspace Case Study No. 2023-AWP-6199-NRA

The Los Angeles Airports District Office (LAX-ADO) completed the final review of the Chino Airport updated Airport Layout Plan (ALP) drawing set. Accordingly, a Conditional Approval dated November 14, 2023, is issued for the subject ALP. A signed copy of the approved ALP is enclosed.

An aeronautical study, Airspace Case Study No. 2023-AWP-6199-NRA was conducted on the proposed development depicted on the ALP. This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

The FAA has only limited means to prevent the construction of structures near an airport. The airport sponsor has the primary responsibility to protect the airport environs through such means as local zoning ordinances, property acquisition, avigation easements, letters of agreement or other means.

The most notable changes made on this ALP submittal can be found in the letter dated November 14, 2023 as part of the ALP submittal.

This ALP approval is conditioned on acknowledgement that any development on airport property requiring Federal environmental approval must receive such written approval from the FAA prior to commencement of the subject development. This ALP approval is also

conditioned on acceptance of the plan under local land use laws. We encourage appropriate agencies to adopt land use and height restrictive zoning based on the plan.

Approval of the plan does not indicate that the United States will participate in the cost of any development proposed. Airport Improvement Program funding requires evidence of eligibility and justification at the time a funding request is ripe for consideration. When construction of any proposed structure or development indicated on the plan is undertaken, such construction requires a normal 45-day advance notification to the FAA for review in accordance with applicable Federal Aviation Regulations (i.e., Parts 77, 157, 152, etc.). More notice is generally beneficial to ensure that all statutory, regulatory, technical, and operational issues can be addressed in a timely manner.

Please attach this letter to the FAA-approved Airport Layout Plan and retain it for your records.

Should you have any questions or comments regarding this letter, please do not hesitate to contact Justin Guan of my staff at (424) 405-7276 or via email at Justin.Guan@faa.gov.

Sincerely,

CATHRYN G CASON
Digitally signed by CATHRYN G CASON
Date: 2024.06.27 10:14:26 -07'00'

Cathryn G. Cason
Manager
Los Angeles Airports District Office

Enclosure: FAA Conditionally Approved ALP

AIRPORT LAYOUT PLAN

for the

County of San Bernardino, California
Department of Airports

CHINO AIRPORT

Chino, California

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21. EXHIBIT "A" AIRPORT PROPERTY INVENTORY MAPS

NO.	REVISIONS	DATE	BY	APP'D
4	–	–	–	–
3	–	–	–	–
2	–	–	–	–
1	ALP UPDATE	05/23	Coffman	–

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

CHINO AIRPORT

TITLE SHEET

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 1 OF 21

Coffman Associates
Airport Consultants
www.coffmanassociates.com

AIRPORT DATA

City: Chino, CA		County: San Bernardino	Owner: San Bernardino County
Airport Name & ID		EXISTING	ULTIMATE
Airport Reference Code (ARC)		C-II	D-III
Mean Maximum Temperature of Hottest Month		94.1° F (August)	Same
Airport Elevation (NAVD 88)		650'	Same
Airport Navigational Aids		ATCT, Beacon, Segmented Circle, Lighted Windcones	Same
Airport Reference Point (ARP) Coordinates	Latitude	33-58'29.206"N	33-58'29.361"N
	Longitude	117°38'11.338"W	117°38'10.444"W
Miscellaneous Facilities		ASOS	Same
Critical Aircraft		C-II-2	D-III-2
Critical Aircraft Example		Gulfstream 300	Gulfstream 550
Wingspan of Critical Aircraft (Feet)		77.83'	93.5'
Approach Speed of Critical Aircraft (Knots)		125	145
Undercarriage Width of Critical Aircraft (Feet)		15.67'	15.88'
Magnetic Declination (Degrees)		11°33'E ±0°21'	
Declination Date		9/20/2021	
Declination Source		NOAA	
NPIAS Service Level		GA/RL	Same
State System Plan Role		Regional GA	Same

AIRPORT NAVAID OWNERSHIP

NAVAID	OWNER
ATCT	FAA
Beacon	FAA
Segmented Circle	Airport
Windcones	Airport
PAPI-4L (All)	Airport
REILS	Airport
MIRL/HIRL	Airport
ILS (Localizer & Glideslope)	FAA

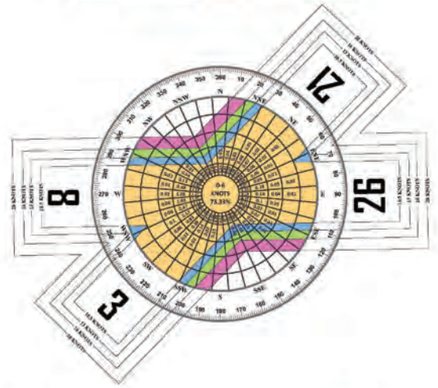
RUNWAY DATA TABLE

		RUNWAY 8R/26L				RUNWAY 8L/26R				RUNWAY 3/21			
		EXISTING		ULTIMATE		EXISTING		ULTIMATE		EXISTING		ULTIMATE	
Runway Identification		8R	26L	8R	26L	8L	26R	8L	26R	3	21	3	21
Runway Design Code (RDC)		C-II-VIS		D-III-5000		C-II-4000		D-III-4000		C-II-VIS		C-II-VIS	
Approach Reference Code (APRC)		D-IV-VIS/D-V-VIS		D-IV-5000/D-V-5000		D-IV-4000/D-V-4000		Same		D-IV-VIS/D-V-VIS		Same	
Departure Reference Code (DPRC)		D-IVD-V		Same		D-IVD-V		Same		D-IVD-V		Same	
Runway Surface Material		Asphalt		Same		Asphalt		Same		Asphalt		Same	
Runway Pavement Strength By Wheel Loading (in thousands of lbs.)		75(S)/150(D)/215(DD)		Same		12(S)		75(S)/150(D)/215(DD)		21(S)/130(D)/50(DD)		Same	
Runway Pavement Strength by PCN		Not Reported		Same		Not Reported		Same		Not Reported		Same	
Runway Surface Treatment		Grooved		Same		None		Same		None		Same	
Runway Effective Gradient		0.40%		Same		0.20%		Same		0.80%		Same	
Runway Percent Wind Coverage	10.5 knots	99.23		Same		99.23		Same		98.41		Same	
	13 knots	99.76		Same		99.76		Same		99.53		Same	
	16 knots	99.94		Same		99.94		Same		99.91		Same	
	20 knots	99.99		Same		99.99		Same		99.98		Same	
Runway Dimensions (L x W)		7,000' x 150'		Same		4,858' x 150'		5,500' x150'		4,919' x 150'		Same	
Runway End Coordinates	Latitude	33°58'24.645"N	33°58'25.342"N	Same	Same	33°58'32.554"N	33°58'33.045"N	Same	33°58'33.124"N	33°58'14.270"N	33°58'49.027"N	Same	Same
	Longitude	117°38'48.217"W	117°37'25.108"W	Same	Same	117°38'48.318"W	117°37'50.637"W	Same	117°37'43.028"W	117°38'30.392"W	117°37'59.515"W	Same	Same
Runway Displaced Threshold		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Runway Displaced Threshold Elevation		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Runway Displaced Threshold Coordinates	Latitude	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Longitude	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Runway Safety Area Dimensions (width x length beyond end) - Design Std.		500' x 1,000'		Same		500' x 1,000'		Same		500' x 1,000'		Same	
Runway Safety Area Dimensions (width x length beyond end) - Actual		500' x 1,000'		Same		500' x 1,000'		Same		500' x 1,000'		Same	
Runway Lighting Type		MIRL		Same		HIRL		Same		MIRL		Same	
Runway Protection Zone Dimensions (length x inner width x outer width)		1,700' x 500' x 1,010'		Same		1,700' x 500' x 1,010'	1,700' x 1,000' x 1,510'	Same	Same	1,700' x 500' x 1,010'		Same	
Runway Marking Type		Non-Precision		Same		Basic	Precision	Non-Precision	Same	Non-Precision		Same	
14 CFR Part 77 Approach Slope		20:1	20:1	34:1	34:1	20:1	50:1/40:1	34:1	Same	20:1	20:1	Same	Same
14 CFR Part 77 Approach Type		Visual	Visual	NP	NP	Visual	PIR	NP	Same	Visual	Visual	Same	Same
Approach Visibility Minimums		Visual	Visual	1-Mile	1-Mile	Visual	¾-mile	1-Mile	Same	Visual	Visual	Same	Same
Type of Aeronautical Survey Required for Approach		NVG	NVG	Same	Same	NVG	VG	Same	Same	NVG	NVG	Same	Same
Departure Surface (Yes or N/A)		Yes	Yes	Same	Same	Yes	Yes	Same	Same	NA	NA	Same	Same
Runway Object Free Area Dimensions (width x length beyond end) - Design Std.		800' x 1,000'		Same		800' x 1,000'		Same		800' x 1,000'		Same	
Runway Object Free Area Dimensions (width x length beyond end) - Actual		800' x 1,000'		Same		800' x 1,000'		Same		800' x 1,000'		Same	
Runway Obstacle Free Zone Dimension (width x length beyond end) - Design Std.		400' x 200'		Same		400' x 200'		Same		400' x 200'		Same	
Runway Obstacle Free Zone Dimension (width x length beyond end) - Actual		400' x 200'		Same		400' x 200'		Same		400' x 200'		Same	
13B Approach Surfaces*		3	3	4	4	3	5,6	4	Same	3	3	Same	Same
Runway Visual and Instrument Navaids		MIRL, PAPI-4L		MIRL, PAPI-4L, REIL		HIRL, PAPI-4L, Localizer & Glideslope (26R), RNAV-GPS (26R), VOR (26R)		HIRL, PAPI-4L, ODALS (26R), Localizer & Glideslope (26R), RNAV-GPS (26R), VOR (26R), REILs		z		Same	
Touchdown Zone Elevation (TDZE)		624.8'	636.5'	Same	Same	629.6'	630.1'	Same	640'	EXISTING	650'	Same	Same
Blast Pad		200'x200'	200'x200'	Same	Same	197'x150'	None	Same	190'x150'	946'x150'	354'x150'	Same	Same
Vertical Datum		NAD83											
Horizontal Datum		NAVD88											

*Tables 3-2, 3-3, & 3-4 in AC 150/5300 13B.

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8-26	99.23%	99.76%	99.94%	99.99%
Runway 3-21	98.41%	99.53%	99.91%	99.98%
All Runways	99.06%	99.67%	99.92%	99.98%



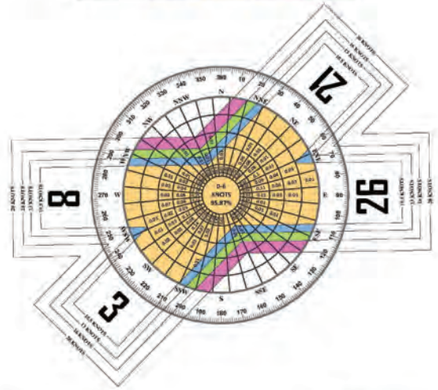
Magnetic Declination 11°-12' 00" East (April 2020) Annual Rate of Change 00° 5' 00" West (April 2020)

SOURCE: NOAA National Climatic Center Asheville, North Carolina Chino Airport Chino, California

OBSERVATIONS: 98,079 All Weather Observations Jan. 1, 2010 - Dec. 31 2019

IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8-26	99.99%	99.82%	99.99%	99.99%
Runway 3-21	99.62%	99.93%	99.99%	99.99%
All Runways	99.99%	99.97%	100.00%	100.00%



Magnetic Declination 11°-12' 00" East (April 2020) Annual Rate of Change 00° 5' 00" West (April 2020)

SOURCE: NOAA National Climatic Center Asheville, North Carolina Chino Airport Chino, California

OBSERVATIONS: 12,259 IFR Weather Observation Jan. 1, 2010 - Dec. 31 2019

RUNWAY DECLARED DISTANCE	EXISTING		ULTIMATE		EXISTING		ULTIMATE		EXISTING		ULTIMATE	
	8R	26L	8R	26L	8L	26R	8L	26R	3	21	3	21
Takeoff Run Available (TORA)	7,000'	7,000'	Same	Same	4,858'	4,858'	5,500'	5,500'	4,919'	4,919'	Same	Same
Takeoff Distance Available (TODA)	7,000'	7,000'	Same	Same	4,858'	4,858'	5,500'	5,500'	4,919'	4,919'	Same	Same
Accelerate-Stop Distance Available (ASDA)	7,000'	7,000'	Same	Same	4,858'	4,858'	5,500'	5,500'	4,919'	4,919'	Same	Same
Landing Distance Available (LDA)	7,000'	7,000'	Same	Same	4,858'	4,858'	5,500'	5,500'	4,919'	4,919'	Same	Same

NON-STANDARD CONDITIONS

Deviation Description	Affected Design Standard	Design Standard	Existing Condition	Proposed Disposition
Localizer antenna in Rwy 8L RSA.	Runway Safety Area (RSA)	1,000' beyond runway end	898' beyond ruwnay end	Localizer to remain in current location because it is on frangible mounts.
Gas pipeline infrastructure and surrounding fencing protruding the Runway 26R RSA/RSA not graded to standard.	Runway Safety Area (RSA)	1,000' beyond runway end	920' beyond ruwnay end	Relocate pipeline infrastructure and fence/Grade RSA to standard.
Fire suppression storage ponds and fence in Rwy 26L ROFA.	Runway Object Free Area (ROFA)	1,000' beyond runway end/800' wide	400' beyond runway end/325' south of extended runway centerline.	Relocate fire suppression ponds.

TAXIWAYS AND TAXILANES

Current Designation & (Location)	Future Designation and Location	Existing Width	Future Width	Existing/Future Safety Area (TSA) Width	Existing/Future TOFA/TLOFA Width	Object Penetration/ Distance from Centerline	Existing/Future Shoulder Width	Existing/ Future TDG	Existing/Future Taxiway Edge Safety Margin	Existing/Future Wingtip Clearance	Existing/Future Twy or Twl Centerline to Fixed or Movable Object	Existing/Future Taxiway Lighting
TAXIWAYS												
Taxiway A (Parallel to Rwy 8L-26R)	Same	50'	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
Taxiway B (Partial Parallel to Rwy 8R-26L)	Same	75'	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
NA	Taxiway D - New Parallel to Rwy 8R-26L	NA	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
Taxiway C (Parallel to Rwy 8R-26L)	Same	75'	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
Taxiway E (Partial Parallel to Rwy 3-21)	Same	50'	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
Taxiway F (Rwy 8 Threshold)	Same	60'-100'	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
Taxiway H (Connector to Rwy 8L-26R)	from Rwy 8L-26R to Taxiway B	NA	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
Taxiway K (From Twy A to Twy L)	To Be Removed	40'-80'	NA	79'/118'	124'/NA	None	15'/NA	NA	7.5'/NA	23'/NA	62'/NA	MTL/NA
Taxiway L (From Twy K to Rwy 3-21)	To Be Removed	50'-60'	NA	79'/118'	124'/NA	None	15'/NA	NA	7.5'/NA	23'/NA	62'/NA	MTL/NA
Taxiway P (From Twy D to Twy B)	To Be Removed	50'-90'	NA	79'/118'	124'/NA	None	15'/NA	NA	7.5'/NA	23'/NA	62'/NA	MTL/NA
Taxiway Q (From Twy D to Rwy 21)	Same	70'	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
NA	Taxiway Q - New Threshold Taxiway	NA	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
NA	Taxiway S - New from Twy B to Twy C	NA	35'	79'/118'	124'/171'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	62'/85.5'	MTL/MTL
TAXILANES												
Taxilane J (North from Twy A)	To Be Removed	40'	NA	79'/118'	110'/NA	None	15'/NA	NA	7.5/NA	23'/NA	55'/NA	MTL/NA
NA	Taxilane J - New Parallel Taxilane	NA	35'	79'/118'	110'/158'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	55'/79'	MTL/MTL
Taxilane K (North from Twy A)	Same	75'	35'	79'/118'	110'/158'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	55'/79'	MTL/MTL
Taxilane M (North from Twy D)	Same	90'	35'	79'/118'	110'/158'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	55'/79'	MTL/MTL
Taxilane N (North from Twy D)	Same	50'	35'	79'/118'	110'/158'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	55'/79'	MTL/MTL
Taxilane P (North from Twy D)	Same	90'	35'	79'/118'	110'/158'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	55'/79'	MTL/MTL
Taxilane R (North from Twy D) - Currently Closed	To be Reopened	70'	35'	79'/118'	110'/158'	None	15'/15'	2A/2B	7.5'/7.5'	23'/27'	55'/79'	MTL/MTL

