



**COLORADO SPRINGS
AIRPORT**

LAND USE STUDY

OCTOBER 2020

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1 Introduction

The City of Colorado Springs has recently experienced significant growth and is forecasted to continue to grow at an unprecedented rate. In response to this growth, the Colorado Springs Airport (COS or the Airport) determined an analysis of existing and planned land uses on and around the Airport was vital to ensuring that both the Airport and community can continue to thrive and grow in harmony.

At the writing of this chapter (summer 2020), the 2020 coronavirus pandemic (COVID-19) is significantly impacting the aviation industry as well as most other industries across the world, hitting harder than any previous crisis. More cases of COVID-19 are still being reported and it is anticipated that non-essential travel will continue to be cancelled for the next several months. Airlines have made deep capacity cuts, grounded fleets, and massive layoffs have occurred. Aircraft production has come to a halt. According to Airports Council International-North America, it is estimated passengers declined 73 percent in the March to June 2020 period and total enplanements in the U.S. decreased by 349 million for the year¹. General aviation activity and aircraft orders have also slowed drastically. Corporate travel is minimal, many flight schools have ceased flight training, skydiving operations are shut down, and airshows have been cancelled. Airport and FBO staff are working with skeleton crews. The biggest question for the aviation community and the rest of the world, is how long the virus-induced global economic downturn will last. The aviation industry is, however, resilient and it is anticipated that activity will at some point return to pre-pandemic levels. The long-term implications of the pandemic on the aviation industry are largely unknown. COVID-19 has undoubtedly impacted aviation activity presented in this report, but it is difficult to quantify/project the impact it may have on long-term activity at COS at this time.

Land use planning as it pertains to airports is unique with restrictions not commonly considered in general land use planning analysis. Incompatible land use in proximity to airports is a significant risk; proactive planning, such as that being done by COS, is the best mitigation strategy, reducing the opportunity for future incompatible land use and maintaining a safe operating environment.

This Land Use Compatibility Study was prepared to analyze the ability of the jurisdictions surrounding the Airport to implement land use policies and zoning and building ordinances that balance the current and projected future needs of the Airport with the needs of the community and property owners.

As an introduction, the following questions will be answered:

1. What is airport compatible land use?
2. Why is airport land use compatibility important?
3. What are the most common land use compatibility concerns?
4. What land uses are most commonly found near airports?
5. How is airport land use compatibility achieved?

¹ <https://airportscouncil.org/wp-content/uploads/2020/03/Economic-Impact-of-Coronavirus-on-U.S.-Commercial-Airports.pdf>

1.1. What is Airport Compatible Land Use?

Airport compatible land use can be defined as “uses that can coexist with a nearby airport without either constraining the safe and efficient operation of the airport or exposing people living and working nearby to unacceptable levels of noise or hazards.”² The definition is broad and intentionally leaves room for the consideration of variables that may influence whether a use is considered compatible with a specific airport’s environment. Variables that may influence land use compatibility may include the location of the land in relation to the airport and associated flight paths, the future use of the land and development attributes (specifically height of buildings), and secondary or induced impacts resulting from the land use. It can be assumed that when these variables are considered within an airport’s unique environment, the compatibility of land use merits close review.

Compatible land use includes promoting land uses on and around an airport that, at best, are complementary and synergistic with the airport, and, at a minimum, can coexist with the airport without presenting undue burdens on property owners and tenants. In the case of the Airport, Peterson Air Force Base is the clearest example of a compatible land use. The City’s efforts to promote non-aeronautical commercial development on and around the Airport that benefits from access to the Airport’s landside and airside facilities present another example of compatible land use. By contrast, communities that permit the encroachment of residential development too close to the Airport reflects incompatible land use.

To simplify, two general questions can be asked when determining land use compatibility:

1. Could the characteristics of the land use adversely affect airport operations or hinder the airport’s ability to operate safely and efficiently, now and in the future?
2. Could the people living and working near the airport be exposed to safety hazards or unacceptable levels of noise, now and in the future?

The basic answers, though not always easily determined, should stand as the guide for development and implementation of compatible land use planning; ensuring the safety of aircraft operations and persons and property on the ground are maintained.

1.2 Why is Airport Land Use Compatibility Important?

The aviation industry is one of the most crucial elements to the national transportation system as well as local, state, and national economies. In 2018, the system carried an all-time high of 1.0 billion passengers and continues on an uphill trend.³ To further express the importance of aviation, according to FAA’s 2017 study, *The Economic Impact of Civil Aviation on the U.S. Economy*, in 2014 alone, “civil aviation generated \$1.6 trillion in economic activity, supported 10.6 million jobs with \$446.8 billion in earnings. Additionally, civil aviation accounted for 5.1 percent of U.S. gross domestic product.” Clearly, the aviation industry stands as a vital connection between people and goods, utilized by billions of passengers throughout the world.

² National Academies of Sciences, Engineering, and Medicine, *Enhancing Airport Land Use Compatibility*, Volume 1: Land Use Fundamentals and Implementation Resources. Washington, DC: The National Academies Press, 2010

³ Bureau of Transportation Statistics, 2018 Traffic Data for U.S. Airlines and Foreign Airlines U.S. Flights, March 21, 2019

Locally, the Airport has an annual economic impact of approximately \$3.43 billion and supports more than 25,000 jobs and an annual payroll of \$1.52 billion.⁴ In short, the Airport is vital to the regional business community, tourism, residents, and the aviation mission of Peterson Air Force Base.

As population and demand for increased transportation of people and goods grow, development on and near airports also surge. Addressing incompatible land use, tied to increased development, is one of the industry's most important challenges and is crucial to ensuring aircraft and community safety. If not addressed, incompatible development near airports could greatly hinder the industry's, specifically the nation's airports, ability to respond to increased demands. Equally, if not more important, unaddressed incompatible land uses near airports can create safety hazards and less than desirable quality of life for the residents and businesses residing near an airport. This can erode public support for the airport, resulting in a cycle of mistrust and animosity. Safety and quality of life are truly the fundamental basis for maintaining land use compatibility on and near airports.

Historically, most airports throughout the nation were built on the outskirts of towns in open fields. As the population of the nearby towns and cities have increased, they have begun to encroach on the airports and new conflicts such as noise, safety and airspace protection may have become an issue. One solution has been to close the constrained airport and build a new airport further away from the growing population. Unfortunately, in today's environment, open fields are becoming rare, airports are no longer a dirt strip but rather an economic engine, and connectivity to the population is important. Likewise, history often repeats itself and a new airport is often followed by development, repeating the encroachment cycle.

To combat these cycles, the FAA has taken a keen interest in incompatible land use challenges and initiated federal programs that promote compatible land use, specifically regarding noise and safety impacts both from airport development and encroachment. The FAA itself cannot specifically mandate the use of land around an airport; however, they can, and do encourage local and state compatible land use planning through guidance and support projects such as the following (this is not an all-inclusive list, but the most commonly referenced guidance):

- *Advisory Circulars (AC's)* – define requirements related to building setbacks and runway protection zones as well as guidelines in preparing airport master plans, including land use planning.
- *The Aviation Safety and Noise Abatement Act of 1979* – provides assistance to encourage airport operators to prepare and carry out noise compatibility as well as other programs.
- *The Federal Aviation Regulation Part 150 Noise Compatibility Program* – defines land use compatibility guidelines for aviation noise exposure. These guidelines consider land use compatibility for different uses over a range of Day-Night Average Sound Level (DNL) noise exposure, including the adoption of DNL 65 dB as the accepted limit for residential land use compatibility.
- *The Airport and Airway Improvement Act of 1982* – is the funding mechanism for improvement projects and requires grant recipients to meet grant assurances. Included in these assurances is an obligation by the sponsor to maintain compatible land use within the vicinity of the airport.

⁴ Colorado Department of Transportation, Division of Aeronautics, 2018 Economic Impact Study for Colorado Airports. Includes military activity at Peterson Air Force Base.

- The *Airport Noise and Capacity Act (ANCA) of 1990* – established the national aviation-related noise policy and requires that certain review and approval procedures be completed before a proposed restriction that impacts Stage 2⁵ (noise limits established in 1969) or Stage 3 (more stringent noise limits established in 1977) aircraft is implemented.
- The *National Environmental Policy Act (NEPA) of 1969* – requires the consideration of impacts to the environment and specifically states that “governments, and other public and private organizations, use all practical means and measures to create and maintain conditions under which man and nature can exist in harmony.”

Although extremely valuable, guidance from the FAA does not impose direct restrictions on land use near an airport; rather this responsibility is on the local entity with jurisdiction over the land. It is the community’s responsibility to proactively take action to develop, implement, and maintain a land use compatibility program at their airport. It is imperative that the programs receive support, which is most often successful if all stakeholders, to include the airport sponsor, state officials, and local jurisdictions, work cooperatively in developing compatible land uses that serve to benefit each entity.

With respect to this Land Use Compatibility Study for COS, the primary data sources utilized are:

- Chapter 7 of the City of Colorado Springs’ City Code (2019)
- Chapter 3 and Chapter 4 of El Paso County’s Land Development Code (2017)
- The City of Fountain’s Municipal Code, Title 17 (2019)
- Colorado Springs’ Comprehensive Plan - COSPlan (2019)
- Transportation Research Board’s *Enhancing Airport Land Use Compatibility* (2010)

1.3 What are the Most Common Land Use Compatibility Concerns?

Although each individual community determines what is considered compatible, the aviation industry historically has focused on considerations of noise and safety. Compatible land use near airports should limit land uses that:

1. May expose sensitive areas and people to noise,
2. Could create hazards to the flight of aircraft, and
3. May affect the severity of an accident (such as high concentrations of people).