NO.	REVISIONS	DATE	BY	APP'D.
1	--	--	--	--
2	--	--	--	--
3	--	--	--	--
4	ALP UPDATE	05/23	Coffman	--

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CHINO AIRPORT

AIRPORT DATA SHEET

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 2 OF 21

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Airport Consultants
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Coffman Associates - C:\Users\maggie\Coffman Associates Inc\Coffman - Inc. CAD\APRONS\2_3YR\ALP\ALP 2020\03 CHO DATA 08 2023.dwg - Printed Date: 5/14/24 11:55:17 AM - maggie

EXISTING BUILDINGS/FACILITIES			
NO.	DESCRIPTION	ELEVATION Top (MSL)	OL LIGHTED
A-220	Building	652.9	
A-230	Conventional Hangar	663.2	
A-240	Conventional Hangar	681.3	
A-245	Conventional Hangar	658.4	
A-270	Conventional Hangar	658.7	
A-280	Conventional Hangar	651.2	
A-285	Conventional Hangar	657.2	
A-290	Conventional Hangar	653.0	
A-305	Building	654.2	
A-310	Building	657.8	
A-315	Restaurant	652.2	
A-320	Building	657.8	
A-325	Building	656.3	
A-330	Building	656.3	
A-335	Conventional Hangar	662.3	
A-340	Conventional Hangar	664.4	
A-385	Executive Hangar	643.5	
A-390	Executive Hangar	645.4	
A-430	Park Area	N/A	
A-435	Conventional Hangar	667.2	
A-436	Building	655.5	
A-437	Airport Maintenance	655.9	
A-440	Executive Hangar	656.6	
A-445	Port-a-Port Hangars	649.0	
A-460	T-Hangars	648.0	
A-465	T-Hangars	648.0	
A-470	T-Hangars	647.0	
A-475	T-Hangars	646.0	
A-480	Executive Hangar	656.0	
A-485	Conventional Hangar	657.0	

EXISTING BUILDINGS/FACILITIES			
NO.	DESCRIPTION	ELEVATION Top (MSL)	OL LIGHTED
A-490	Conventional Hangar	656.2	
A-495	Conventional Hangar	657.0	
A-497	Conventional Hangar	659.0	
A-503	Airport Maintenance/Operations	657.1	
A-505	Airport Maintenance/Operations	664.8	
A-510	Conventional Hangar	667.8	
A-515	Conventional Hangar	662.8	
A-520	Conventional Hangar	669.2	
A-530	Conventional Hangar	669.2	
A-532	Conventional Hangar	663.8	
A-545	Executive Hangars	668.5	
A-542	Executive Hangars	663.4	
A-544	Executive Hangars	669.8	
A-546	Executive Hangars	667.4	
A-548	Executive Hangars	659.6	
A-550	Airport Administration	675.4	
A-552	Conventional Hangar	679.4	
A-555	Conventional Hangar	661.0	
A-560	Conventional Hangar	662.0	
B-110	Executive Hangars	N/A	
B-120	Executive Hangars	664.9	
B-130	Executive Hangars	664.8	
B-140	Executive Hangars	664.0	
B-150	Executive Hangars	667.1	
B-160	T-Hangars	659.0	
B-170	T-Hangars	662.0	
B-180	T-Hangars	660.0	
B-181	Executive Hangars	667.7	
B-182	Executive Hangars	667.7	
B-183	Executive Hangars	669.7	

EXISTING BUILDINGS/FACILITIES			
NO.	DESCRIPTION	ELEVATION Top (MSL)	OL LIGHTED
B-184	Executive Hangars	669.7	
B-185	Executive Hangars	669.7	
B-186	Executive Hangars	669.7	
B-187	Executive Hangars	669.7	
B-188	Executive Hangars	669.7	
B-195	ATCT / Airport Beacon	737.0	YES
B-197	Electrical Vault	N/A	
B-199	Self-Serve Fuel Facility	N/A	
B-210	T-Hangars	685.2	
B-220	T-Hangars	685.0	
B-230	T-Hangars	665.0	
B-240	T-Hangars	663.0	
B-250	T-Hangars	663.0	
B-260	T-Hangars	661.0	
B-270	T-Hangars	659.0	
B-280	T-Hangars	659.0	
B-290	T-Hangars	659.0	
B-295	Conventional Hangar	666.9	YES
B-297	Executive Hangar	659.7	
B-310	Vacant land	N/A	
B-320	T-Hangars	672.3	
B-330	T-Hangars	672.3	
B-340	T-Hangars	670.3	YES
B-350	Conventional Hangar	668.3	
D-305	Chino Fire Station	659.0	
F-330	Conventional Hangar	683.4	
F-340	Conventional Hangar (Vacant)	683.4	
F-350	Conventional Hangar	683.4	
F-360	Conventional Hangar	683.4	
F-365	Executive Hangar	658.0	

FUTURE BUILDINGS/FACILITIES		
NO.	DESCRIPTION	BUILDING HEIGHT (FT AGL)*
1	Linear Box Hangar	18'
2	200' x 200' Hangar	35'
3	200' x 200' Hangar	35'
4	200' x 200' Hangar	35'
5	150' x 150' Hangar	25'
6	150' x 150' Hangar	25'
7	150' x 150' Hangar	25'
8	150' x 150' Hangar	25'
9	150' x 150' Hangar	25'
10	150' x 150' Hangar	25'
11	150' x 150' Hangar	25'
12	150' x 150' Hangar	25'
13	150' x 150' Hangar	25'
14	Terminal Building	25'
15	125' x 100' Hangar	25'
16	150' x 150' Hangar	25'
17	150' x 150' Hangar	25'
18	200' x 200' Hangar	35'
19	200' x 200' Hangar	35'

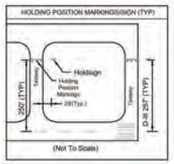
*Building height estimated

FUTURE BUILDINGS/FACILITIES		
NO.	DESCRIPTION	BUILDING HEIGHT (FT AGL)*
20	FBO/Terminal Facility	25'
21	200' x 200' Hangar	35'
22	200' x 200' Hangar	35'
23	150' x 150' Hangar	25'
24	150' x 150' Hangar	25'
25	125' x 120' Hangar	25'
26	125' x 120' Hangar	25'
27	125' x 120' Hangar	25'
28	125' x 120' Hangar	25'
29	125' x 120' Hangar	25'
30	125' x 120' Hangar	25'
31	125' x 120' Hangar	25'
32	125' x 120' Hangar	25'
33	125' x 120' Hangar	25'
34	125' x 120' Hangar	25'
35	200' x 150' Hangar	25'
36	200' x 150' Hangar	25'
37	200' x 150' Hangar	25'
38	Fuel Farm	8'

*Building height estimated

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical data and NAD 83 for all horizontal data.
5. There are three monuments at the airport, one PACS and two SACSs. AA7146-SACS CNO A this station is a standard NOS disk stamped CNO a 1976 and is set in a drill hole in a concrete pad. AA7148-SACS CNO B the station is set in a drill hole in the northwest corner of a concrete helopad flush with the surface. AA7147-PACS CNO ARP the station is a standard NOS disk stamped ARP CNO 1976 and set in the top of a concrete monument that is flush with the surface.
6. Taxiway development depending upon removal/relocation of Existing GS Antenna.
7. See the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS for OCS Object Penetrations.
8. The target date for relocation of the natural gas valves and the fire suppression storge tanks is estimated during FAA Fiscal Years 2021-2025.
9. Future Taxiway Designations Subject to Change.
10. All current/future taxiways that support the critical aircraft are planned to a width of 35' (TDG 2B). Anytime a taxiway reconstruction project is pursued, the width standard should be verified.



LEGEND

EXISTING	FUTURE	DESCRIPTION
N/A		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		RUNWAY TAXIWAY PAVEMENT
		APRON PAVEMENT
		ROADS PAVED
		FENCING
		NAVIGATIONAL AID INSTALLATION (PAPI-4)
		RUNWAY THRESHOLD LIGHTS and REIL
SEC	SAME	SECTION CORNER
	SAME	SEGMENTED CIRCLE/WIND INDICATOR
	SAME	TOPOGRAPHY (NAVD 88)
	SAME	HOLDING POSITION MARKING
TOFA	TOFA(U)	TAXIWAY OBJECT FREE AREA
TSA	TSA(U)	TAXIWAY SAFETY AREA
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
Ext/Alt OFZ	SAME	EXT./ALT. OBSTACLE FREE ZONE
Ext/Alt RSA	SAME	EXT./ALT. RUNWAY SAFETY AREA
Ext/Alt OFA	SAME	EXT./ALT. RUNWAY OBJECT FREE AREA
xOFZ	xOFZ	OBSTACLE FREE ZONE
xRSA	xRSA	RUNWAY SAFETY AREA
xOFA	xOFA	RUNWAY OBJECT FREE AREA
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
		ASOS
LOC		LOCALIZER CRITICAL AREA
GS		GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
		GLIDE SLOPE ANTENNA
N/A		MALSR APPROACH LIGHT SYSTEM
		PRECISION OBSTACLE FREE ZONE (POFZ)
	SAME	TIE-DOWNS
		CDA EXTRACTION WELLS
RVZ	RVZ(U)	RUNWAY VISIBILITY ZONE

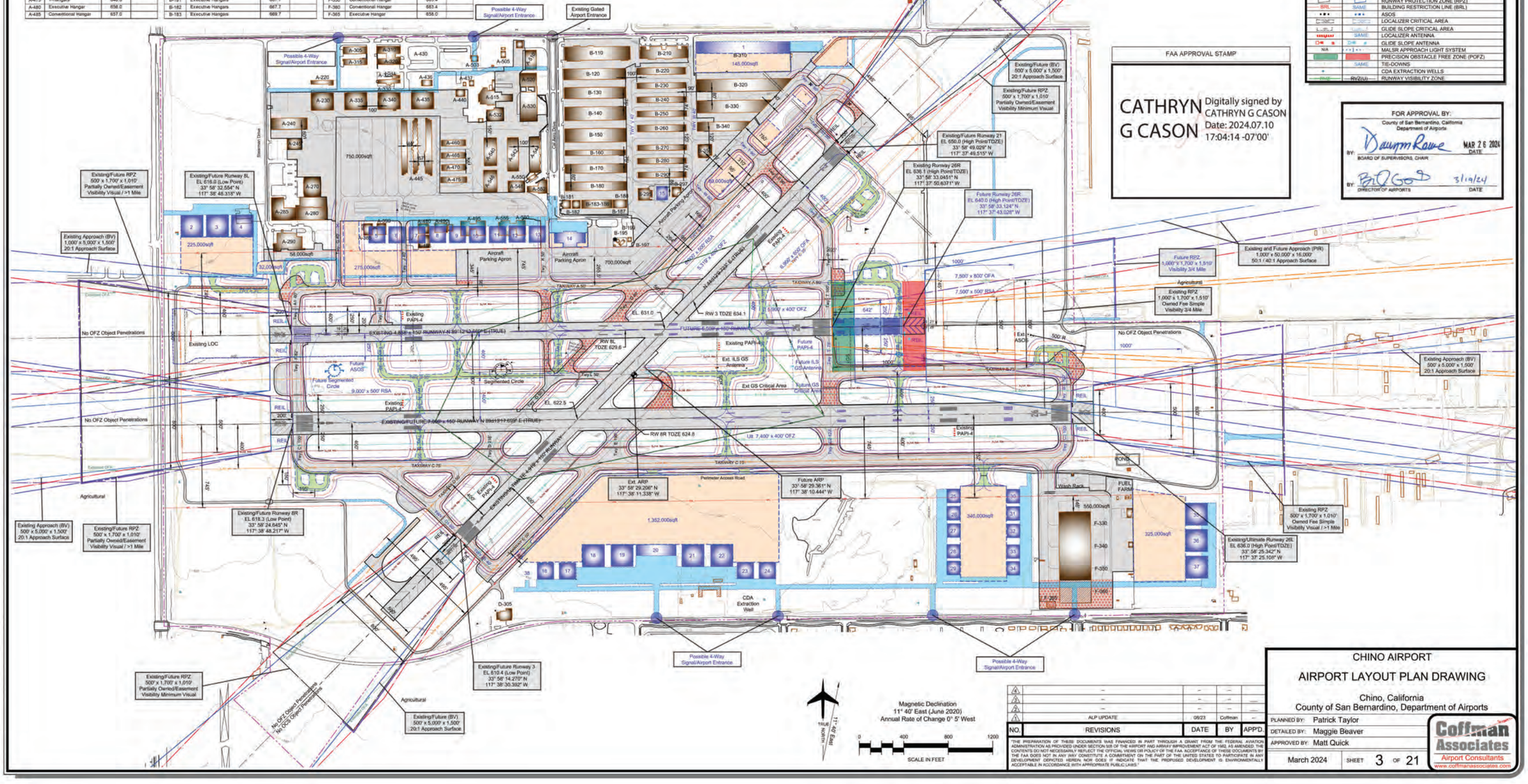
FAA APPROVAL STAMP

CATHRYN G CASON
Digitally signed by CATHRYN G CASON
Date: 2024.07.10 17:04:14 -07'00'

FOR APPROVAL BY:
County of San Bernardino, California
Department of Airports

BY: Dawyn Rowe — BOARD OF SUPERVISORS, CHAIR — DATE: MAR 26 2024

BY: — DIRECTOR OF AIRPORTS — DATE: 3/19/24



NO.	REVISIONS	DATE	BY	APP'D.
1	--	--	--	--
2	--	--	--	--
3	--	--	--	--
4	ALP UPDATE	09/23	Coffman	--

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

CHINO AIRPORT

AIRPORT LAYOUT PLAN DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 — SHEET 3 OF 21

Coffman Associates
Airport Consultants
www.coffmanassociates.com

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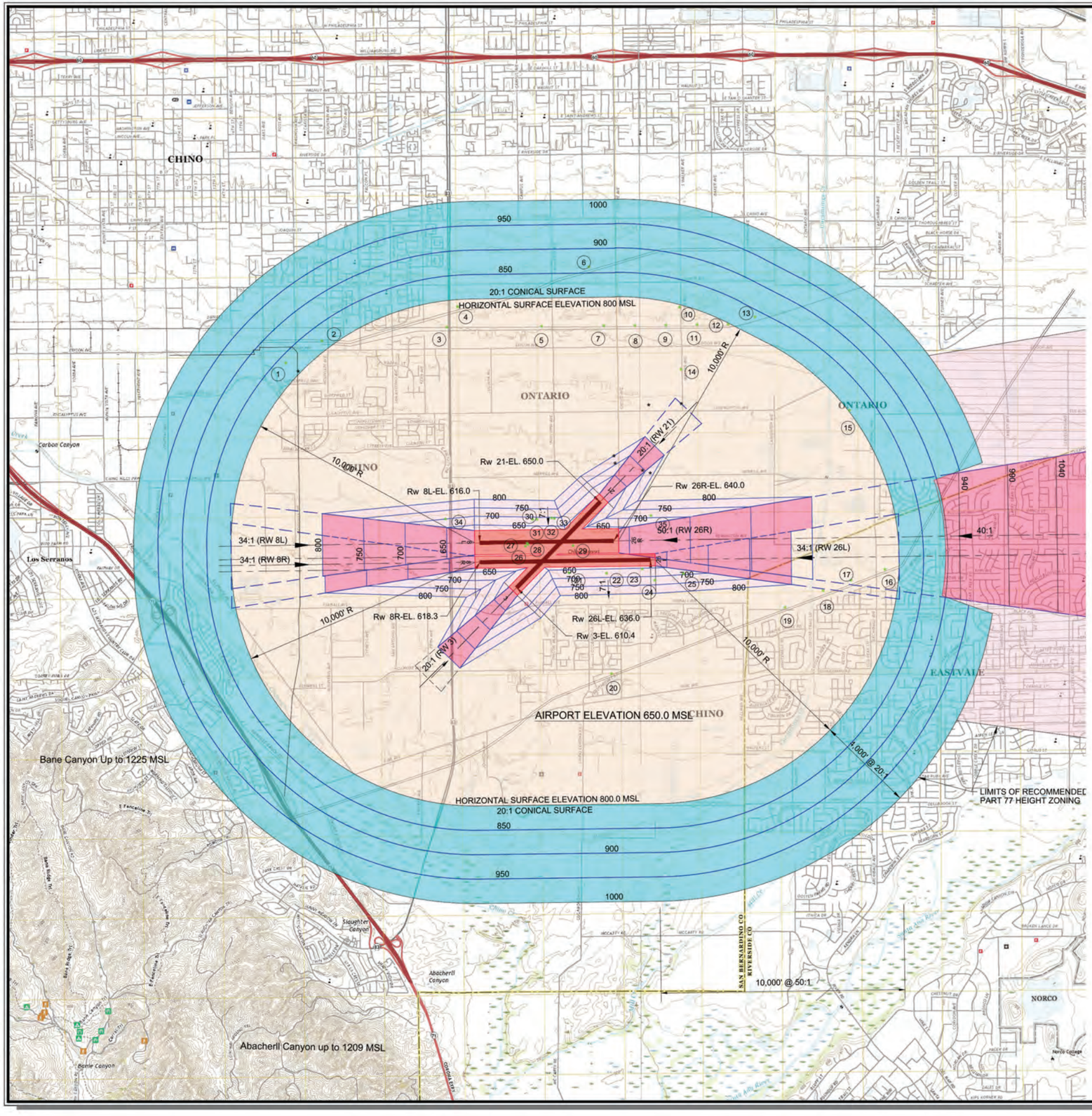


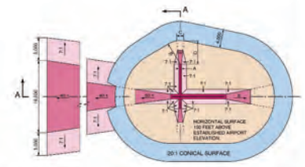
ID	Feature	Elevation (ft. msl.)	AGL (ft.)	Surface Obstructed	Penetration Value (ft.)	Proposed Disposition
1	OL WATER TOWER	832 MSL	161.45	CONICAL	2'	NO ACTION
2	TRANSMISSION TOWER	843 MSL	160.14	CONICAL	43'	NO ACTION
3	TRANSMISSION TOWER	823 MSL	124.81	HORIZONTAL	23'	NO ACTION
4	TRANSMISSION TOWER	870 MSL	159.99	HORIZONTAL	70'	ADD OL
5	TRANSMISSION TOWER	848 MSL	147.71	HORIZONTAL	48'	NO ACTION
6	TRANSMISSION TOWER	880 MSL	150.51	CONICAL	30'	NO ACTION
7	TRANSMISSION TOWER	855 MSL	153.66	HORIZONTAL	55'	NO ACTION
8	TRANSMISSION TOWER	866 MSL	161.58	HORIZONTAL	66'	NO ACTION
9	TRANSMISSION TOWER	869 MSL	164.23	HORIZONTAL	69'	ADD OL
10	TREE	824 MSL	110.86	HORIZONTAL	24'	NO ACTION
11	TRANSMISSION TOWER	862 MSL	154.45	HORIZONTAL	62'	ADD OL
12	TRANSMISSION TOWER	832 MSL	123.12	HORIZONTAL	32'	NO ACTION
13	TRANSMISSION TOWER	852 MSL	138.88	CONICAL	31'	NO ACTION
14	TREE	805 MSL	116.67	HORIZONTAL	5'	NO ACTION
15	TREE	807 MSL	120.03	HORIZONTAL	7'	NO ACTION
16	TRANSMISSION TOWER	808 MSL	169.41	HORIZONTAL	8'	NO ACTION
17	TRANSMISSION TOWER	807 MSL	172.25	APPROACH	33'	ADD OL
18	TRANSMISSION TOWER	826 MSL	194.33	TRANSITIONAL	26'	NO ACTION
19	TRANSMISSION TOWER	841 MSL	214.41	HORIZONTAL	41'	NO ACTION
20	TRANSMISSION TOWER	798 MSL	200.83	HORIZONTAL	0'	ADD OL
21	LIGHT POLE	656 MSL	34.82	TRANSITIONAL	6'	RELOCATE
22	TREE	676 MSL	55.04	TRANSITIONAL	16'	TRIM/REMOVE TREES
23	LIGHT POLE	659 MSL	28.39	PRIMARY	18'	RELOCATE
24	HANGAR	683 MSL	55.22	TRANSITIONAL	0'	NO ACTION
25	TREE	686 MSL	51.48	TRANSITIONAL	14'	TRIM/REMOVE TREES
26	OL WINDSOCK	650 MSL	28.28	PRIMARY	29'	RELOCATE
27	OL AMOM	647 MSL	24.49	PRIMARY	23'	RELOCATE
28	RON ON OL WDI	657 MSL	34.65	PRIMARY	35'	RELOCATE
29	GLIDE SLOPE	665 MSL	34.27	PRIMARY	37'	RELOCATE/ADD OL
30	LIGHT POLE	672 MSL	40.79	TRANSITIONAL	12'	RELOCATE
31	LIGHT POLE	675 MSL	43.08	TRANSITIONAL	11'	RELOCATE
32	ANT ON OL ATCT	747 MSL	110.47	TRANSITIONAL	75'	NO ACTION
33	LIGHT POLE	679 MSL	41.24	TRANSITIONAL	9'	RELOCATE
34	TREE	682 MSL	58.48	TRANSITIONAL	7'	TRIM/REMOVE
35	TREE	701 MSL	57.29	TRANSITIONAL	13'	TRIM/REMOVE

OBSTRUCTION LEGEND

- OBSTRUCTION
- TOPOGRAPHIC OBSTRUCTION

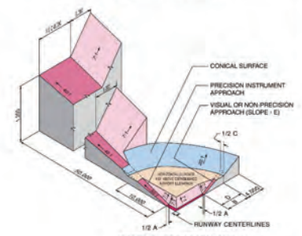
GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Height Restrictions/Ordinances - San Bernardino County has adopted Part 77 standards into its General Plan and are applied to its ALUCP. See Federal Rule CFR Part 77.



DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY	NON-PRECISION INSTRUMENT RUNWAY				PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH	NON-PRECISION INSTRUMENT APPROACH				PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: FAA Order JO 7400.2J, Figure 6-3-3

Magnetic Declination
12° 26' East (October 2011)
Annual Rate of Change 0° 5' West

0 2000 4000 6000

SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
4	--	--	--	--
3	--	--	--	--
2	--	--	--	--
1	ALP UPDATE	08/23	Coffman	--

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CHINO AIRPORT

AIRPORT AIRSPACE DRAWING I

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 SHEET 4 OF 21

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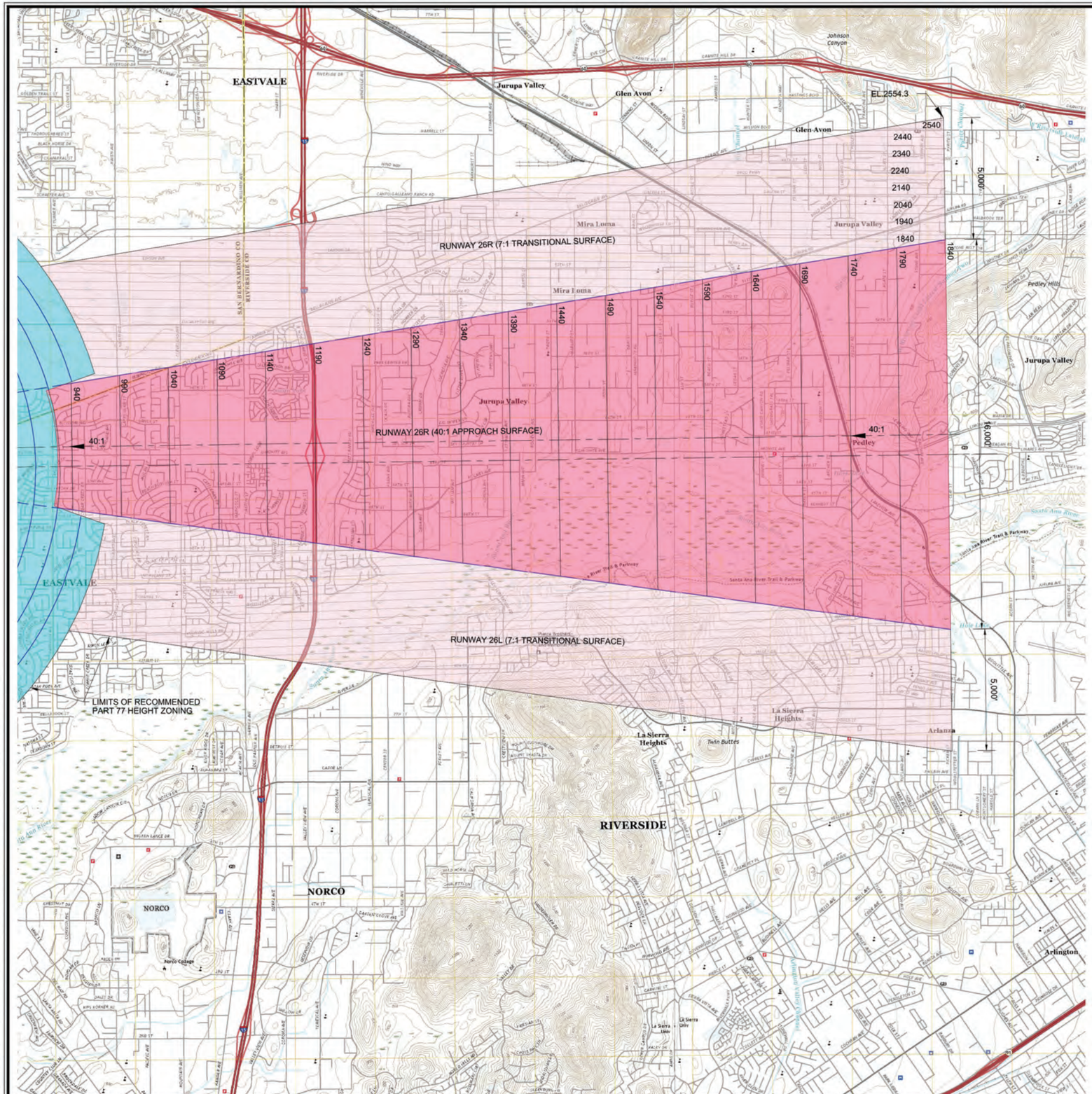

ID	Feature	Elevation (ft. msl.)	AGL (ft.)	Surface Obstructed	Penetration Value (ft.)	Proposed Disposition
	None					

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
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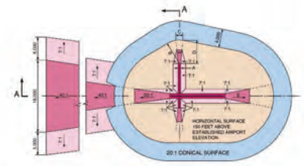
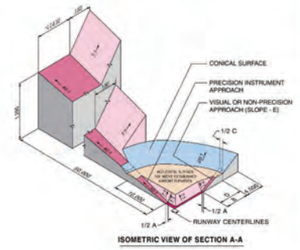


DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

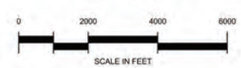
A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: FAA Order JO 7400.2J, Figure 6-3-3

Magnetic Declination
12° 26' East (October 2011)
Annual Rate of Change 0° 5' West



NO.	REVISIONS	DATE	BY	APP'D.
4	–	–	–	–
3	–	–	–	–
2	–	–	–	–
1	ALP UPDATE	08/23	Coffman	–

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CHINO AIRPORT

AIRPORT AIRSPACE DRAWING II

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 5 OF 21

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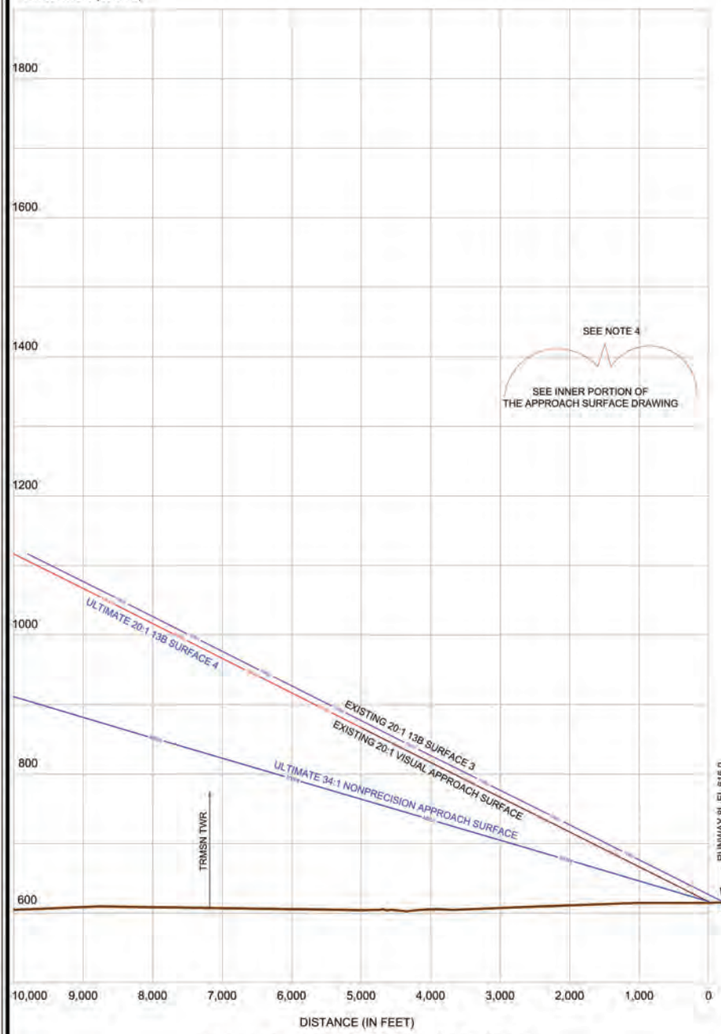
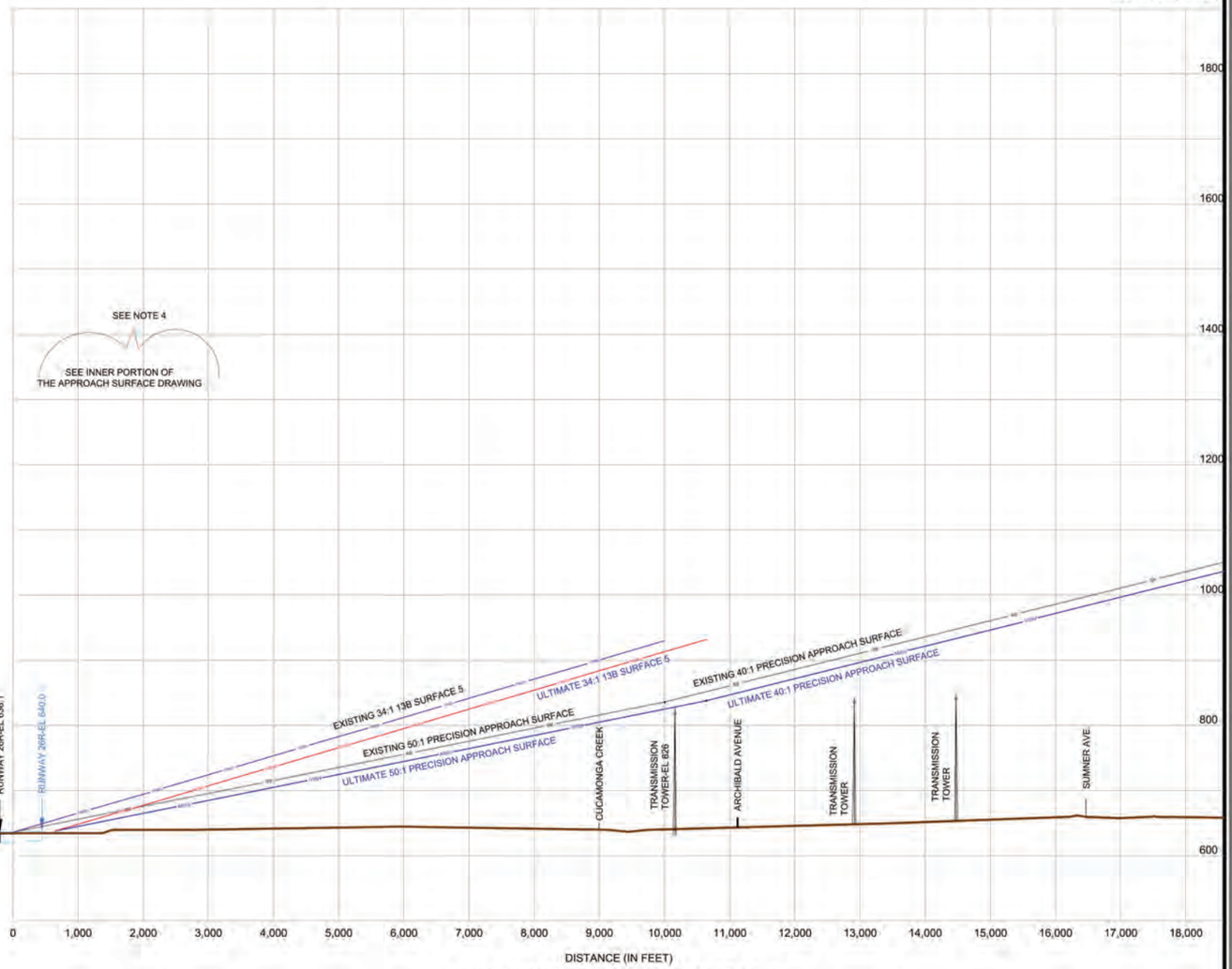