When evaluating land use compatibility, these three areas should stand as a guide for whether the proposed (or existing) development is compatible with the airport environment.

1.3.1 Noise-Related Concerns

The goal of compatible land use planning as it relates to noise concerns is to promote land uses that are less sensitive to the noise associated with airport operations and aircraft overflights, and to correspondingly limit land uses that are more sensitive to noise. Because airport and aircraft noise at high levels has the potential to affect learning, disrupt sleep and annoy residents, compatible planning for noise

⁵ Stage 2 aircraft phaseout was December 2015

often involves promoting industrial and commercial uses closest to airports and limiting residences, schools and similar uses.

Noise can be measured a variety of ways depending on the number of events, their intensity or loudness, and their duration. For example, airports that have military operations may experience very loud noises, while commercial airports generally have moderately loud events, and general aviation airports often have relatively quiet events that occur more often. Factors that impact the level of noise at an airport vary but most often include:

- Number of aircraft operations,
- Type of aircraft operating at the airport,
- Time of day that the operations occur,
- Layout of the airfield,
- Percentage of time each runway is used,
- Location and frequency of use of flight tracks, and
- Use of the airport for specific aeronautical activities (e.g., pilot training, skydiving, etc.).

A community's response may vary due to factors such as:

- Surrounding land uses and the level of noise they produce,
- Surrounding environment and its ambient noise level,
- Noise sensitivity of surrounding land uses,
- Community's previous exposure to and experience with noise, and
- Community's perceptions of the necessity of the activities that create the noise.

A change to any of these variables may affect the community's perception of noise and ultimately the assessment of what is considered a compatible land use. Actions can be taken to minimize the extent that airport related noise causes disruptions, such as:

- Reduce the number of people occupying a high noise-sensitive area,
- Shield or insulate people from noise,
- Increase awareness of noise through educational programs and outreach, and
- Allow land uses that have relatively high ambient noise levels or are not particularly noise sensitive.

1.3.2 Safety-Related Concerns

Addressing safety concerns in relation to land use compatibility at airports also is a challenge. Safety concerns are often associated with "what if" scenarios, while noise concerns deal with existing issues. The goal of compatible land use planning for safety-related concerns are two-fold: 1) address issues that may create hazards to aircraft overflights, and 2) address issues that may affect the severity of an accident. Within each of these, there are more specific concerns.

1.3.2.1 Hazards to Airspace and Overflight

While the risk may be low, it is possible for aircraft to come in contact with tall structures and natural objects surrounding airports, particularly during an aircraft emergency, such as engine failure. Protecting against this risk is an essential aspect of airport land use planning. Secondly, land use conditions that create hazards to flight may hinder the continued viability of airport operations and restrict the airport's ability to operate as needed. The following categories give examples of common land use conditions that may create hazards to airspace and overflight.

- **Tall Structures** – This often includes cell towers, wind turbines, trees and other tall vegetation, power lines, and buildings. It is largely understood that tall structures near airports pose a direct hazard to airspace and aircraft operation; however, it is less known that tall structures further from an airport can still create a hazard. Given the location of the structure and flight conditions (times of low visibility), a tall structure may pose a threat to aircraft. It is prudent to discourage the placement of tall structures, both permanently and during construction (cranes) within the airport approach and departure paths.
- **Visual Obstructions and Electronic Interference** – Not thought of as often as physical obstructions, visual obstruction such as smoke, glare, steam, dust, and light emissions, can also obscure a pilot's visibility. Many aircraft operations, specifically those in general aviation, are conducted under Visual Flight Rules (VFR); maintaining an unobstructed view for pilots is an important element in creating land use compatibility.

When visibility is reduced due to inclement weather, aircraft must operate under Instrument Flight Rules (IFR) and rely solely on navigational instruments for guidance. A pilot must be certain that their instruments are operating properly during IFR operations; however, electromagnetic interference can reduce the reliability of such equipment and create a safety concern. As a result, certain land uses that may generate electronic signals that could disrupt aircraft communication or navigation near an airport should be discouraged.

- **Wildlife and Bird Attractants** – Attractants such as standing water, wetlands, and crops that attract wildlife create safety concerns for aircraft. According to the *FAA Wildlife Strikes to Civil Aircraft in the United States 1990-2018*, wildlife strikes (and in particular bird strikes) have resulted in more than 282 deaths and over 263 aircraft destroyed since 1988 and are increasing with time. Monitoring wildlife activity and habitats on or near airports as well as developing a wildlife management plan can play a significant role in reducing wildlife on and near airports. Control techniques such as removal of wildlife, fence installation, and airport ground maintenance can help manage wildlife hazards. Additionally, habitat management controls aid in reducing wildlife attractants. Techniques may include:
 - Selecting and spacing tree species,
 - Maintaining appropriate grass lengths,
 - Prohibiting certain agricultural crops near airports,
 - Eliminating standing water, and
 - Using repellents to disperse or remove wildlife.

1.3.2.2 Characteristics that Can Affect Accident Severity

In some cases, land uses are not the cause of an accident but if not restricted can affect the severity of an accident. The degree of control of restrictions on land use development varies depending on the potential for an accident to occur in the area. For example, the tightest restrictions should be placed off the end of runways as this is where the highest risk of an accident exists. In an ideal situation, areas with the highest potential for accident would be open land with few occupants and development. This makes for a viable landing area if an aircraft needs to make an emergency landing and is unable to reach the intended runway. If open space is not a feasible option, reducing the concentrations of people and high risk-sensitive uses within a probable accident area can affect the severity of an accident.

- **High Concentration of People** – The number of people concentrated in an accident area is the most closely tied consequence to an aircraft accident. Land use restrictions that discourages and if possible, limits the number of dwellings and concentrations of people near airports, specifically off runway ends where aircraft are most likely ascending and descending is strongly encouraged. This is one of the most direct methods for reducing the potential severity of an accident.
- **High Risk-Sensitive Uses** – Land uses in which the mobility of occupants is limited should be avoided near runway ends. Most often this includes uses such as schools, hospitals, and nursing homes. Uses that provide critical community infrastructure such as power plants, electrical substations, public communication facilities and other facilities that if damaged could negatively affect public health and welfare should also be restricted to areas outside of runway ends and potential accident areas. Lastly, the storage of hazardous and/or flammable materials in potential accident areas should be restricted as these would significantly affect the severity of an accident, if involved.

1.4 What Land Uses are Most Commonly Found Near Airports?

Land uses near airports can generally be divided into seven categories; residential, commercial, industrial/manufacturing, institutional, infrastructure, agricultural/open space, and park/recreational. The attributes within each category often vary by building type, density of development, size of development, and location relative to the runway environment. These variances affect the lands compatibility with the airport as well as the surrounding communities.

1.4.1 Residential Use

Residential land use is commonly defined as an area that includes dwellings used to house people. The variety of housing types, such as multi-level apartments and single-family homes, influence the density and concentrations of people. As the nation's population continues to increase, residential land use continue to encroach on the open spaces previously found near airports. In response, residential development near airports, specifically, in potential accident areas and high noise exposure areas should be discouraged, or at a minimum, planned and designed to address safety issues related to high concentrations of people and potential noise impacts.

1.4.2 Commercial Use

Commercial use is generally defined as a use the involves the sale of products and services. These uses often are compatible with airport operations; however, the specific use and activities within this area can

significantly vary and often require specific review by local jurisdictions to determine compatibility with airport operations. Mixed use development is a popular trend where commercial, leisure, and residential uses are combined into one area. This type of development could result in residential uses within accident areas and high noise exposure areas resulting in incompatible land uses; however, many individuals desire this type of development and value the ability to live and work within the same neighborhood. Such cases require a careful review by local planners.

1.4.3 Industrial/Manufacturing Use

Industrial and manufacturing uses are commonly defined as those relating to, used in, or created by industry. Historically, industrial parks were composed solely of industrial uses which are often considered compatible with airport activities. However, today industrial parks are often composed of a mix of industrial businesses, manufacturing facilities, office parks, and research and development complexes. Hotels, restaurants, and retail uses may also be included to support the economic environment of the area. Industrial parks may also include waste disposal facilities such as landfills, compost sites, garbage dumps, and waste transfer and storage facilities; these uses can create wildlife hazards/attractants. As a result of the variety of industrial use, the compatibility of each development should be carefully considered by local planners.

1.4.4 Institutional Use

Institutional uses are generally defined to include uses related to an organization that is influential in the community. They often include places of worship, daycare, eldercare centers, hospitals, health care facilities, and educational facilities. These uses are frequently sensitive to noise, support high concentrations of people, and may attract sensitive populations (e.g., children, elderly, etc.). Additionally, they can also contain large parking lots and water detention areas that create light emissions and wildlife attractants. Institutional uses should not be located on and near airports due to the potential safety risks to aircraft and persons on the ground.

1.4.5 Infrastructure Use

Infrastructure activities can include a wide variety of uses such as above ground utilities (power lines), cellular communication towers, water towers, wind farms, solar farms, etc. As discussed previously, many of these uses have compatibility issues with airports as they create flight hazards as well as navigation and communication disruption. As a result, infrastructure activities near airports should be discouraged, or in the very least, carefully considered.

1.4.6 Agricultural Use and Open Space

Agricultural uses and open space activities are commonly defined as uses related to farming, including the use of both manmade and naturally occurring water resources, and mining. These uses are often perceived as compatible land uses with an airport; however, if not properly managed, they can create significant wildlife and bird attractant concerns. Uses that attract wildlife within approach and departure paths and other critical flight areas should be discouraged.