RUNWAY 8L APPROACH SURFACE PROFILE



RUNWAY 26R APPROACH SURFACE PROFILE

APPROACH SURFACE OBSTRUCTION TABLE				
Runway 8L Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
NONE	-	-	-	-

APPROACH SURFACE OBSTRUCTION TABLE				
Runway 26R Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
NONE	-	-	-	-

GENERAL NOTES:

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Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

0 100 200 300
VERTICAL SCALE IN FEET

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
1	--	--	--	--
2	--	--	--	--
3	--	--	--	--
4	ALP UPDATE	05/23	Coffman	--

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CHINO AIRPORT
RUNWAY 8L-26R
APPROACH SURFACE PROFILES
Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 SHEET 6 OF 21

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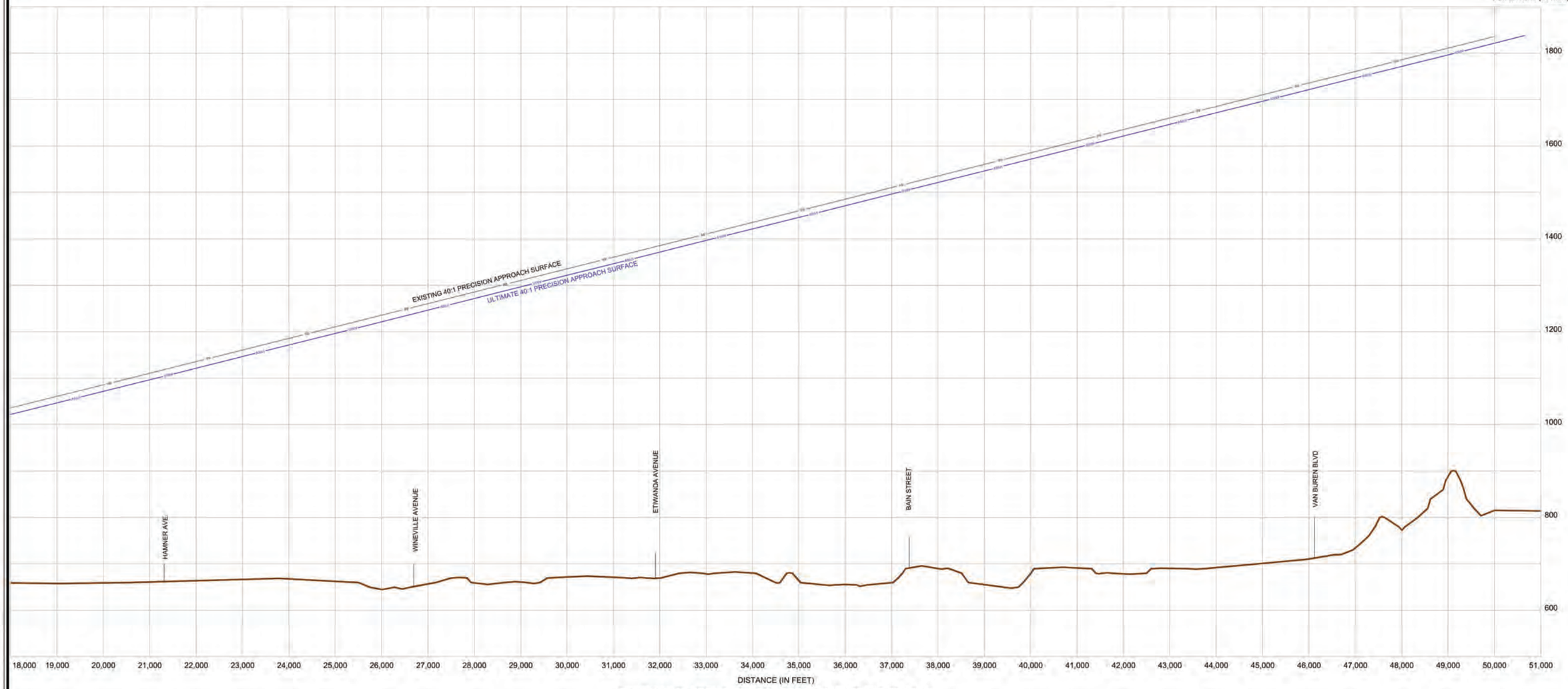

RUNWAY 26R PRECISION 40:1 APPROACH SURFACE PROFILE

APPROACH SURFACE OBSTRUCTION TABLE				
Runway 26R Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
NONE	-	-	-	-

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

TRUE NORTH
11° 40' EAST

0 100 200 300
VERTICAL SCALE IN FEET

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	ALP UPDATE	05/23	Coffman	-

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CHINO AIRPORT
RUNWAY 26R
PRECISION 40:1 APPROACH PROFILE

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 7 OF 21

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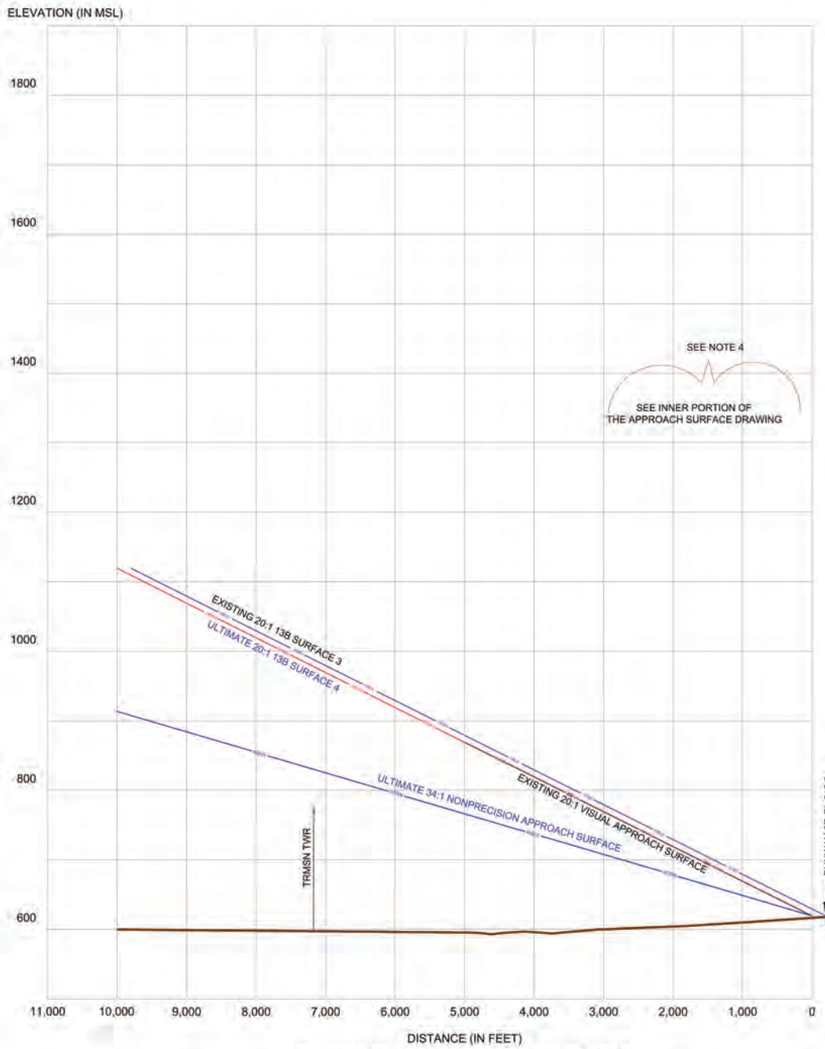
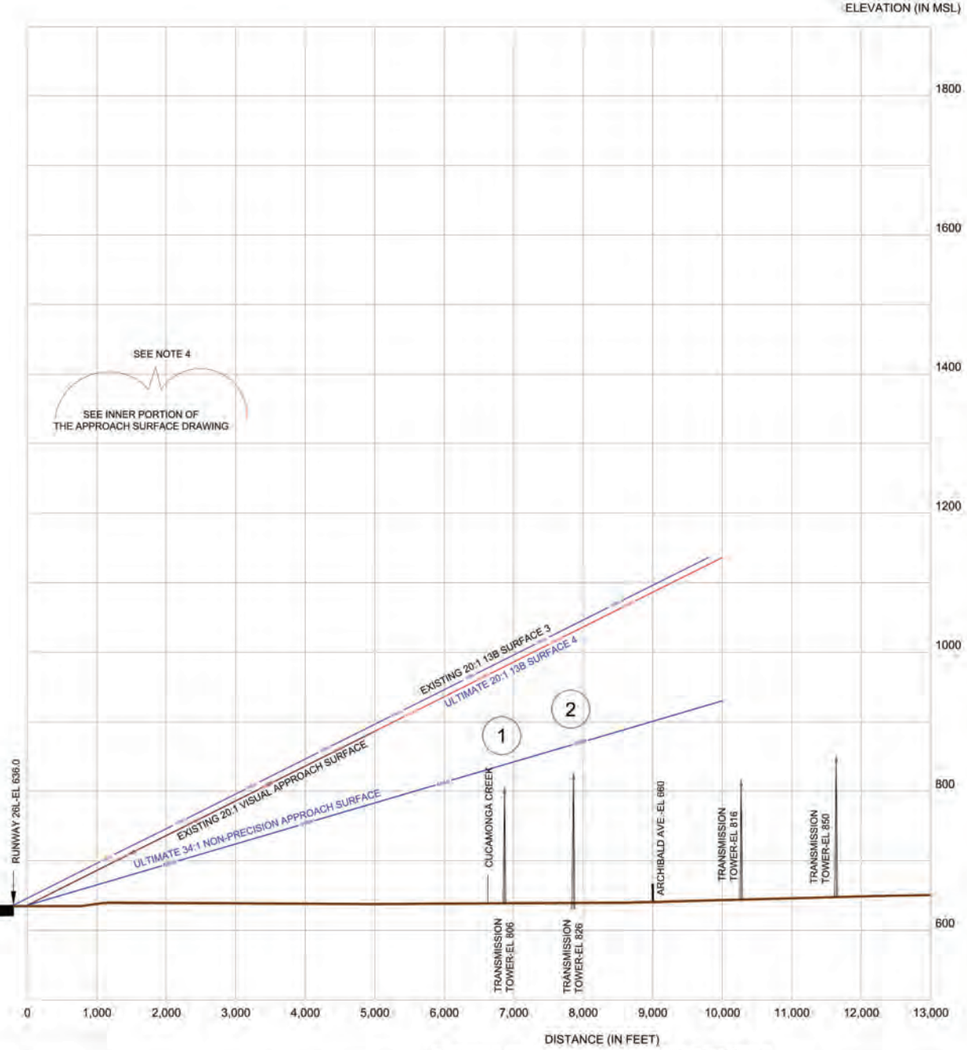


RUNWAY 8R APPROACH SURFACE PROFILE

RUNWAY 8R-26L



RUNWAY 26L APPROACH SURFACE PROFILE

APPROACH SURFACE OBSTRUCTION TABLE				
Runway 8R Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
NONE	-	-	-	-

APPROACH SURFACE OBSTRUCTION TABLE				
Runway 26L Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
1. Transmission TWR EL 806	Ult. 50:1 Approach	32'	0'	Lower Pole/Relocate
2. Transmission TWR EL 826	Ult. 50:1 Approach	32'	0'	Lower Pole/Relocate

GENERAL NOTES:

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2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

VERTICAL SCALE IN FEET: 0, 100, 200, 300

HORIZONTAL SCALE IN FEET: 0, 1000, 2000, 3000

NO.	REVISIONS	DATE	BY	APP'D.
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	ALP UPDATE	08/23	Coffman	-

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CHINO AIRPORT
RUNWAY 8R-26L
APPROACH SURFACE PROFILES

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 SHEET 8 OF 21

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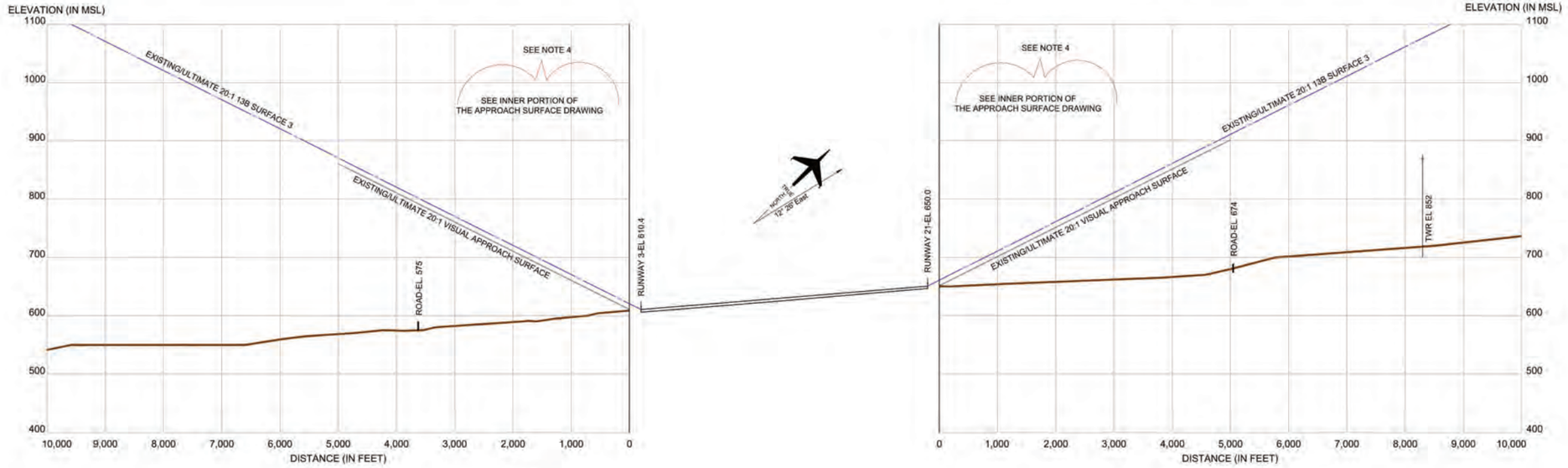

APPROACH SURFACE OBSTRUCTION TABLE				
Runway 3 Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
NONE	-	-	-	-

GENERAL NOTES:

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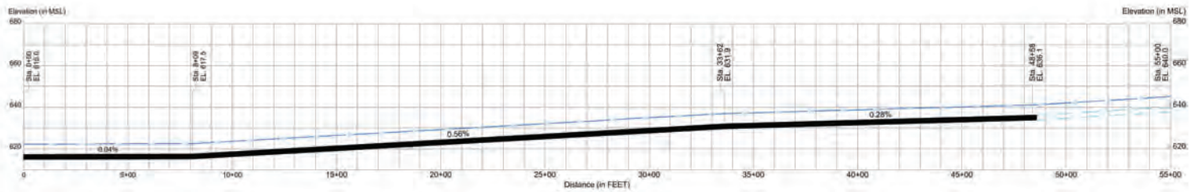
Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

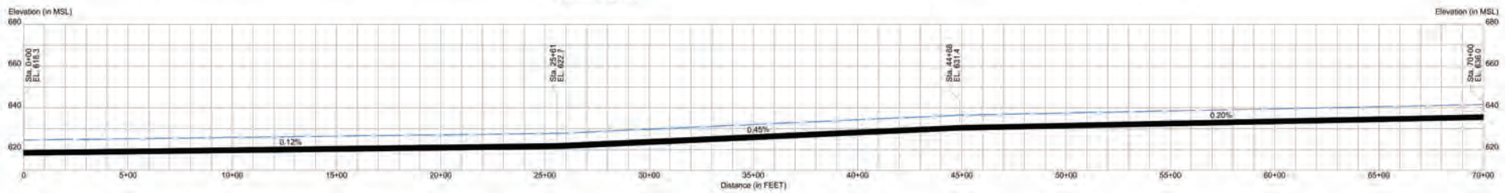
0 100 200 300
VERTICAL SCALE IN FEET

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

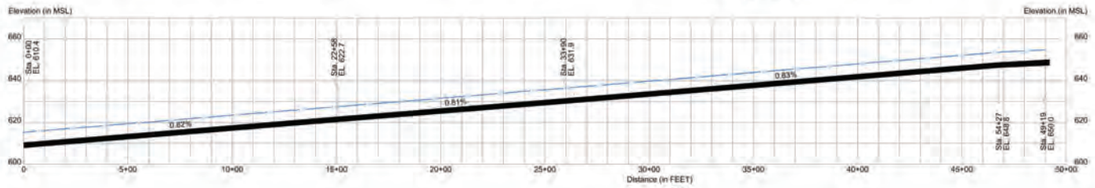
APPROACH SURFACE OBSTRUCTION TABLE				
Runway 21 Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	13B Approach Penetration	Proposed Object Disposition
NONE	-	-	-	-



Runway 8L-26R



Runway 8-R-26L



Runway 3-21

NO.	REVISIONS	DATE	BY	APP'D.
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	ALP UPDATE	08/23	Coffman	-

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CHINO AIRPORT
RUNWAY 3-21
APPROACH SURFACE PROFILES

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 SHEET 9 OF 21

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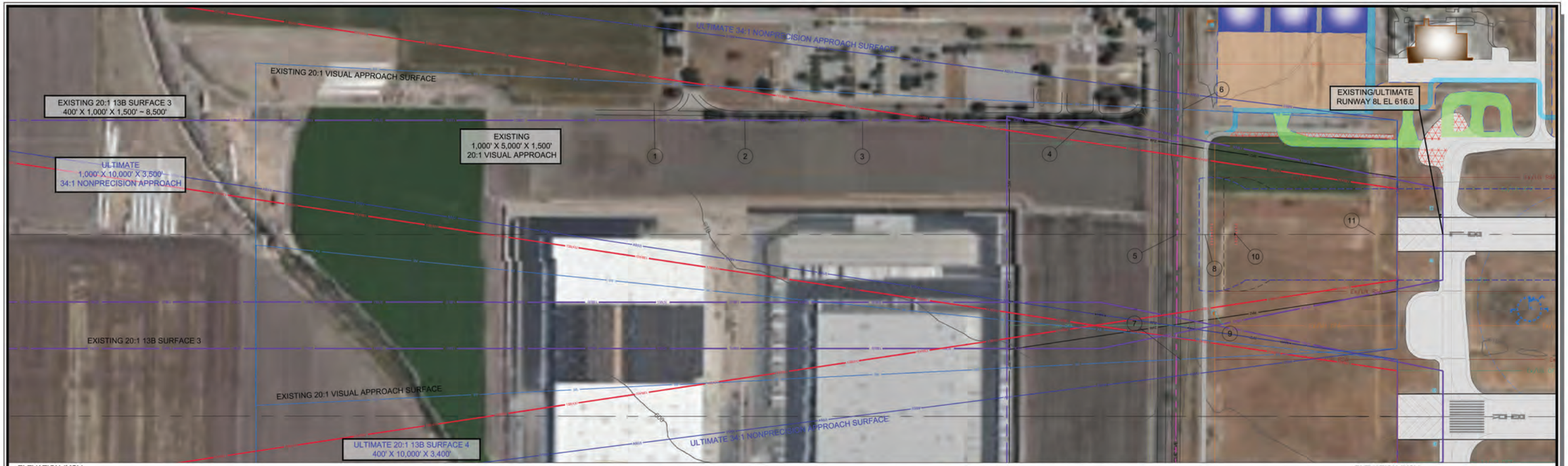

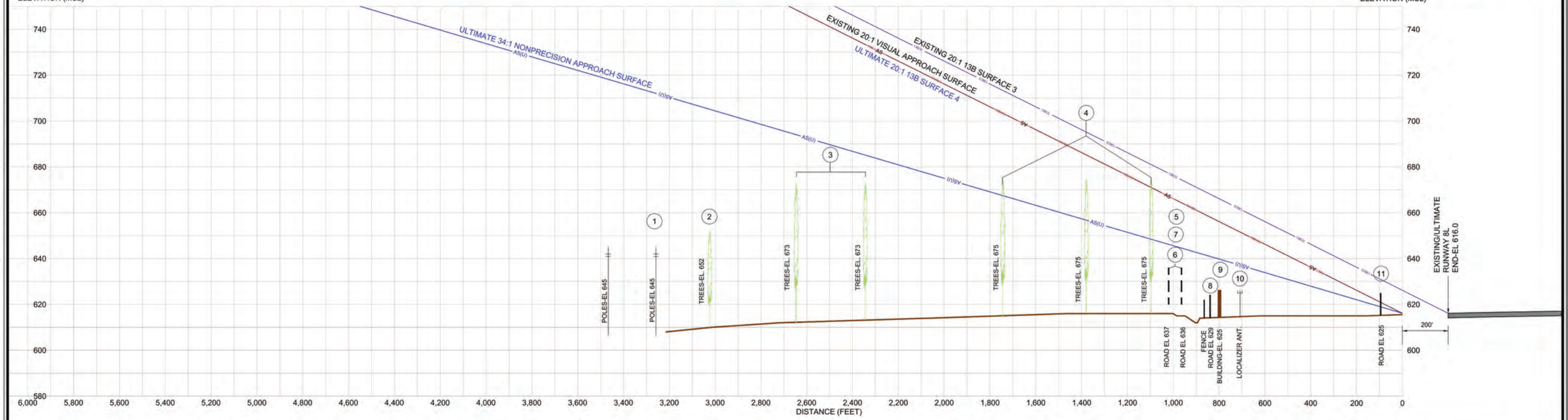

RUNWAY 8L OBSTRUCTION TABLE

	Objects Description/Elevation	Part 77 Approach		150/5300-13B		DESCRIPTION
		Ext. 20:1	Ult. 34:1	Ext. 20:1 App	Ult. 20:1 App	
4.	TREES - EL. 670	4'	27'	4'	4'	TRIM/REMOVE ALL TREES
11.	ROAD - EL. 626	4'	6'	4'	4'	REMOVE DIRT ROAD
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
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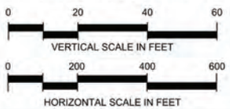
Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West



NO.	REVISIONS	DATE	BY	APP'D.
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4	--	--	--	----
3	--	--	--	----
2	ALP UPDATE	08/23	Coffman	--
1	--	--	--	--

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CHINO AIRPORT
INNER PORTION OF RUNWAY 8L APPROACH SURFACE DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024

SHEET 10 OF 21

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RUNWAY 26R OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		150/5300-13B		DESCRIPTION
	Ext 50:1	Ult 50:1	Ext 34:1 App	Ult 34:1 App	
1. GROUND EL 640	4'	N/A	2'	N/A	GRADE AREA
2. ASOS ANTENNA EL 664	0'	5'	0'	0'	RELOCATE
3. POLE EL 673	0'	3'	0'	0'	LOWER POLES/REMOVE POLES
16. TREES EL 698	24'	33'	6'	21'	REMOVE ALL TREES
17. TREES EL 693	0'	1'	0'	0'	REMOVE ALL TREES
18. TREES EL 702	0'	5'	0'	0'	REMOVE ALL TREES

GENERAL NOTES:

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2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the AIRPORT AIRSPACE DRAWING.

TRUE NORTH
11° 40' EAST

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

0 20 40 60
VERTICAL SCALE IN FEET

0 200 400 600
HORIZONTAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D
4	--	--	--	--
3	--	--	--	----
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CHINO AIRPORT
INNER PORTION OF RUNWAY 26R APPROACH SURFACE DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 SHEET 11 OF 21

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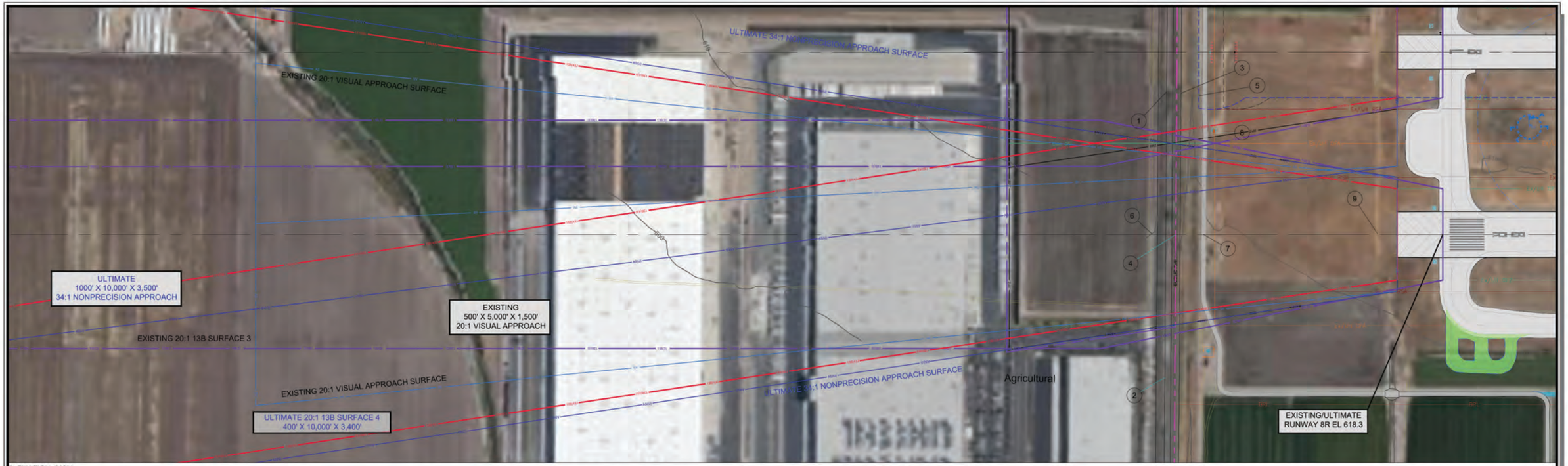

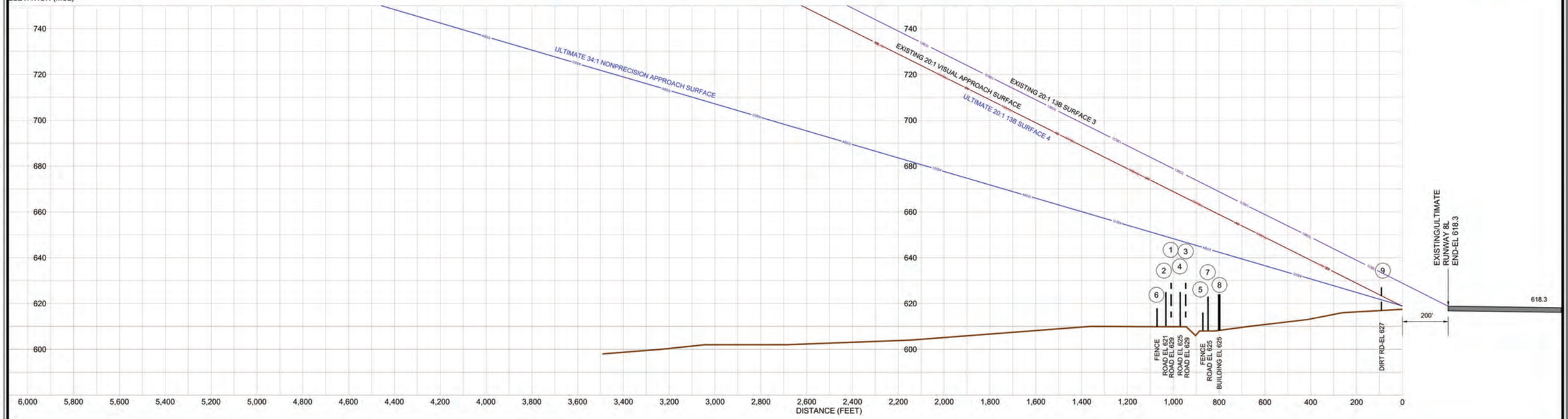

RUNWAY 8R OBSTRUCTION TABLE

	Objects Description/Elevation	Part 77 Approach		150/5300-13B		DESCRIPTION
		Ext. 20:1	Ult. 34:1	Ext. 20:1 App	Ult. 20:1 App	
9.	DIRT ROAD-EL 627	4'	6'	4'	4'	REMOVE DIRT ROAD
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the AIRPORT AIRSPACE DRAWING.

TRUE NORTH
11° 40' East

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

0 20 40 60
VERTICAL SCALE IN FEET

0 200 400 600
HORIZONTAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
4	--	--	--	--
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2	--	--	--	----
1	ALP UPDATE	08/23	Coffman	--

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CHINO AIRPORT
INNER PORTION OF RUNWAY 8R APPROACH SURFACE DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024

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Airport Consultants
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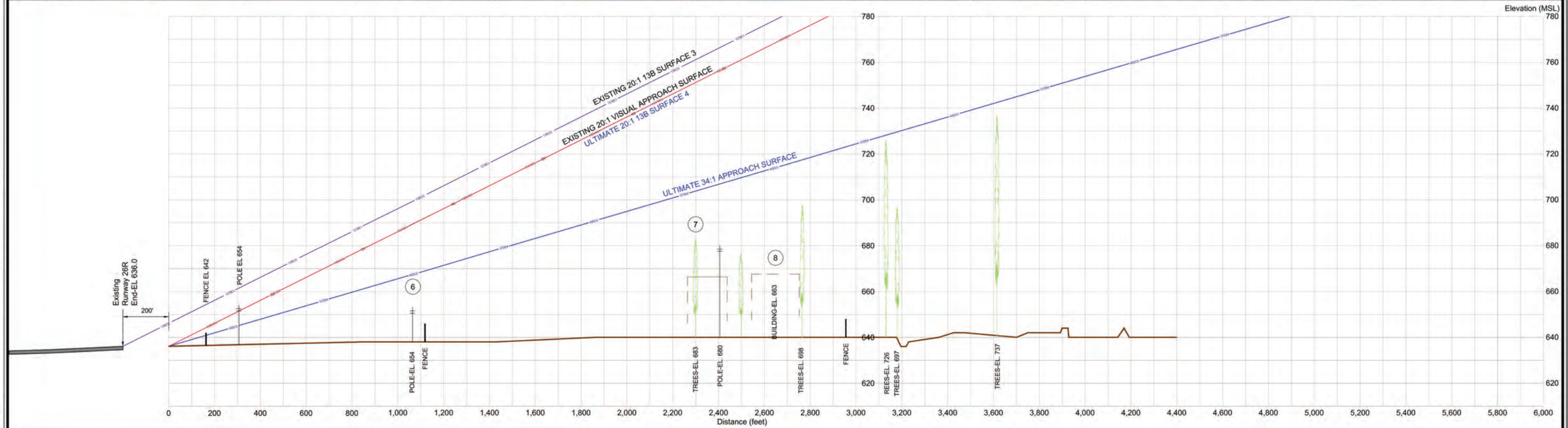

RUNWAY 26L OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		150/5300-13B		DESCRIPTION
	Ext. 20:1	Ult. 34:1	Ext. 20:1 App	Ult. 34:1 App	
1. NO OBSTRUCTIONS					

GENERAL NOTES:

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TRUE NORTH
11° 40' East

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

VERTICAL SCALE IN FEET
0 20 40 60

HORIZONTAL SCALE IN FEET
0 200 400 600

NO.	REVISIONS	DATE	BY	APP'D.
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CHINO AIRPORT
INNER PORTION OF RUNWAY 26L APPROACH SURFACE DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 13 OF 21

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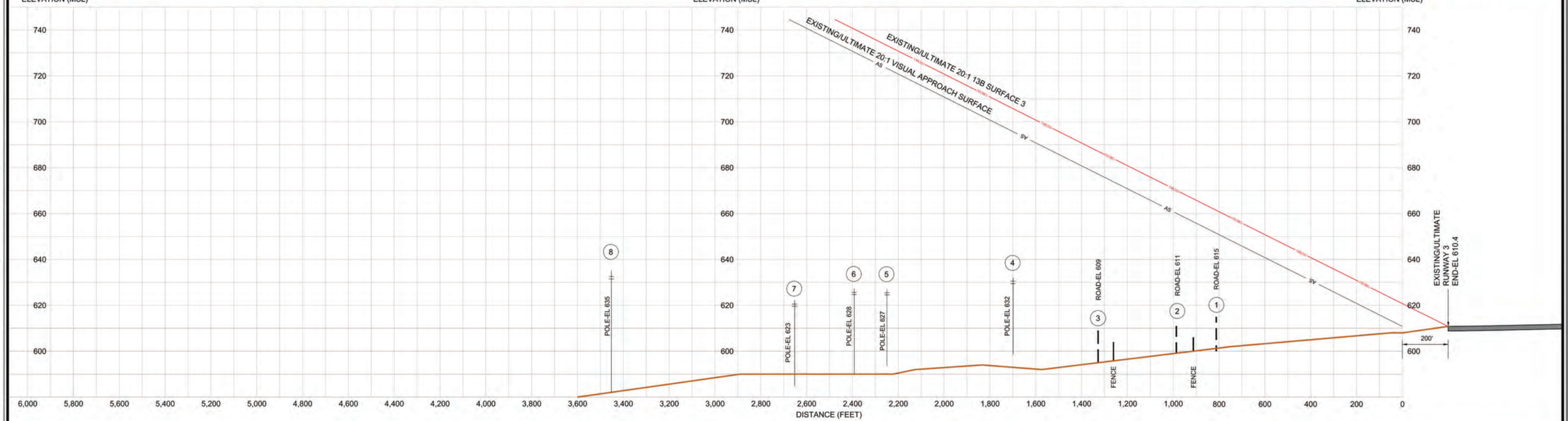