1.4.7 Parks and Recreational Use

Parks and recreational uses typically take place outdoors and can vary from community baseball fields to professional auto racing tracks. Each use comes with a variety of attributes such as lighting emissions,

open water, concentrations of people, etc., that cause concern in relation to land use compatibility with airports. Similar to other potentially incompatible land uses, local planners should carefully consider the development of park and recreational uses near airports, specifically those planned within a potential accident area.

1.5 How is Airport Land Use Compatibility Achieved?

Land use compatibility near airports is a difficult task considering the variety of uses and individual development scenarios. Therefore, it is critical that airports, local stakeholders, and entities with jurisdiction over land near airports take an active and cooperative role in the development, implementation, and maintenance of land use compatibility projects. A successful land use compatibility plan preserves the airports viability to provide transportation and economic benefits while recognizing the legitimate interests of local governments, property owners and tenants to develop and occupy their property for productive and satisfying purposes.

For COS, multiple entities have jurisdiction over land on and off the Airport, as will be discussed in **Chapter 2**. The City of Colorado Springs primarily maintains land use jurisdiction to the west and north (except for Cimarron Hills, which is directly north of the Airport and part of El Paso County), El Paso County maintains land use jurisdiction to the east and south, and the City of Fountain also maintains land use jurisdiction to the south of the Airport. Each of these entities is responsible for the review of development plans and changes in land use; however, the Colorado Springs Airport is often given an opportunity to review and comment on development projects that may impact airport operations or would occur in proximity to the Airport. The Airport Advisory Commission (AAC) was formed in 1965 by City of Colorado Springs Ordinance No. 3183 and is a board of seven appointed members with representation from the Airport, City of Colorado Springs and El Paso County. The AAC acts in an advisory capacity to the Mayor, the City Council and the City Planning Commission, and, if requested, other City departments, enterprises, and quasi-governmental entities with an interest on Airport controlled property and may act in an advisory capacity to the El Paso County Planning Commission and the Board of County Commissioners of El Paso County. The AAC advises on matters concerning land use and all other matters affecting the construction, planning or operation of COS.

Airport land use compatibility at the Colorado Springs Airport has historically been achieved through a cooperative and transparent relationship between the Airport and local municipalities. However, burgeoning development in the Colorado Springs area will make finding compatible land uses more difficult. A clear understanding of the land use codes and the interests of all stakeholders is crucial. This Land Use Compatibility Study will provide a summary of existing conditions and regulations; discuss how they may influence future development; analyze the impacts to the Airport's long-term viability as a transportation and economic driver for the region; and lastly, provide recommendations for updates to land use policies in proximity to the Airport.

The following chapters will be included in this document:

- Chapter 2 – Inventory and Background. This chapter will provide a summary of the airport influence area, existing land use and zoning codes, planned development in proximity to the Airport, environmental considerations, and statutory and regulatory information.
- Chapter 3 – Aviation Activity Forecast. This chapter will summarize the role of forecasting in land use planning, discuss activity trends, provide historical and existing activity data, present aviation

activity projections, and discuss the future critical design aircraft which will be used as inputs in the development of updated noise exposure conditions.

- Chapter 4 – Noise Exposure Conditions. This chapter will introduce noise impacts, provide baseline and future noise conditions, detail noise monitoring results, and discuss the integration of noise contours in the land use study.
- Chapter 5 – Recommended Airport Land Use Compatibility Plan. This chapter will discuss the recommended land use compatibility review process and policies ensuring long-term viability of the Airport and compatibility with future development.

2 Inventory and Background

2.1 Overview

The Colorado Springs Airport (COS or the Airport) is located within the City of Colorado Springs jurisdictional boundary and regulated by the City's land use and zoning code. The Airport is also located within El Paso County and adjacent to property under the county's jurisdiction. Peterson Air Force Base is also located at the Airport under a shared joint civil-military arrangement, subject to overlapping and complementary land use compatibility standards and guidelines by the Federal Aviation Administration (FAA) and Department of Defense (DoD). The following sections provide a summary of existing land uses, zoning designations, planned development, and regulatory and statutory requirements and how they relate to the Airport.

2.2 Airport Influence Area

An airport's influence area is an area in which existing and future airport-related noise, over-flights, safety, and airspace protection may affect land uses or require restrictions on development and uses. It may include airport property as well as other publicly and privately owned land.

For this land use analysis, the airport influence area for COS includes typical aircraft traffic patterns (including commercial, general aviation, and military traffic), approach and departure paths, and areas within the 65-average day-night sound level (DNL) noise exposure. As shown in **Figure 2-1**, the Airport is located within the boundary of the City of Colorado Springs and adjacent to El Paso County with both entities having jurisdiction over land within the airport influence area. In general terms, land to the north (except for Cimaron Hills, which is directly north of the Airport and part of El Paso County) and west are largely within the City of Colorado Springs and comprised mainly of residential, commercial, and industrial uses. Land to the east and south of COS include more open space and is less densely populated; however, these areas are slated for future development and will be discussed in the Planned Development section below. Figure 2-1 illustrates airport noise contours created in 2001.

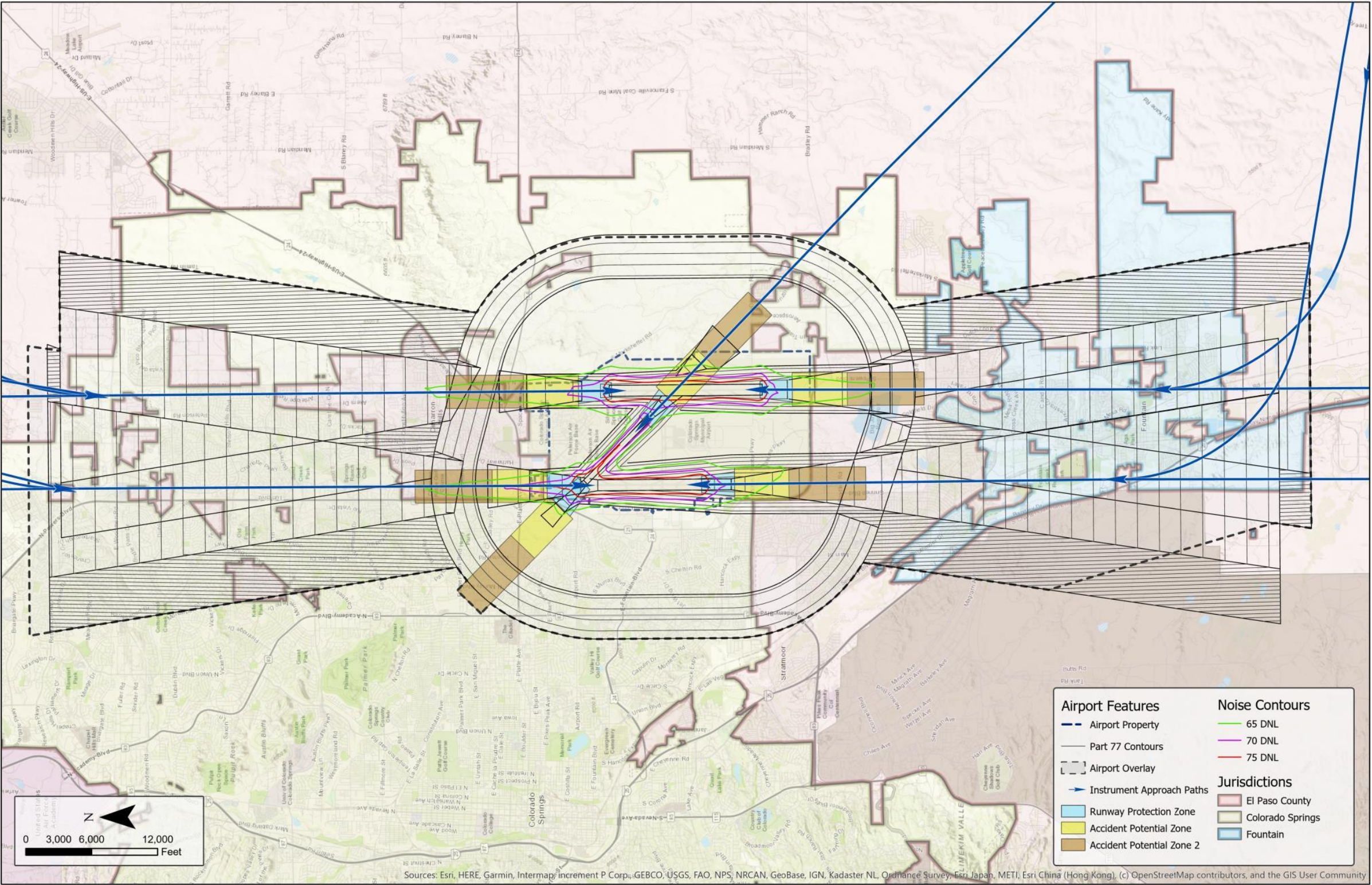
The Airport is owned and operated by the City of Colorado Springs. The U.S. Air Force operates Peterson Air Force Base (PAFB) on Airport property through a lease with the Airport and makes use of the COS airfield for its aviation mission. The FAA has promulgated standards and guidelines for airfield design, safety areas surrounding runways, and compatibility of land uses with varying levels of aircraft noise. DoD and the Air Force have developed comparable standards and guidelines for airfield design, safety and noise.