RUNWAY 3 OBSTRUCTION TABLE

Objects Description/Elevation		Part 77 Approach		150/5300-13B		DESCRIPTION
		Ext. 20:1	Ult. 20:1	Ext. 20:1 App	Ult. 20:1 App	
-	None	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

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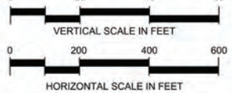

NO.	REVISIONS	DATE	BY	APP'D
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	ALP UPDATE	08/23	Coffman	-

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CHINO AIRPORT
INNER PORTION OF RUNWAY 3 APPROACH SURFACE DRAWING

Chino, California
County of San Bernardino, Department of Airports

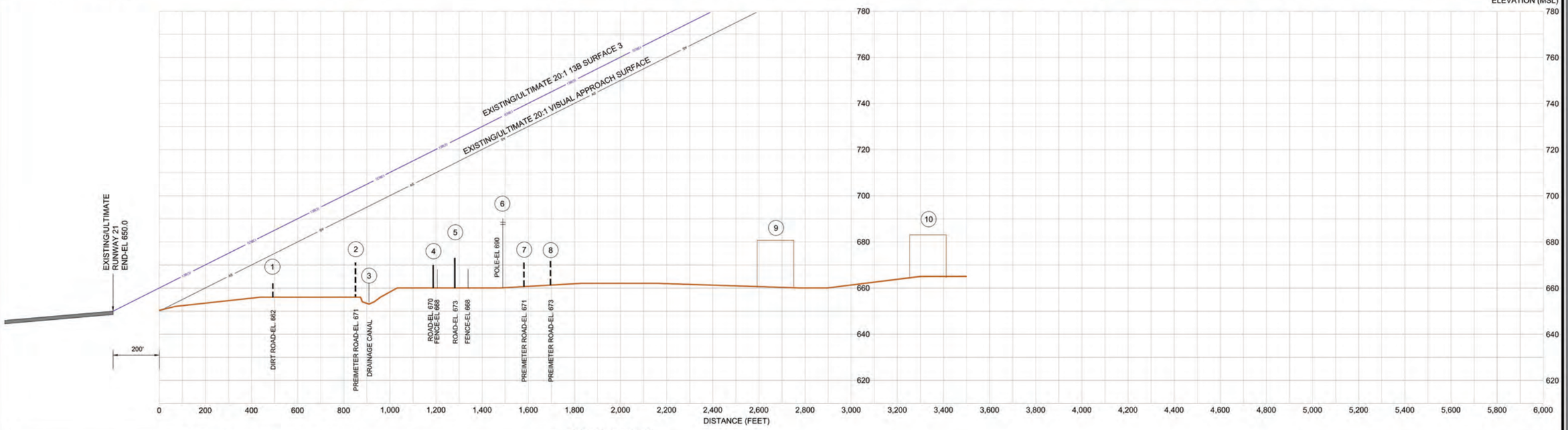
PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024

SHEET 14 OF 21

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Coffman Associates_CD Data\planning\ALP\Coffman Associates\ 2021\ALP\08 2023\15-15 CHO IFR\SD 08 2023.dwg Printed Date: 2-01-24 11:37:21 AM maggie



RUNWAY 21 OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		150/5300-13B		DESCRIPTION
	Ext. 20:1	Ult. 20:1	Ext. 20:1 App	Ult. 20:1 App	
NONE	-	-	-	-	-

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the AIRPORT AIRSPACE DRAWING.

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

0 20 40 60
VERTICAL SCALE IN FEET

0 200 400 600
HORIZONTAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
1	--	--	--	----
2	--	--	--	----
3	--	--	--	----
4	ALP UPDATE	08/23	Coffman	--

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CHINO AIRPORT
INNER PORTION OF RUNWAY 21
APPROACH SURFACE DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024

Coffman Associates
Airport Consultants
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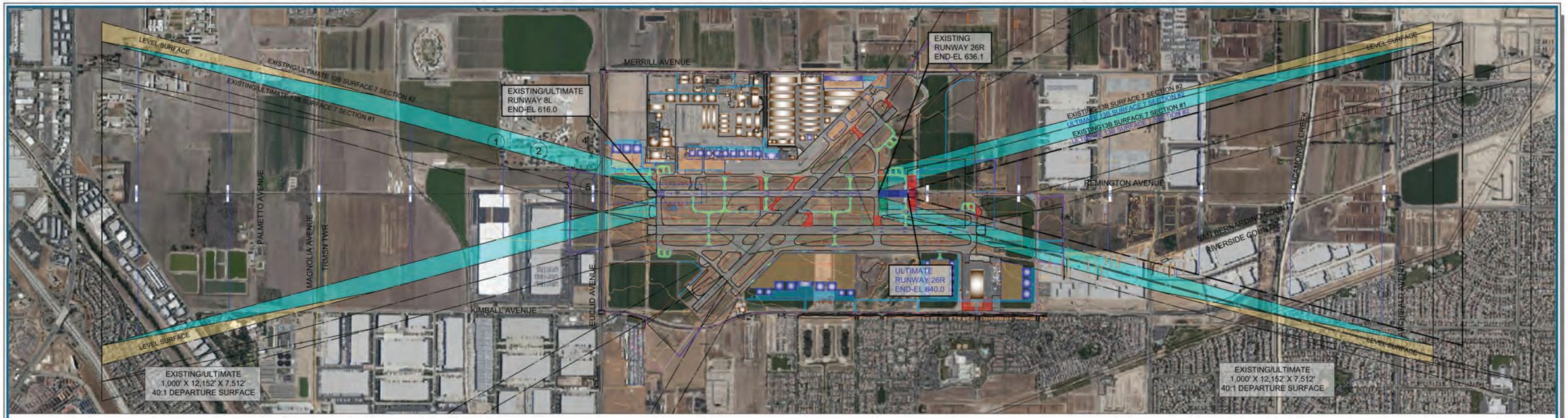
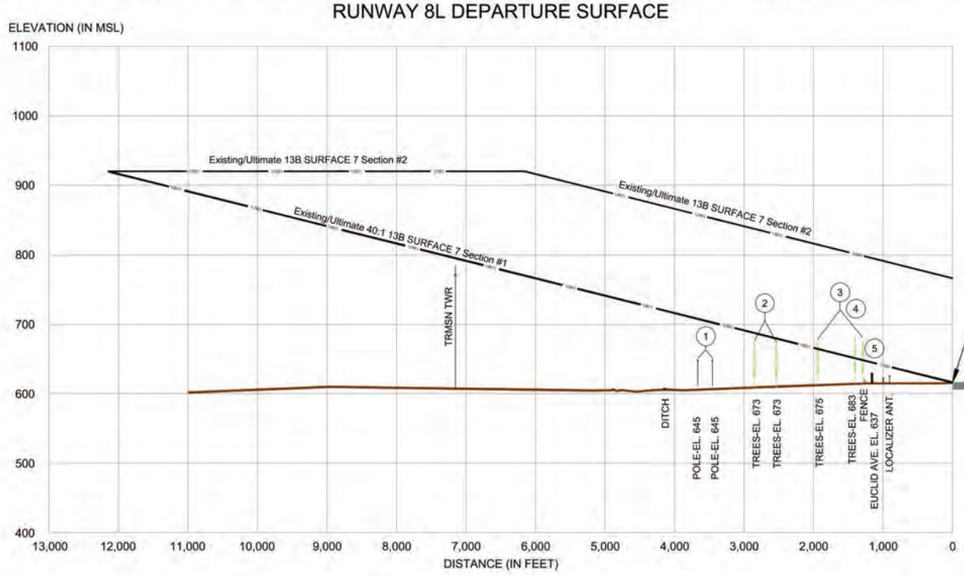
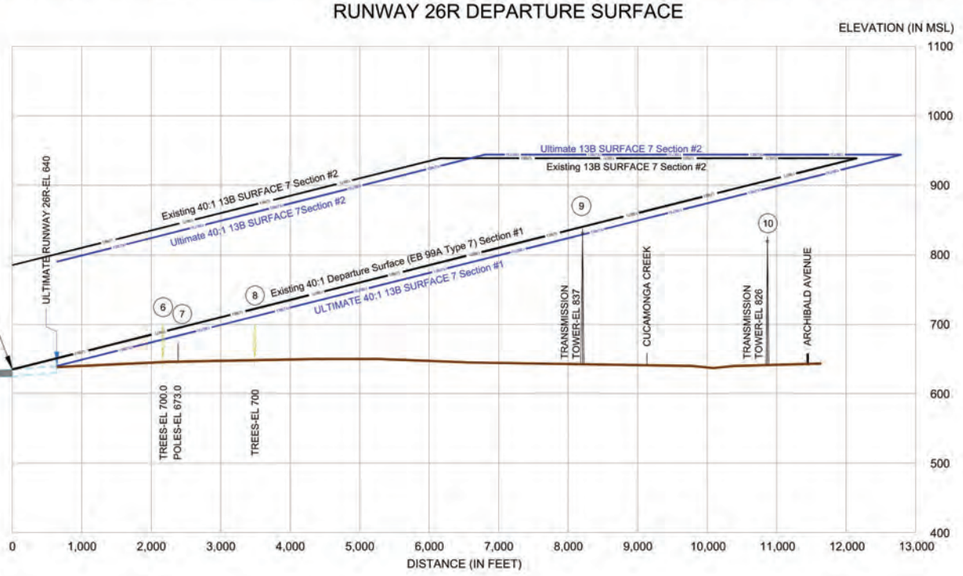
Coffman Associates LCD CNO: plot:11:55 (Sat/Sep Thursday (tentative)) 2/8/2012 1:58pm M:\AIRPORTS\CNO_21\ALP\08 2023\15-15 CNO IPAS(D 08 2023.dwg Printed Date: 2-01-24 11:36:40 AM maggie



RUNWAY 8L DEPARTURE SURFACE



RUNWAY 26R DEPARTURE SURFACE



GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt roads or private roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroad.
2. Standard in AC 150/5300-13 Appendix 2, Runway End Siting Requirements are not applicable for identifying objects affecting navigable airspace. See CFR Part 77 Title 14.
3. Roads and Buildings Clearance of more than 50 feet AGL are not detail in Departure Surface Profiles.

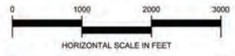
RUNWAY 8L OBSTRUCTION

Object Description/Elevation	Departure Surface		Obstacle Clearance Requirements (Remove, Relocate, or Lower Object)
	Existing 40:1	Ultimate 40:1	
3. TREES EL 675	27'	27'	REMOVE ALL TREES
4. TREES EL 683	33'	33'	REMOVE ALL TREES

RUNWAY 26R OBSTRUCTION

Object Description/Elevation	40:1 Departure Surface		Obstacle Clearance Requirements (Remove, Relocate, or Lower Object)
	Existing 40:1	Ultimate 40:1	
6. TREES-EL 700	11'	22'	REMOVE ALL TREES
9. TRANSMISSION TOWER-EL 837	N/A	8'	LOWER TOWERS

Magnetic Declination
12° 26' East (October 2011)
Annual Rate of Change 0° 5' West



NO.	REVISIONS	DATE	BY	APP'D
4	--	--	--	--
3	--	--	--	--
2	--	--	--	--
1	ALP UPDATE	05/23	Coffman	--

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CHINO AIRPORT
RUNWAY 8L-26R
DEPARTURE SURFACE DRAWING
Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 16 OF 21

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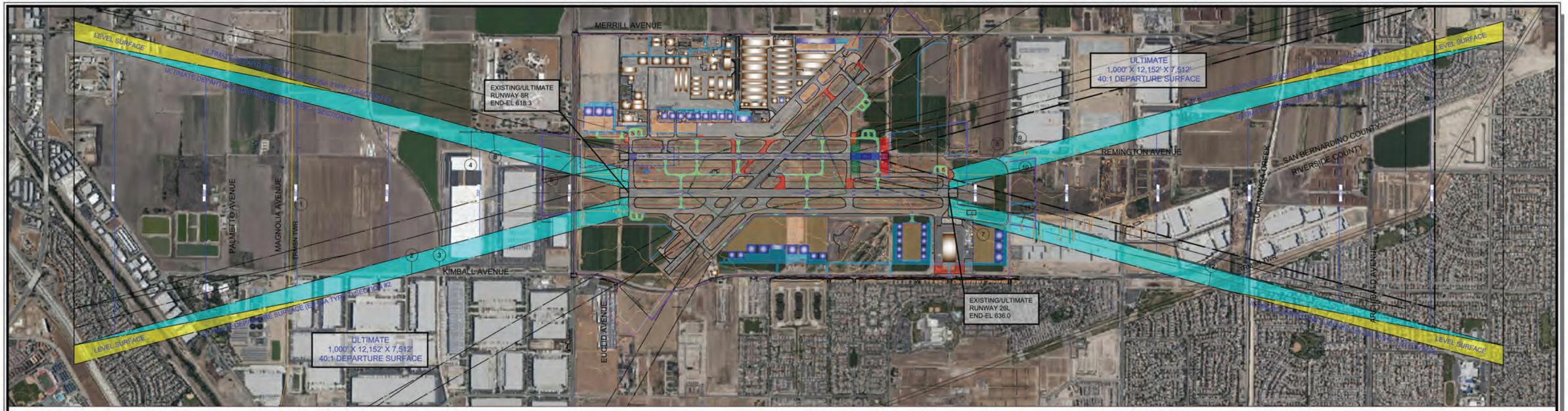
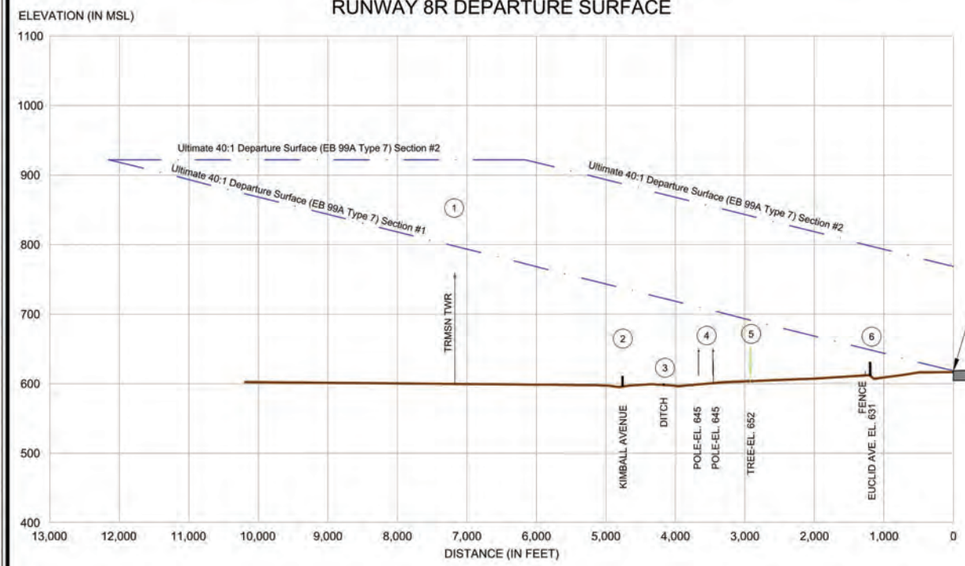
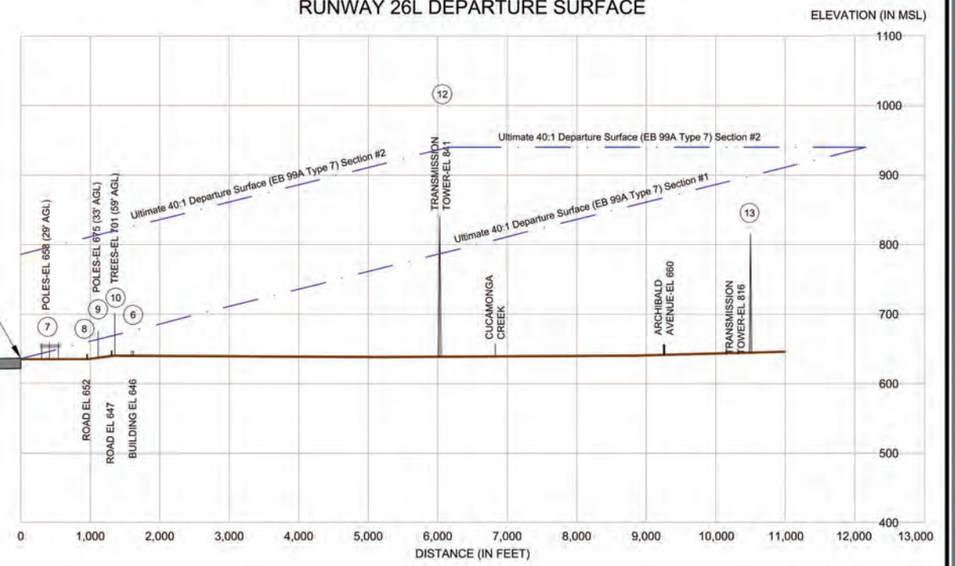


RUNWAY 8R DEPARTURE SURFACE



RUNWAY 26L DEPARTURE SURFACE



GENERAL NOTES:

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3. Roads and Buildings Clearance of more than 50 feet AGL are not detail in Departure Surface Profiles.