Both the City of Colorado Springs and El Paso County have adopted Airport Overlays (AOs) within their land development codes that promote compatible development surrounding COS. The AOs are based on a combination of FAA and DoD standards and guidelines for safety and noise. For example, the City's AO incorporates standards for aircraft noise (based on identical FAA and DoD guidelines), "Runway Protection Zone" (based on FAA design standards), and "Accident Potential Zones" (based on DoD guidelines). In addition to these AOs, the City of Colorado Springs, El Paso County, and the City of Fountain have exercised their zoning authority to designate which land uses are permissible within the Airport's influence area.

The City of Colorado Springs is currently in the process of revising Chapter 7 of the City Code which includes zoning designations and the AO. The ordinances have not been updated since the mid 1990's and will establish new, modern, and more user-friendly codes. Additionally, El Paso County is in the process of preparing a new Master Plan to help the County establish priorities, projects, and recommendations. It is possible that modifications to their current zoning and land use policies may result from the planning process. As such, the following information is based on existing zones and land uses; however, these may change in the future.

The following subsections describe the City and County AOs as well as permitted land uses within the AO and AO sub-zones.

Figure 2-1: COS Overview Map



Source: Jviation, 2019 Note: Noise contours shown above were created in 2001. These have been updated as a part of this study and are illustrated/discussed in greater detail in Chapter 4.

2.2.1 Airport Overlay Districts

2.2.1.1 City of Colorado Springs

Chapter 7, *Planning, Development, and Building*, of the City Code of the City of Colorado Springs, contains land use zoning districts such as the AO and the associated subzones. The overlay districts include the following zones:

- **Airport Overlay Zone (AO):** The AO is an overlay zone, including associated subzones, that, as determined by the FAA and in accord with 14 C.F.R. Part 77 (discussed later in this chapter), will create, establish, enhance, or maintain hazards to air navigation. The AO zone is an overlay on all other underlying airport zoning districts.
- **Runway Protection Zone (RPZ):** The RPZ is a trapezoidal shaped overlay centered about the extended runway centerline immediately beyond the end of the runway. The functions of the RPZ is to protect people and property on the ground immediately beyond the runway end. Per Colorado Springs Code, construction of a height greater than an imaginary surface extending outward and upward at a slope of one hundred to one (100:1) (i.e., 1 foot of height for each 100 feet of distance) from the nearest point of the nearest runway through the length of the RPZ requires notice to the FAA.
- **Accident Potential Subzone (APZ – 1):** The APZ-1 is an area located immediately beyond the runway protection zone (or clear zone) and possess a higher potential for aircraft accidents. The City of Colorado Springs restricts ground level development up to the maximum height of the base zone in these areas. This zone is not recognized by the FAA but is by the military standards.
- **Accident Potential Subzone (APZ – 2):** The APZ-2 is an area beyond the APZ-1 that has a measurable potential for accidents. The City of Colorado Springs restricts ground level development up to the maximum height of the base zoning district. This zone is not recognized by the FAA but is by the military standards.
- **Aircraft Navigation Subzone (ANAV):** The ANAV encompasses all land within the overlay to include that at and above the ground as depicted on the Airport Overlay District Map (see **Figure 2-1**).
- **Airport Noise Subzone (ADNL):** The ADNL is indicated by lines of increasing projected DNL from 65 DNL to 70 DNL, 70 DNL to 75 DNL, and 75 DNL to 80 DNL. The ADNL necessitates additional requirements within 65 DNL prior to the issuance of a building permit.

Each of the above-mentioned zones with the AO have permitted and conditionally permitted uses within the respective zones. **Table 2-1** depicts the allowed uses.

Table 2-1: Colorado Springs Land Uses within the AO Zone

Use	ADNL ¹	RPZ	APZ – 1	APZ – 2	ANAV
Commercial retail and wholesale	P		P ⁵	P	P
Golf courses; cemetery; stables	P		C	P	P
Hotel and motels	C ³				P
Mobile homes					P
Multiple-family residences; human service establishments; residential hotels; convalescent hospitals	4				P
Offices	C ³		P ⁵	P	P

Use	ADNL ¹	RPZ	APZ – 1	APZ – 2	ANAV
Playgrounds; parks; arenas	C ²		C	P	P
Schools; churches; hospitals					P
Single-family residences	4				P
Warehouse; light manufacturing; laboratories	P	P ⁶	P	P	P
Uses not listed above, but permitted by the underlying zone district	C		P	P	P

Source: City of Colorado Springs, City Code, Chapter 7, *Planning, Development, and Building*, 2019

P = Permitted Use, C = Conditional Use

Notes:

1. Certain uses may be permitted with proper building design and minimal outdoor uses (see page 14 of ACI50/5050-6).
2. Public assembly areas, noise sensitive cultural activities and nature exhibits are not permitted.
3. Conditional use review is required for proposed development in an area with greater than 65 DNL.
4. Residential uses are prohibited within a noise subzone of 65 DNL or greater.
5. Retail and office square footage to be determined through development plan review.
6. Warehousing and outdoor storage only, with no permanent occupancy.

In addition to the zoning overlays, the airport is zoned as Airport Planned Development (20 APD). Within this zone, development standards such as minimum lot size, setbacks, and maximum height are determined at the time of zoning and development plan review.

2.2.1.2 El Paso County

El Paso County has defined the same AO overlay district and similar sub-zones to that of the City of Colorado Springs. The overlay and subzones are defined in the El Paso County Land Development Code, Chapter 4:

- Commercial Airport Overlay District (CAD-O): The CAD-O is an overlay zone intended to serve the following purposes:
 - The FAA, in accordance with 14 CFR Part 77, has determined that certain land uses create, establish, enhance, or maintain hazards to air navigation and are or may be a public nuisance and an injury to the communities served by the airports;
 - The free and unobstructed passage of all aircraft, regardless of the owner or operator of such, in, through, and across all of the navigable airspace above the communities served by the airports is a defined right under federal and state law including but not limited to 14 CFR Part 91.119, and CRS §41-1106 and CRS §41-1-107 as amended, or any similar regulation or statute which may hereinafter be enacted in total or in part;
 - Private property owners have a property interest in useable airspace above the surface of their property;
 - That non-conforming use may be created, which are subject to the nonconforming use rights and restrictions as established by this Code;
 - That the Board of County Commissioners (BoCC) in adopting these regulations intends to exercise the full extent of its authority to protect the public health, safety, and general welfare of the citizens of El Paso County; and
 - That these regulations support and implement the Master Plan.

- The CAD-O Zoning District is comprised of four Sub-Zones: Aircraft Navigation Sub-Zone (ANAV), Airport Noise Sub-Zone (ADNL) [65 DNL line], Accident Potential Zone I (APZ-1) [Class A Runway Accident], and Accident Potential Zone II (APZ-2) [Class A Runway].
- It should be specifically noted that adoption of the CAD-O by El Paso County does not impose in the unincorporated area of El Paso County any additional height or use restrictions from those uses or height restrictions identified in these overlay zoning regulations

Each of the above-mentioned zones within the AO have permitted and conditionally permitted uses within the respective zones. **Table 2-2** depicts the allowed uses.

Table 2-2: El Paso County Land Uses within the AO Zone

Use	ADNL ¹	APZ – 1	APZ – 2	ANAV ³
Mobile Homes				A
Single-Family Residences			A	A
Multiple-Family Residences; Residential Hotels; Convalescent Hospitals			A	A
Mixed Use if involving residential component	S	S	A	A
Hotel	S ⁴		A	A
Hospitals, Institutional Uses	S ⁴		A	A
Religious Uses, School	A ⁴	A	A	A
Playgrounds; Parks; Arenas	A ³	S	S	A
Golf Course; Cemetery; Stables	A	S	A	A
Offices	S ^{2,4}	S	A	A
Commercial; Retail & Wholesale; Sexually-Oriented Business	A ⁴	S	A	A
Warehouse; Light Manufacturing; Industrial; Laboratories; Wholesale	A ⁴	A	A	A
Farming; Ranching; Feed Lots; Related Agricultural Uses	A	A	A	A

Source: El Paso County Land Development Code, Chapter 4, *Special Purpose, Overlay, and Obsolete Zoning Districts*, Effective 12/12/2017

A = Allowed Use, S = Special Use

Note: The boundary of the ADNL District reflects the 65 DNL line.

1. Public assembly areas, noise-sensitive cultural activities, and nature exhibits are discouraged.
2. Many service type businesses which may be disturbed by noise should not be located in an area with greater than 65 Day Night Equivalent Sound Level (Ldn).
3. Airport Activity Notice and Disclosure or equivalent required, if not already recorded, in order to secure a building permit or development permit.
4. A 30 dbA indoor noise reduction shall be achieved by approved construction techniques as evidenced by Noise Reduction Certificate. In the case of land uses classified as industrial uses, only the office portion of the building is required to achieve the noise reduction.

2.3 Land Use and Zoning

Of critical interest to any airport is the degree to which it is compatible with surrounding land uses. Airport compatible land uses can be defined as “those uses that can co-exist with an airport without constraining the safe and efficient operation of the airport or exposing people living or working nearby to unacceptable levels of noise or hazards.” This definition is intentionally broad since there are many variables that must be factored when considering whether a given land use is compatible within an airport operational environment.

Appropriate land use compatibility promotes the safety, health, and welfare of airport users and surrounding neighbors by protecting airspace and ensuring appropriate uses of lands both within and surrounding airport property boundaries. Typically, development actions that may affect surrounding land uses are changes in airport fleet mix and/or the number of aircraft operations, air traffic changes, and new approaches. Zoning ordinances in proximity to airports often include height limiting criteria as well as restrictions on land uses that may create an airspace hazard. The City of Colorado Springs, El Paso County, and the City of Fountain all have jurisdiction within the AO; subsequently, they also have zoning designations in place. The following subsections describe the zoning designations by each entity within the AO.

2.3.1 Existing Off-Airport Zoning Districts

2.3.1.1 City of Colorado Springs

Similar to the AO, the City of Colorado Springs includes zoning ordinances in Chapter 7 of their City Code. The zoning ordinances within the AO are diverse and include a variety of uses to include agricultural, business, industrial, residential, park areas, and others as shown in **Figure 2-2**.

The City zoning ordinances are described in further detail in **Table 2-3**. As noted previously, the City is in the process of updating Chapter 7 of the City Code which may include changes to these zoning designations. The Airport is collaborating with the City to ensure future zoning designations maintain protection for airspace and ensure a safe airport operating environment.

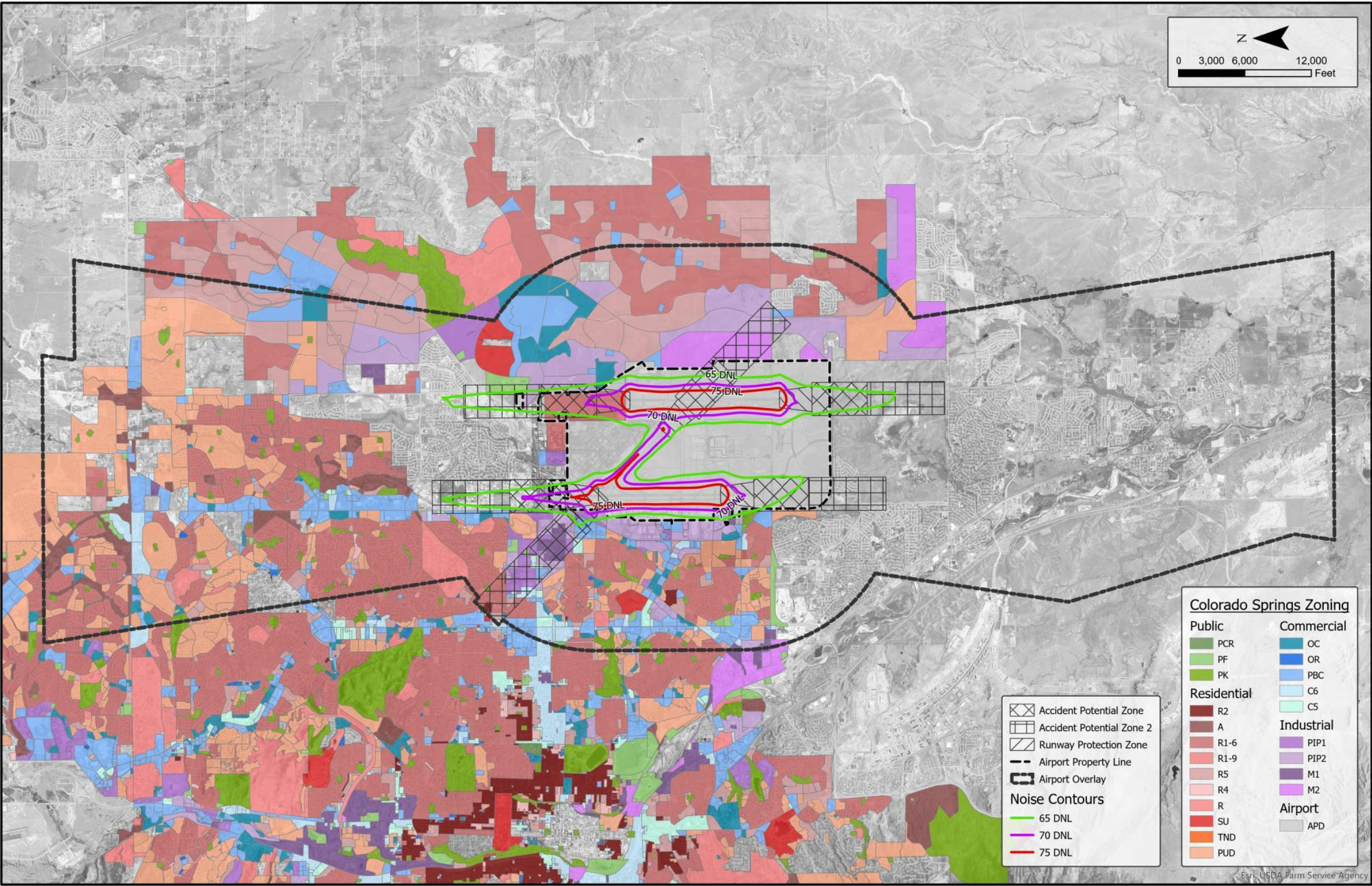
Table 2-3: City of Colorado Springs Zones within the AO

Zone Code	Zone	Description
A	Agricultural	The A zone accommodates large lot residential development and agricultural purposes that are, in most cases, on the periphery of the City limits but may become an urban area in the future. The agricultural activities conducted in the A zone district should not be detrimental to adjacent urban land uses. The types, size and intensity of uses permitted in this district shall encourage and protect agricultural uses until urban development occurs upon that parcel.
C-5	Intermediate Business	This zone district accommodates general commercial uses that are of moderate intensity. The emphasis of the zone is placed on individual sites which in some cases will be located near established residential zoning.
C-6	General Business	This zone district accommodates general commercial uses that are typically high-volume traffic generators and are generally dependent on more than the immediate neighborhood for their market area.
M-1	Light Industrial	This zone district accommodates light industrial uses and commercial uses that are complementary and compatible to the industrial uses.
M-2	Heavy Industrial	This zone district accommodates heavy industrial uses that are likely to have an extensive impact on the surrounding area and are subject to section 7.3.301 of the City of Colorado Springs Code.
OC	Office Complex	This zone district accommodates various types of office uses performing administrative, professional and personal services. These are typically small office buildings developed in a cluster with an internal traffic system or one larger office building with considerable landscaping. This type of development can serve as a transitional use between more intensive uses of land such as major thoroughfares and/or commercial districts and the less intensive uses of land such as low density residential.
OR	Office Residential	This transitional zone district accommodates a variety of residential unit types and offices. The zone is directed to smaller office sites which need a careful evaluation of use to use compatibility such that the stability and value of the surrounding neighborhood is best protected.
PBC	Planned Business Center Nos. 1 & 2	This zone district accommodates commercial land uses and preserves and enhances areas for a range of retail sales and service establishments.

PCR	Planned Cultural Resort	This zone district is intended to provide a framework for the unified development of unique mixed use cultural, resort, or recreational developments intended to attract visitors from both within and outside the Colorado Springs metropolitan area.
PF	Public Facilities	This zone is provided for land which is used or being reserved for a governmental purpose by the City of Colorado Springs, El Paso County, the State of Colorado, the Federal government or a public utility
PIP-1 and PIP-2	Planned Industrial Park	This zone district accommodates a limited group of professional, administrative, research, manufacturing and industrial uses with operations which are quiet and clean to ensure the creation and maintenance of an environment which will serve the mutual interest of the community as a whole, any adjacent residential areas, and the occupants of the industrial park in particular. Planned industrial park zone districts shall be located on lands that are suitable for industrial development, have an acceptable relationship to the major thoroughfare plan and applicable master plans, and are held in single ownership or under unified control.
PUD	Planned Unit Development	<p>The PUD zone serves several purposes, to include:</p> <ul style="list-style-type: none"> – To implement the Comprehensive Plan of the City of Colorado Springs by promoting development that is characterized by a variety of mutually supportive and integrated residential and nonresidential land uses. – To allow for a variety of residential, commercial, office and industrial land use types and encourage appropriate mixed-use developments. This zone district is intended to provide the means through which land may be developed with an overall unified approach. The district encourages flexibility in design to create a better living environment, to preserve the unique features of the site and to provide public services in a more economic manner. – To encourage flexibility, innovation of design and a variety of development types that will improve the quality of physical development over that normally achieved through the application of the City's standard single use zones. – To provide a clear and reasonable plan for the phased development and completion of proposed development, consistent with the Comprehensive Plan for the City of Colorado Springs
PK	Public Park	The Public Parks Zone District is intended for land set aside for use as public recreation and open space. These parks may include playground equipment, athletic fields, sport courts, swimming pools, and other facilities and programmed activities normally associated with public parks. Parks may also be reserved for natural or environmental reasons, such as preservation of wildlife, vegetation or significant natural, cultural or historic resources.
R	Single Family Residential – Estate	This zone district accommodates large lots primarily for low density, detached single-family residential use.
R1-6	Single Family Residential – 6,000 sq. ft.	This zone district accommodates small lots primarily for detached single-family residential use.
R1-9	Single Family Residential – 6,000 sq. ft.	This zone district accommodates medium sized lots primarily for detached single-family residential use.
R-2	Two-family Residential	This zone district accommodates small or medium lots primarily for detached one-family or attached two-family residential use.
R-4	Multi-Family Residential	This zone district accommodates lots primarily for medium density attached multi-family residential use at a density of not more than eight (8) dwelling units per acre.
R-5	Multi-Family Residential	This zone district accommodates lots primarily for high density attached multi-family residential use.
SU	Special Use	This zone district accommodates primarily colleges or universities and those uses customarily associated with and in close proximity to those institutions. The zone encourages the use of active and passive open space within an urban environment.
TND	Traditional Neighborhood Development	This zone creates a residential zoning classification that encourages a pattern of neighborhood development that was commonly built in Colorado Springs prior to World War II. These neighborhoods are characterized by a diversity of housing types integrated with neighborhood schools, parks, civic spaces and commercial uses.