RUNWAY 8R OBSTRUCTION

Object Description/Elevation	Departure Surface		Obstacle Clearance Requirements (Remove, Relocate, or Lower Object)
	Existing 40:1	Ultimate 40:1	
NONE	N/A	NONE	NONE

RUNWAY 26L OBSTRUCTION

Object Description/Elevation	Departure Surface		Obstacle Clearance Requirements (Remove, Relocate, or Lower Object)
	Existing 40:1	Ultimate 40:1	
7. POLES-EL 658 (29' AGL)	N/A	15'	RELOCATE OBJECTS
9. POLES-EL 675 (POLE 33' AGL)	N/A	11'	RELOCATE OBJECTS
10. TREES-EL 701(59' AGL)	N/A	31'	REMOVE ALL TREES
12. TRANSMISSION TOWER-EL 841	N/A	54'	LOWER TOWER AND LINES

TRUE NORTH
Mag Bd -21

Magnetic Declination
12° 26' East (October 2011)
Annual Rate of Change 0° 5' West

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
4	--	--	--	--
3	--	--	--	--
2	--	--	--	--
1	ALP UPDATE	08/23	Coffman	--

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CHINO AIRPORT
RUNWAY 8R-26L
DEPARTURE SURFACE DRAWING
Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 17 OF 21

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EXISTING BUILDINGS/FACILITIES			EXISTING BUILDINGS/FACILITIES			EXISTING BUILDINGS/FACILITIES		
NO.	DESCRIPTION	TOP ELEVATION (MSL)	NO.	DESCRIPTION	TOP ELEVATION (MSL)	NO.	DESCRIPTION	TOP ELEVATION (MSL)
A-220	Building	652.9	A-490	Conventional Hangar (To Be Removed)	656.2	B-184	Executive Hangars	669.7
A-230	Conventional Hangar	663.2	A-495	Conventional Hangar (To Be Removed)	657.0	B-185	Executive Hangars	669.7
A-240	Conventional Hangar	661.3	A-497	Conventional Hangar	659.0	B-186	Executive Hangars	669.7
A-245	Conventional Hangar	656.4	A-503	Airport Maintenance/Operations	657.1	B-187	Executive Hangars	669.7
A-270	Conventional Hangar	658.7	A-505	Airport Maintenance/Operations	664.8	B-188	Executive Hangars	669.7
A-280	Conventional Hangar	651.2	A-510	Conventional Hangar	667.8	B-195	ATCT / Airport Beacon	737.0
A-285	Conventional Hangar	657.2	A-515	Conventional Hangar	662.6	B-197	Electrical Vault	N/A
A-290	Conventional Hangar	653.0	A-520	Conventional Hangar	669.2	B-199	Self-Serve Fuel Facility	N/A
A-305	Building	654.2	A-530	Conventional Hangar	669.2	B-210	T-Hangars	685.2
A-310	Building	657.8	A-532	Conventional Hangar	665.8	B-220	T-Hangars	665.0
A-315	Restaurant	652.2	A-540	Executive Hangars	668.5	B-230	T-Hangars	665.0
A-320	Building	657.8	A-542	Executive Hangars	663.4	B-240	T-Hangars	663.0
A-325	Building	656.3	A-544	Executive Hangars	669.6	B-250	T-Hangars	663.0
A-330	Building	656.3	A-546	Executive Hangars	667.4	B-260	T-Hangars	661.0
A-335	Conventional Hangar	662.3	A-548	Executive Hangars	659.8	B-270	T-Hangars	659.0
A-340	Conventional Hangar	664.4	A-550	Airport Administration	675.4	B-280	T-Hangars	659.0
A-385	Executive Hangar (To Be Removed)	643.5	A-552	Conventional Hangar	675.4	B-290	T-Hangars	659.0
A-390	Executive Hangar (To Be Removed)	645.4	A-555	Conventional Hangar (To Be Removed)	661.0	B-295	Conventional Hangar	666.9
A-430	Park Area	N/A	A-560	Conventional Hangar (To Be Removed)	662.0	B-297	Executive Hangar	659.7
A-435	Conventional Hangar	667.2	B-110	Executive Hangars	668.2	B-310	Vacant land	N/A
A-436	Building	655.5	B-120	Executive Hangars	664.9	B-320	T-Hangars	672.3
A-437	Airport Maintenance	655.9	B-130	Executive Hangars	664.0	B-330	T-Hangars	672.3
A-440	Executive Hangar	658.6	B-140	Executive Hangars	664.0	B-340	T-Hangars	670.3
A-445	Port-a-Port Hangars	649.0	B-150	Executive Hangars	667.1	B-350	Conventional Hangar	668.3
A-460	T-Hangars	648.0	B-160	T-Hangars	659.0			
A-465	T-Hangars	648.0	B-170	T-Hangars	662.0			
A-470	T-Hangars	647.0	B-180	T-Hangars	660.0			
A-475	T-Hangars	646.0	B-181	Executive Hangars	667.7			
A-480	Executive Hangar (To Be Removed)	656.0	B-182	Executive Hangars	667.7			
A-485	Conventional Hangar (To Be Removed)	657.0	B-183	Executive Hangars	669.7			

FUTURE BUILDINGS/FACILITIES		
NO.	DESCRIPTION	BUILDING HEIGHT (FT AGL)*
1	Linear Box Hangar	18'
2	200' x 200' Hangar	35'
3	200' x 200' Hangar	35'
4	200' x 200' Hangar	35'
5	150' x 150' Hangar	25'
6	150' x 150' Hangar	25'
7	150' x 150' Hangar	25'
8	150' x 150' Hangar	25'
9	150' x 150' Hangar	25'
10	150' x 150' Hangar	25'
11	150' x 150' Hangar	25'
12	150' x 150' Hangar	25'
13	150' x 150' Hangar	25'
14	Terminal Building	25'
15	125' x 100' Hangar	25'

*Building Heights Estimated

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical Data and NAD 83 for all horizontal data.
5. Taxiway development depending upon removal/relocation of Existing GS Antenna.

LEGEND

EXISTING	FUTURE	DESCRIPTION
N/A		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		RUNWAY TAXIWAY PAVEMENT
		APRON PAVEMENT
		FENCING
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
19 / 30	19 / 30	RUNWAY THRESHOLD LIGHTS and REIL
REIL	SAME	SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
TOFA	TOFA(U)	TAXIWAY OBJECT FREE AREA
TSA	TSA(U)	TAXIWAY SAFETY AREA
Exist OFA	SAME	EXTENDED OBJECT FREE AREA
Ex/Ult OFZ	SAME	EXT./ULT. OBSTACLE FREE ZONE
Ex/Ult RSA	SAME	EXT./ULT. RUNWAY SAFETY AREA
Ex/Ult OFA	SAME	EXT./ULT. RUNWAY OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
xRSA	uRSA	RUNWAY SAFETY AREA
xOFA	uOFA	RUNWAY OBJECT FREE AREA
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
		ASOS
	SAME	LOCALIZER CRITICAL AREA
		GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
		GLIDE SLOPE ANTENNA
N/A		MALSR APPROACH LIGHT SYSTEM
		PRECISION OBSTACLE FREE ZONE (POFZ)
	SAME	TIE-DOWNS
		CDA EXTRACTION WELLS
RVZ	RVZ(U)	RUNWAY VISIBILITY ZONE

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

TRUE NORTH 12° 35' East

0 200 400 600
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
1	---	---	---	---
2	---	---	---	---
3	---	---	---	---
4	ALP UPDATE	08/23	Coffman	---

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CHINO AIRPORT

TERMINAL AREA DRAWING I

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 SHEET 18 OF 21

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Airport Consultants
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(Coffman_Associates) (D:\Client\Chino\Working\ALP\Drawings) Attachments: TerminalArea.dgn, ID: 4258.dgn (CHINO_21ULPAG 20253516.v9 (CHO TAD) 08 2023.dwg, Printed Date: 2/01/24 - 11:34:36 AM - mgbeav

Existing Runway 26R
RPZ 1000' x 1700' x 1510'
Owned Fee Simple
3/4 Mile Visibility
50:1 Approach

Ultimate Runway 26R
RPZ 1000' x 1700' x 1510'
Owned Fee Simple
3/4 Mile Visibility
(Part 77 Surface 50:1 Approach)

Agricultural

Aircraft Parking Apron
Aircraft Parking Apron 700,000sqft
TAXIWAY A 50'
Twy K 50'
Twy L 35'
Twy D 80'
Twy L 50'
Twy D 50'
Twy D 218'
Twy E 190'
TAXIWAY C 75'
TAXIWAY E 60'
TWY E1 40'
Twy P 93'
Twy T 100'
Twy T 75'
Twy A2 35'
Twy M 35'
Twy P1 35'
Twy C2 127'
Twy B3 100'
Twy C3 100'
26
26 L
20 21 29 28
REIL
7,500' x 800' OFA
7,500' x 500' RSA
5,900' x 400' OFZ
7,400' x 400' OFZ
RWY 8R-26L 9,000' x 800' OFA
Existing PAPI-4
Ultimate PAPI-4
Ext. ILS GS Antenna
Ult. ILS GS Antenna
xGS
Ext. ARP
33° 58' 29.206" N
117° 38' 11.338" W
Ult. ARP
33° 58' 29.38" N
117° 38' 10.444" W
PACS AA7147
CNO ARP 1976
EL 924.7
ASOS
Segmented Circle
Ext. ASOS
Ult. ASOS
MALSR APPROACH LIGHT SYSTEM
Existing Runway 26L
RPZ 500' x 1700' x 1010'
Partially Owned/Easement
20:1 Approach/Visual
POND POND
Wash Rack
Run-Up-Area
FUEL FARM
BRL
1,352,000sqft
340,000sqft
325,000sqft
990,000sqft
F-330
F-340
F-350
F-360
F-365
D-305
CDA Extraction Well
Possible 4-Way Signal/Airport Entrance
Possible 4-Way Signal/Airport Entrance

EXISTING BUILDINGS/FACILITIES		
NO.	DESCRIPTION	TOP ELEVATION (MSL)
D-305	Chino Fire Station	635.4
F-330	Conventional Hangar	683.4
F-340	Conventional Hangar	683.4
F-350	Conventional Hangar	683.4
F-360	Conventional Hangar	683.4
F-365	Executive Hangar	658.0

FUTURE BUILDINGS/FACILITIES		
NO.	DESCRIPTION	BUILDING HEIGHT (FT AGL)*
16	150' x 150' Hangar	35'
17	150' x 150' Hangar	20'
18	200' x 200' Hangar	35'
19	200' x 200' Hangar	35'
20	FBO/Terminal Facility	25'
21	200' x 200' Hangar	35'
22	200' x 200' Hangar	35'
23	150' x 150' Hangar	25'
24	150' x 150' Hangar	25'
25	125' x 120' Hangar	25'
26	125' x 120' Hangar	25'
27	125' x 120' Hangar	25'
28	125' x 120' Hangar	25'
29	125' x 120' Hangar	25'
30	125' x 120' Hangar	25'
31	125' x 120' Hangar	25'
32	125' x 120' Hangar	25'
33	125' x 120' Hangar	25'
34	125' x 120' Hangar	25'
35	200' x 150' Hangar	25'
36	200' x 150' Hangar	25'
37	200' x 150' Hangar	25'
38	Fuel Farm	8'

*Building height estimated

LEGEND

EXISTING	FUTURE	DESCRIPTION
N/A		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		RUNWAY TAXIWAY PAVEMENT
		APRON PAVEMENT
		FENCING
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
26 L 26 R	26 L 26 R	RUNWAY THRESHOLD LIGHTS and REIL
	SAME	SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
TOFA	TOFA(U)	TAXIWAY OBJECT FREE AREA
TSA	TSA(U)	TAXIWAY SAFTEY AREA
Ext OFA	SAME	EXTENDED OBJECT FREE AREA
Ex/Ult OFZ	SAME	EXT./ULT. OBSTACLE FREE ZONE
Ex/Ult RSA	SAME	EXT./ULT. RUNWAY SAFETY AREA
Ex/Ult OFA	SAME	EXT./ULT. RUNWAY OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
xRSA	uRSA	RUNWAY SAFETY AREA
xOFA	uOFA	RUNWAY OBJECT FREE AREA
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
		ASOS
		LOCALIZER CRITICAL AREA
		GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
		GLIDE SLOPE ANTENNA
N/A		MALSR APPROACH LIGHT SYSTEM
		PRECISION OBSTACLE FREE ZONE (POFZ)
	SAME	TIE-DOWNS
		CDA EXTRACTION WELLS
RVZ	RVZ(U)	RUNWAY VISIBILITY ZONE

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical data and NAD 83 for all horizontal data.
5. There are three monuments at the airport, one PACS and two SACSs. AA7146-SACS CNO A the station is a standard NOS disk stamped CNO a 1976 and is set in a drill hole in a concrete pad. AA7148-SACS CNO B the station is set in a drill hole in the northwest corner of a concrete helopad flush with the surface. AA7147-PACS CNO ARP the station is a standard NOS disk stamped ARP CNO 1976 and set in the top of a concrete monument that is flush with the surface.
6. Taxiway development depending upon removal/relocation of Existing GS Antenna.

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

TRUE NORTH 11° 39' EAST

0 200 400 600
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
4	--	--	--	--
3	--	--	--	--
2	--	--	--	--
1	ALP UPDATE	08/23	Coffman	--

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CHINO AIRPORT

TERMINAL AREA DRAWING II

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 19 OF 21

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Coffman Associates LLC C:\Data\Projects\Chino\Airport Layout Plan\Terminal Area\Drawings\Terminal Area.dwg Printed Date: 5-14-24 02:17:09 PM maggie

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical data and NAD 83 for all horizontal data.
5. There are three monuments at the airport, one PACS and two SACSs. AA7146-SACS CNO A the station is a standard NOS disk stamped CNO a 1976 and is set in a drill hole in a concrete pad. AA7149-SACS CNO B the station is set in a drill hole in the northwest corner of a concrete helopad flush with the surface. AA7147-PACS CNO ARP the station is a standard NOS disk stamped ARP CNO 1976 and set in the top of a concrete monument that is flush with the surface.
6. Taxiway development depending upon removal/relocation of Existing GS Antenna.
7. See the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS for OCS Object Penetrations.
8. The target date for relocation of the natural gas valves and the fire suppression storge tanks is estimated during FAA Fiscal Years 2016-2018.
9. Height Restrictions/Ordinances - San Bernardino County has adopted Part 77 standards into its General Plan and are applied to its ALUCP. See Federal Rule CFR Part 77.