Source: City of Colorado Springs, City Code, Chapter 7, *Planning, Development, and Building*, 2019

Figure 2-2: Colorado Springs Zoning Map



Source: Colorado Springs, 2019 Note: Noise contours shown above were created in 2001. These have been updated as a part of this study and are illustrated/discussed in greater detail in Chapter 4.

2.3.1.2 El Paso County

El Paso County zoning designations are included in Chapter 3 and 4 of the El Paso County Land Development Code. Likewise, to that of the City, the zones within the AO vary but are similar in nature to the zones designated by the City; County zones are depicted in **Figure 2-3**.

The County zones are further defined in **Table 2-4**. El Paso County is currently in the process of updating their master plan, which may result in recommendations to change zoning designations to accommodate future growth and development. COS is working with the County and participating in the master plan to ensure appropriate zones are maintained near the Airport to protect against hazards to the airport operating area. The zoning designations discussed below include the current zones and may be updated once the master plan is complete.

Table 2-4: El Paso County Zones within the AO

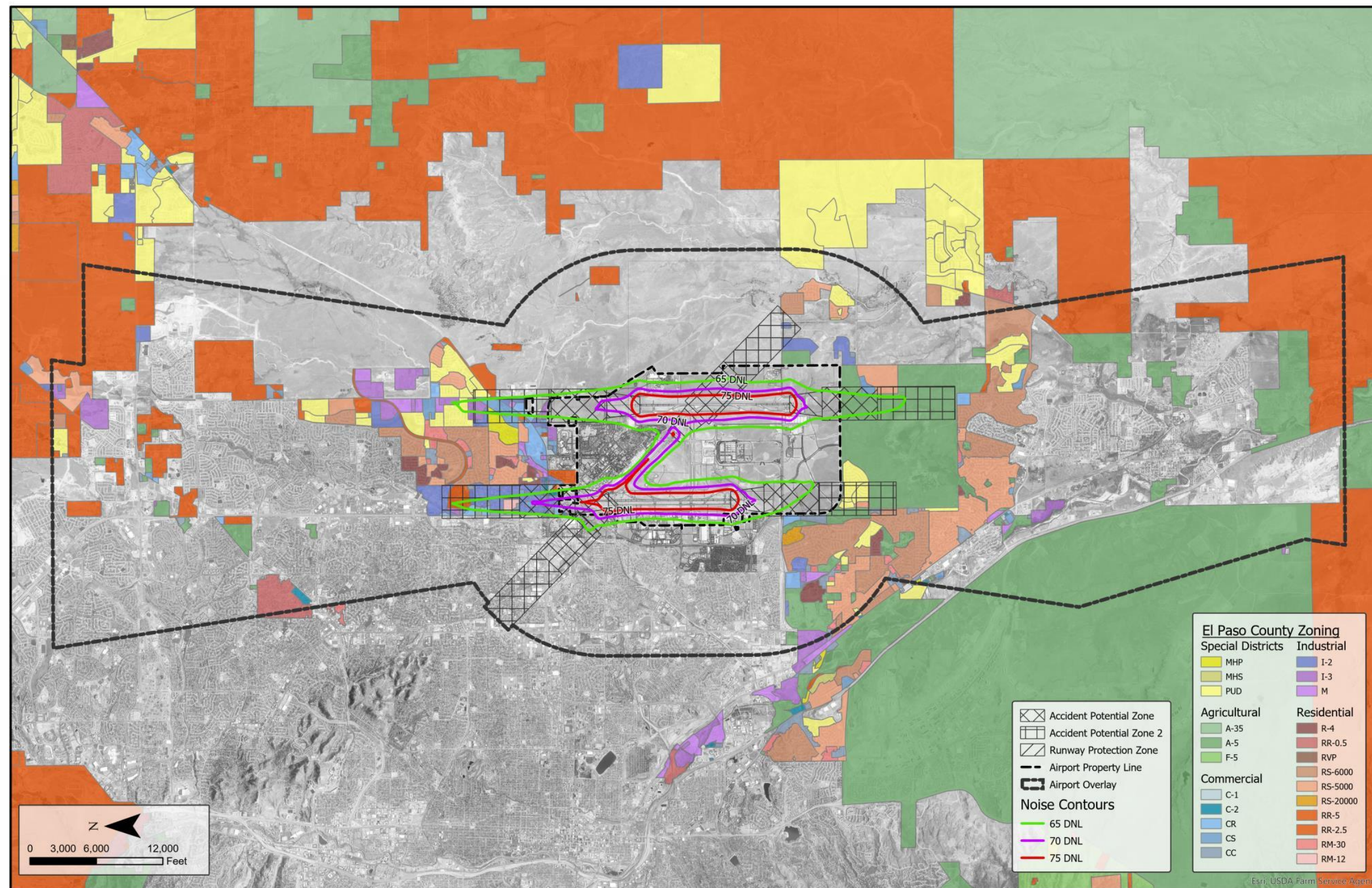
Zone Code	Zone	Description
A-5	Agriculture	The A-5 zoning district is a 5-acre district primarily intended to conserve agricultural resources and ranching operations and accommodate limited residential use.
*C-2	Commercial	This district is established for the purpose of providing for large commercial activities.
CC	Commercial Community	The CC zoning district is intended to accommodate retail sales and service establishments that generally require freestanding or small center type buildings and that primarily serve adjoining neighborhoods.
CR	Commercial Regional	The CR zoning district is intended to accommodate regional centers providing ease of pedestrian and vehicular circulation, unity of architectural design, and best serving the convenience of the public and aesthetic enhancement of the community and region.
CS	Commercial Service	The CS zoning district is intended to accommodate retail, wholesale or service commercial uses that serve the general public.
I-2	Limited Industrial	The I-2 zoning district is intended to accommodate light industrial and manufacturing activities, which are generally clean, quiet and free from objectionable or dangerous nuisance or hazard.
I-3	Heavy Industrial	The I-3 zoning district is intended to accommodate manufacturing and industrial uses, which may include related outside storage of raw or finished materials.
*M	Industrial	This district is established for the purpose of providing for general industrial and manufacturing activities.
MHP	Mobile Home Park	The MHP district is intended to promote an acceptable living environment for occupants of mobile home parks.
MHS	Mobile/Manufactured Home Subdivision	The MHS district is intended to accommodate mobile/manufactured home subdivisions where individual lots are established and may be conveyed.
PUD	Planned Unit Development	The PUD district is a versatile zoning mechanism to encourage innovative and creative design and to facilitate a mix of uses including residential, business, commercial, and industrial, recreation, open space, and other selected secondary uses.
*R-4	<i>Not defined in Land Use Code</i>	The R-4 district is established to provide more flexibility and latitude of design; to provide for a greater variety of principal and accessory uses in the development of land; to address the advantages resultant from technological change; and, to encourage initiative and creative development of parks, recreation areas, and open space.
RM-30	Residential Multi-Dwelling	The RM-30 zoning district is a 30-dwelling unit per acre district primarily intended to accommodate moderate-density multi-dwelling development.
RR-0.5	Residential Rural	The RR-0.5 zoning district is a .5-acre district intended to accommodate rural residential uses where urban services are generally available.
RR-2.5	Residential Rural	The RR-2.5 zoning district is a 2.5-acre district intended to accommodate low-density, rural, single family residential development.

RR-5	Residential Rural	The RR-5 zoning district is a 5-acre district intended to accommodate low-density, rural, single-family residential development.
RS-20000	Residential Suburban	The RS-20000 zoning district is a 20,000-square foot district intended to accommodate larger lot, single-family residential development with available urban services.
RS-5000	Residential Suburban	The RS-5000 zoning district is a 5,000-square foot district intended to accommodate single-family and two-family residential development.
RS-6000	Residential Suburban	The RS-6000 zoning district is a 6,000-square foot district intended to accommodate single-family residential development.

Source: El Paso County, Land Development Code, Chapter 3, 5/2016 and Chapter 4, Effective 12/12/2017

*Obsolete Districts – These zoning districts have been declared to be obsolete pursuant to BoCC Resolution No. 91-59, Land Use 10 as replaced by Resolution 92-46, Land Use-9. No land will be rezoned to an Obsolete Zoning district. The BoCC may modify the allowed uses, special uses, and development standards within these zoning districts. Landowners are encouraged to rezone land from an Obsolete Zoning district classification. The BoCC may offer incentives, such as modified application fees in order to accomplish this goal.

Figure 2-3: El Paso County Zoning Map



Source: El Paso County, 2019 Note: Noise contours shown above were created in 2001. These have been updated as a part of this study and are illustrated/discussed in greater detail in Chapter 4.

2.3.1.3 City of Fountain

The City of Fountain’s Municipal Code, Title 17, defines the zoning ordinances within the city limits of Fountain, nearly all of which are within the City of Colorado Springs and El Paso’s AO. **Figure 2-4** depicts the various zones.

The City of Fountain, similar to Colorado Springs and El Paso County, is currently in the process of assessing and re-writing the City’s zoning ordinances. The update is intended to address issues of current ordinances and reflect the public’s feedback, desires, and interest. As with the other updates, changes to the existing zones may occur. The following information is based on current zones.

Table 2-5 further defines the City of Fountain zones.

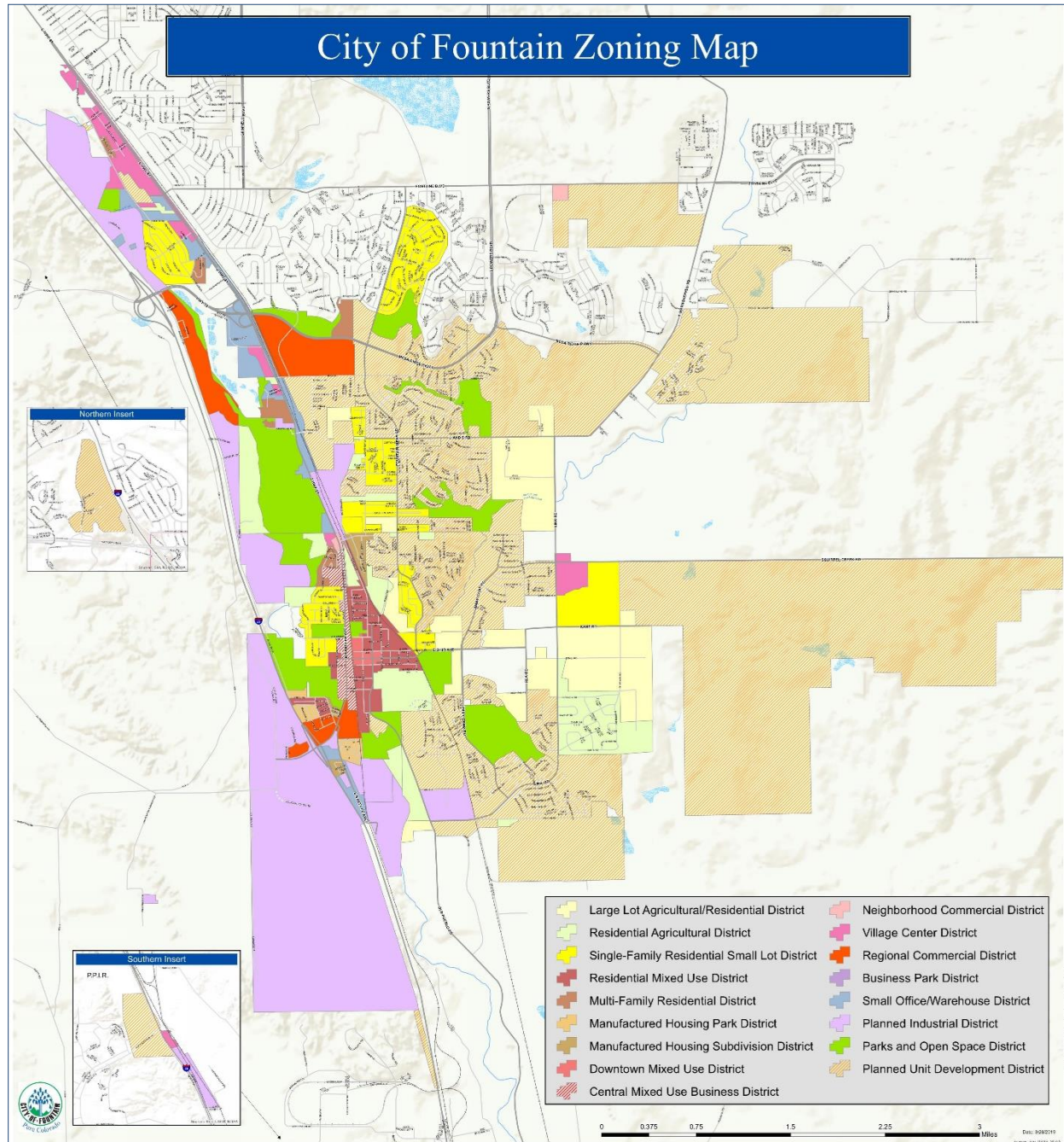
Table 2-5: City of Fountain Zones within the AO

Zone Code	Zone	Description
BP	Business Park District	This district is intended to protect and preserve prime industrial lands for high quality manufacturing, assembly, research and development and related supporting uses
CMU	Central Mixed-Use Business District	The CMU is intended to accommodate specialized government functions, specialty retail and housing.
LLR	Large Lot Agricultural/Residential District	The LLR is designed to accommodate very low density single-family residential uses on large lots that may accommodate livestock at specified density limits and allow land to remain in agricultural production.
MF	Multi-Family Residential District	This district is intended to provide for the development of multi-family residential uses in areas where such development would be compatible with surrounding uses and where such intensive use would not create service problems.
MHP	Manufactured Housing Park District	MHP are composed of residential, medium low-density occupancy of manufactured homes on areas of land having undivided individual, joint or common ownership.
MHS	Manufactured Housing Subdivision District	The MHS zone is designed for promoting a low-medium density, quiet environment for manufactured homes on individually owned lots in manufactured housing subdivisions.
MU	Downtown Mixed-Use District	The MU zoning district is intended to accommodate specialized government functions, specialty retail and housing. The purpose of this district is to promote the development of Fountain's historic downtown area district for retail, service commercial, recreational institutional and secondary residential uses and to enhance the visual character, scale and vitality of the downtown.
NC	Neighborhood Commercial District	This district is designed to create walking and short distance destinations for residents. It is intended for small independently owned retail and service establishments, such as legal and professional services, cafes and restaurants, and specialty retail that are not dependent on high traffic volumes.
PI	Planned Industrial District	PI zoning districts are intended to accommodate a range of industrial activities that are of limited intensity, such as contractor trades, research and development institutions, warehousing and wholesaling, and small-scale production, fabrication, assembly or processing activities, to help provide a diversified employment base for the community.
POS	Parks and Open Space District	The POS shall contain those areas, which are considered to be of special significance for their natural importance in defining the City of Fountain, or for the protection of public health and safety.
PUD	Planned Unit Development District	PUDs are intended, to facilitate the achievement of the purposes and objectives of this title, the Fountain Comprehensive Development Plan and to permit the application of new technology and greater freedom of design in land development than may be possible under the application of standard zoning districts. Developments, however, must demonstrate that flexibility from the provisions of the existing zoning will result in higher quality development.
R1	Single-Family Residential Small Lot District	The R1 is intended for single-family detached residential units with a maximum gross density of six (6) units per acre.

Zone Code	Zone	Description
RA	Residential Agricultural District	The RA is intended for single-family detached residential units with a maximum gross density of one (1) dwelling unit per acre. Incidental recreational, institutional, public and accessory uses compatible with the character of the district and customarily found in proximity to low density residential areas may be permitted.
RC	Regional Commercial District	RC zoning districts shall be established in those areas which are in close proximity to Interstate 25 or the proposed Powers Boulevard extension and/or highly visible from major roadways and have easy and safe access. It is intended to encourage a broad range of commercial services for visitors and residents, which are conveniently accessible by automobile, and which are designed to complement each other in character, scale, and proximity.
RMU	Residential Mixed-Use District	The RMU is intended to provide sites for combined residential and low impact commercial and service uses and to maintain a residential appearance of such sites by establishing appropriate site development standards. This district allows for higher density residential development in close proximity to commercial activity.
SO	Small Office/Warehouse District	This district is intended for uses such as smaller businesses, office, warehouse, research and development space, contractor/trades, repair and equipment shops and workshops that may require the distribution of goods by cargo vans and smaller trucks (UPS, FEDEX) but not semitrucks.
VC	Village Center District	The VC is intended to provide shopping goods and services for surrounding neighborhoods, such as small-scale retail, professional offices and services, live/work development and medical offices. The intent of this zoning district is to encourage a mix of complementary commercial uses that share ingress and egress and clustered on-site parking and that are linked by pedestrian walkways, corridors and plazas.
BP	Business Park District	This district is intended to protect and preserve prime industrial lands for high quality manufacturing, assembly, research and development and related supporting uses. BP zoning districts should be established in those areas that have direct access to major transportation thoroughfares. The primary objective of this district is to ensure the proper development and use of land and improvements so as to achieve a high quality, master planned, campus-like, nuisance free environment for manufacturing, assembly, research and development land uses.
CMU	Central Mixed-Use Business District	The CMU is intended to accommodate specialized government functions, specialty retail and housing. The purpose of this district is to promote the development of Fountain's central business area district for retail, service commercial, recreational institutional and residential uses and to enhance the visual character, scale and vitality of Fountain's downtown.

Source: City of Fountain, City of Fountain Municipal Code, Title 17, July 2019

Figure 2-4: City of Fountain Zoning Map



Source: City of Fountain, Zoning Map, 3/28/2019

2.3.2 Summary

Based on the information presented in this section, it is evident that the municipalities with jurisdiction on and near COS have a variety of zoning and land use policies in place that offer protection for the Airport's airspace and ultimately the aircraft operating environment. However, all three entities have recently or are currently in the process of revising their codes and/or master plan which may result in changes to the existing zones discussed.

2.4 Planned Development

According to the recently completed comprehensive plan for Colorado Springs, PlanCOS, it is forecasted that the airport market area (El Paso and Teller counties) will grow to nearly 1 million residents and support more than 500,000 jobs by 2040. This results in an increase of approximately 300,000 people and 146,000 jobs from 2015 and 2040. PlanCOS anticipates that Colorado Springs will retain roughly 65 percent of this growth, equating to a population of over 600,000 by 2040. Although actual growth will vary; growth is sure to come, and the region is planning for the development. The following sections provide a brief summary of planned development in proximity to COS, with others likely to develop in the future.