AIRPORT LAND USE LEGEND

- AIRFIELD OPERATIONS
- GENERAL AVIATION
- AERONAUTICAL REVENUE SUPPORT (RESERVED)
- NON-AERONAUTICAL REVENUE SUPPORT (RESERVED)

LEGEND

EXISTING	FUTURE	DESCRIPTION
N/A		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		RUNWAY TAXIWAY PAVEMENT
		APRON PAVEMENT
		FENCING
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
		RUNWAY THRESHOLD LIGHTS and REIL
	SAME	SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
630	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
TOFA	TOFA(U)	TAXIWAY OBJECT FREE AREA
TSA	TSA(U)	TAXIWAY SAFTEY AREA
Exist OFA	SAME	EXTENDED OBJECT FREE AREA
Ex/Ult OFZ	SAME	EXT./ULT. OBSTACLE FREE ZONE
Ex/Ult RSA	SAME	EXT./ULT. RUNWAY SAFETY AREA
Ex/Ult OFA	SAME	EXT./ULT. RUNWAY OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE
xRSA	uRSA	RUNWAY SAFETY AREA
xOFA	uOFA	RUNWAY OBJECT FREE AREA
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
		ASOS
		LOCALIZER CRITICAL AREA
		GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
		GLIDE SLOPE ANTENNA
N/A		MALSR APPROACH LIGHT SYSTEM
		PRECISION OBSTACLE FREE ZONE (POFZ)
	SAME	TIE-DOWNS
		CDA EXTRACTION WELLS
RVZ	RVZ(U)	RUNWAY VISIBILITY ZONE

Agricultural

Possible 4-Way Signal/Airport Entrance

Existing Gated Airport Entrance

Aircraft Parking Apron

Existing PAPI-4

Existing LOC

Segmented Circle

EL. 631.0

EL. 622.5

RW 3 TDZE 634.1

RW 8L TDZE 629.6

RW 8R TDZE 624.8

Ext. ILS GS Antenna

Ext GS Critical Area

Ext. ASOS

POND

Wash Rack

FUEL FARM

CDA Extraction Well

Possible 4-Way Signal/Airport Entrance

Existing Gated Airport Entrance

Agricultural

Agricultural

Agricultural

Agricultural

Agricultural

(Residential)

Magnetic Declination
11° 40' East (June 2020)
Annual Rate of Change 0° 5' West

TRUE NORTH 11° 40' East

0 400 800 1200
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D
4	--	--	--	--
3	--	--	--	--
2	--	--	--	--
1	ALP UPDATE	08/23	Coffman	--

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CHINO AIRPORT

LAND USE DRAWING

Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 20 OF 21

Coffman Associates
Airport Consultants
www.coffmanassociates.com

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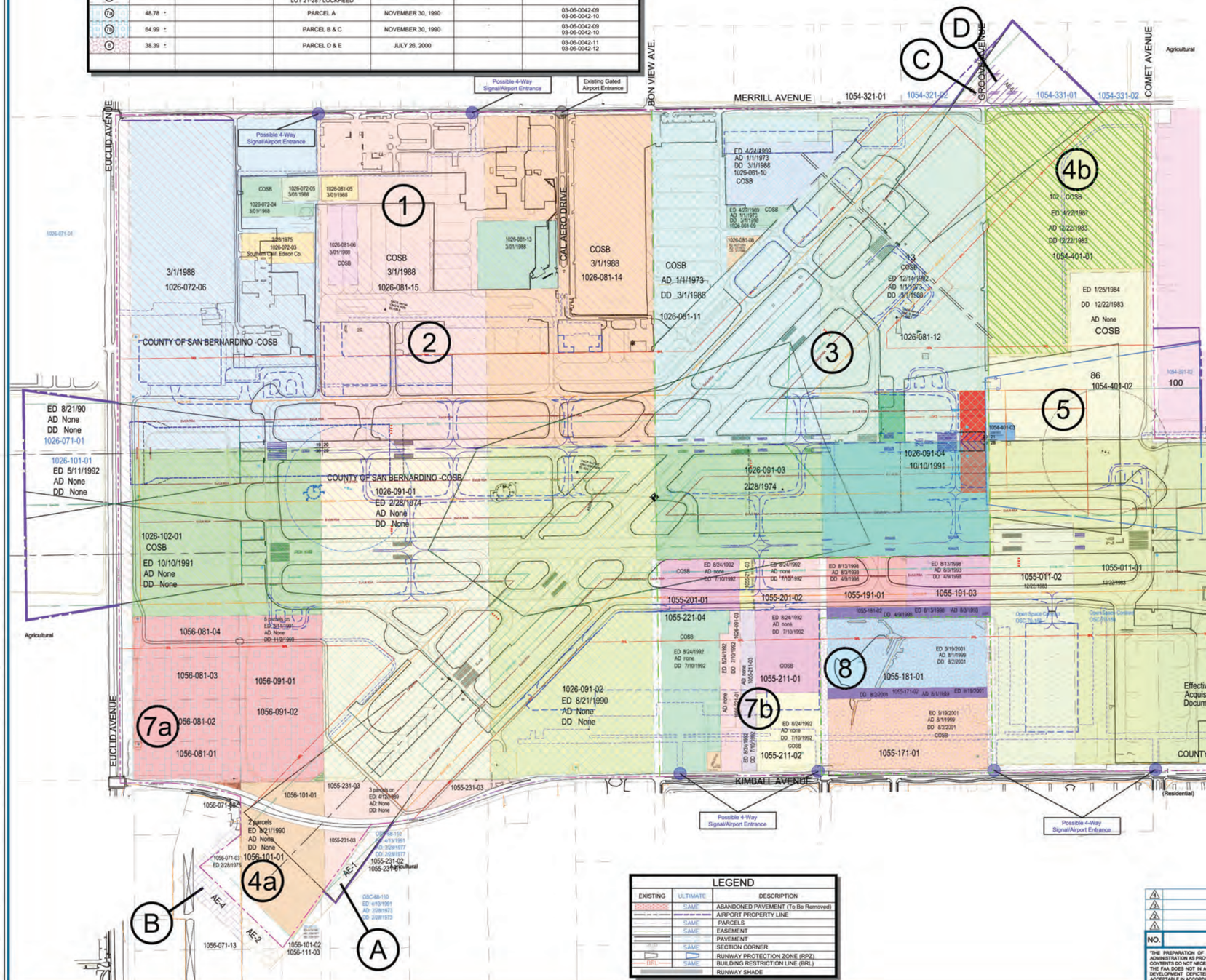
EXISTING PROPERTY DATA

PARCEL	ACREAGE	GRANTOR/GRANTEE	PROPERTY INTEREST	DATE ACQUIRED	BOOK/PAGE	FEDERAL PROJECT NUMBER
1	45.34 ±	UNITES STATES of AMERICA THROUGH THE GENERAL SERVICES ADMIN.	INITIAL ACQUISITION/ FEE SIMPLE-PARCEL NO. 1	JULY 1, 1940	Book 6-Page 15, Book1425-Page 58-60	N/A
2	279.28 ±		INITIAL ACQUISITION/ FEE SIMPLE-PARCEL NO. 2	APRIL 16, 1948	Book 6-Page 15, Book223-Page 104	N/A
3	357.12 ±		INITIAL ACQUISITION/ QUITCLAIM DEED-PARCEL NO. 3	SEPTEMBER 28, 1940 to MARCH 12, 1942	Book 6-Page 15, Book2482-Page 87-98	N/A
4a	31.30 ±		FEE SIMPLE RW 3 CZ	JUNE 17, 1983	Book 6-Page 15, Book1425-Page 58-60	-
4b	39.10 ±		FEE SIMPLE RW 21 CZ	JUNE 17, 1983	Book 6-Page 15, Book1425-Page 58-60	-
5	119.68 ±		FEE SIMPLE	SEPTEMBER 19, 1983	Book 6-Page 15, Book1425-Page 58-60	03-06-0042-03
6	79.89 ±		FEE SIMPLE LOT 21-28 / LOCKHEED	JULY 11, 1989	-	N/A
7a	48.78 ±		PARCEL A	NOVEMBER 30, 1990	-	03-06-0042-09 03-06-0042-10
7b	64.99 ±		PARCEL B & C	NOVEMBER 30, 1990	-	03-06-0042-09 03-06-0042-10
8	38.39 ±		PARCEL D & E	JULY 26, 2000	-	03-06-0042-11 03-06-0042-12

EXISTING EASEMENT DATA

PARCEL	ACREAGE	PROPERTY INTEREST	DATE ACQUIRED	BOOK/PAGE	FEDERAL PROJECT NUMBER
A	5.85 ±	AVIATION EASEMENT	9-26-1972	-	N/A
B	3.63 ±	AVIATION EASEMENT	1-30-1975	-	N/A
C	0.5 ±	AVIATION EASEMENT	9-4-1975	-	N/A
D	1.95 ±	AVIATION EASEMENT	11-19-1976	-	N/A



PROPOSED PROPERTY ACQUISITION

ASSESSOR PARCEL NO.	ACREAGE	PROPERTY INTEREST
1026-071-01	6.33 Ac.	Runway 8L - RPZ
1026-111-01	18.79 Ac.	Runway 8L & 8R - RPZ
1054-321-02	1.96 Ac.	Runway 21 - RPZ
1054-331-01	7.30 Ac.	Runway 21 - RPZ
1054-331-02	1.62 Ac.	Runway 21 - RPZ
1054-391-02	7.23 Ac.	Runway 26R - RPZ
1055-051-02	9.0 Ac.	Runway 26L - RPZ
1055-051-01	9.75 Ac.	Runway 26L - RPZ
1055-111-01	3.1 Ac.	Runway 26L - RPZ
1055-111-02	4.55 Ac.	Runway 26L - RPZ
1055-061-01	9.75 Ac.	Runway 26L - RPZ
1055-061-02	9.75 Ac.	Runway 26L - RPZ
1055-071-01	0.27 Ac.	Runway 26L - RPZ
1055-071-02	0.31 Ac.	Runway 26L - RPZ
1055-101-04	0.17 Ac.	Runway 26L - RPZ
1054-471-02	0.92 Ac.	Runway 26L - RPZ
1055-231-01	1.11 Ac.	Runway 3 - RPZ
1055-231-02	2.5 Ac.	Runway 3 - RPZ

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
	SAME	PARCELS
	SAME	EASEMENT
	SAME	PAVEMENT
	SAME	SECTION CORNER
RPZ	SAME	RUNWAY PROTECTION ZONE (RPZ)
BRL	SAME	BUILDING RESTRICTION LINE (BRL)
		RUNWAY SHADE

NO.	REVISIONS	DATE	BY	APP'D
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	ALP UPDATE	08/23	Coffman	-

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CHINO AIRPORT
EXHIBIT "A" AIRPORT PROPERTY INVENTORY MAPS
Chino, California
County of San Bernardino, Department of Airports

PLANNED BY: Patrick Taylor
DETAILED BY: Maggie Beaver
APPROVED BY: Matt Quick

March 2024 | SHEET 21 OF 21

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Airport Consultants
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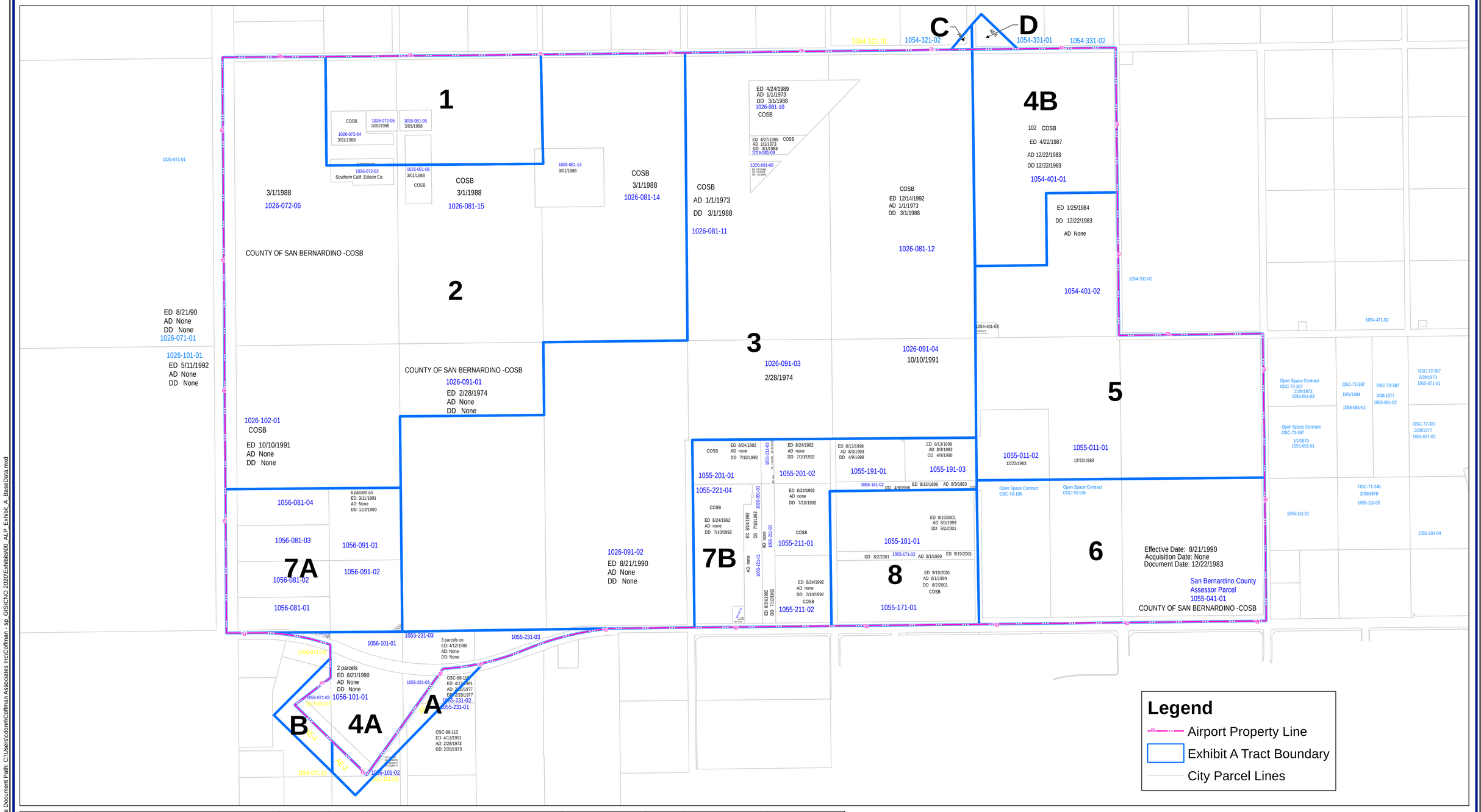

Parcel ID	Grantor	Interest Type	Acreage	Instrument	Book/Page	FAA Grant #	Easement	Date	PurposeofAcquisition
1	United States of America Through the General Services Admin.	Fee Simple	45.34		Book 6, Page 15/Book 1425, Page 58-60	N/A	N/A	7/1/1940	Initial Acquisition
2	United States of America Through the General Services Admin.	Fee Simple	279.28		Book 6, Page 15/Book 223, Page 104	N/A	N/A	4/16/1948	Initial Acquisition
3	United States of America Through the General Services Admin.	Fee Simple	357.12	Quit Claim Deed	Book 6, Page 15/Book 2482, Page 87-98	N/A	N/A	9/28/1940 thru 3/12/1942	Initial Acquisition
4a		Fee Simple	31.3		Book 6, Page 15/Book 1425, Page 58-60	Project 83-01	N/A	6/17/1983	Airport Use
4b		Fee Simple	39.1		Book 6, Page 15/Book 1425, Page 58-60	Project 83-01	N/A	6/17/1983	Airport Use
5		Fee Simple	119.68		Book 6, Page 15/Book 1425, Page 58-60	03-06-0042-03	N/A	9/19/1983	Airport Use
6			79.89			N/A	N/A	7/11/1989	Airport Use
7a			48.78			03-06-0042-09/10	N/A	11/30/1990	Airport Use
7b			64.99			03-06-0042-09/10	N/A	11/30/1990	Airport Use
8			38.39			03-06-0042-11/12	N/A	7/26/2000	Airport Use
A	Frances M. Scott, et al		5.85	Indenture	Book 8028, Page 272-280	N/A	Avigation	9/26/1972	Avigation Easement
B			3.63			N/A	Avigation	1/30/1975	Avigation Easement
C			0.5			N/A	Avigation	9/4/1975	Avigation Easement
D			1.95			N/A	Avigation	11/19/1976	Avigation Easement

0 400 800
1" = 400'

N

DRAFT

No.	REVISIONS	DATE	BY	APP'D

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Chino Airport

CNO Property Parcels

Chino, California

PLANNED BY: *N/A*

DETAILED BY: *CD*

APPROVED BY: *N/A*

07/2024

SHEET 1 OF 1

Coffman Associates Airport Consultants

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