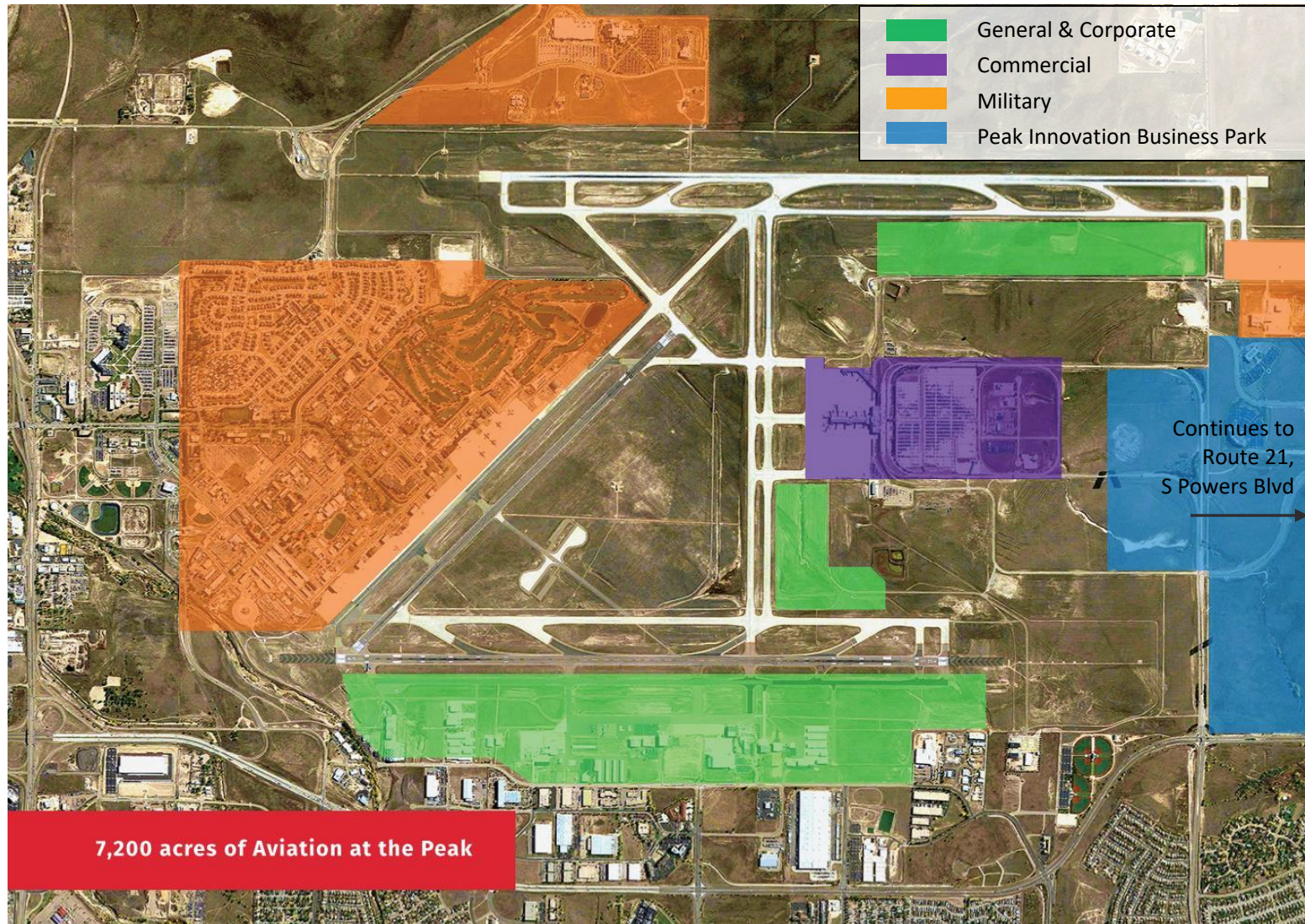
2.4.1 Aviation at the Peak

In 2014, COS along with City and regional leaders developed Aviation at the Peak, an initiative to recognize, revitalize, and promote COS and the important economic driver it is to the region. The Airport has approximately 7,200 acres of land dedicated to aviation uses. This is broken into four business centers (see **Figure 2-5**): general and corporate aviation, commercial aviation, military aviation, and the Peak Innovation Business Park; all of which are compatible with existing Airport uses. The Airport boasts an extensive list of services provided by current tenants (Colorado jetCenter, Cutter Aviation, JHW Hangar Complex) to include fuel services, charter services, car rentals, crew car, deicing services, catering, aircraft maintenance, flight training, aircraft sales and brokerage, and hangar/facility rental.

Most notably, Aviation at the Peak markets that COS has more than 400 acres available for future aviation related development. Incentives to develop at the Airport include:

- Attractive ground lease rates
- Rent abatement during design and construction
- Leases with airfield access
- Local, State, Regional and Federal Incentives

Figure 2-5: Aviation at the Peak Business Centers



Source: Colorado Springs Airport, Aviation at the Peak, 2014

2.4.2 Peak Innovation Park

Peak Innovation Park is a 900-acre master planned development located at the entrance and south of COS (see **Figure 2-6**). The Park uniquely offers easy access to a major highway (I-25) and downtown Colorado Springs, views of the mountains, customizable land sites, location within an Opportunity Zone, and sites with infrastructure in place. It is anticipated that uses may include, but are not limited to office, industrial, retail, hospitality, entertainment, recreation, and residential. Existing tenants include the well-known aerospace companies; Northrop Grumman and The Aerospace Corporation.

The attractive incentives combined with the forecasted growth of the region make it very likely that this area will see a large amount of development in the near future.

Figure 2-6: Peak Innovation Park



Source: Cushman and Wakefield, Peak Innovation Park, 2019

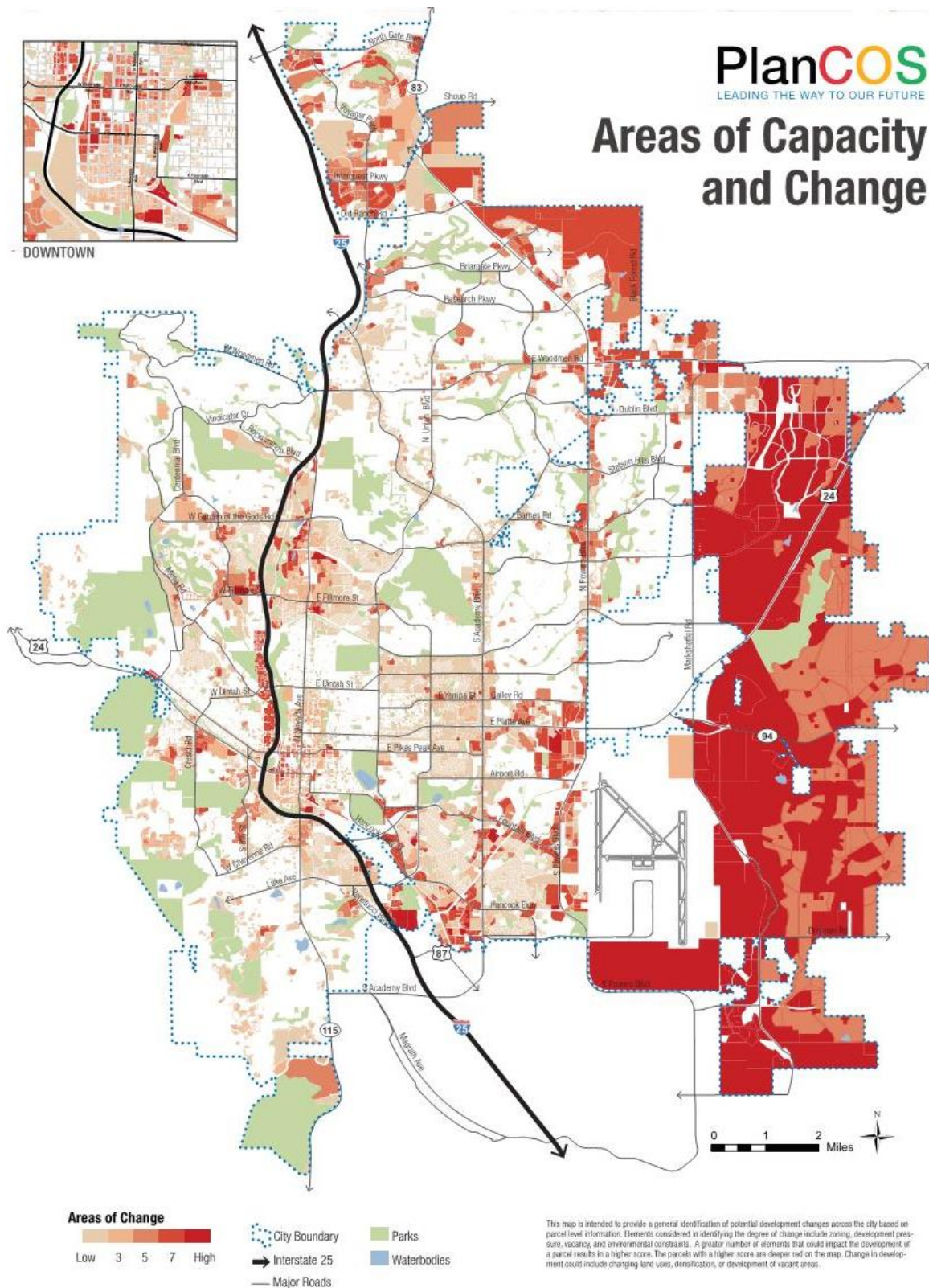
2.4.3 PlanCOS

In 2019, the City of Colorado Springs published their most recent comprehensive plan, PlanCOS. The Plan was created to support the changing and growing markets, private initiatives, public investments, and innovation of the region. With the Plan, areas where significant change is anticipated were identified, see **Figure 2-7**. A majority of this change is anticipated to occur on the east side of the City and in proximity to COS. The Plan recognizes that the Airport serves as the first impression for many of the region's visitors and is a crucial asset to the current and future growth of the City and region. It recommends several goals that serve future development at COS, to include:

- Support the growth and adaptation of Colorado Springs Airport to maintain its economic value as an air service provider for the city and region, and to strengthen its role as an integrated hub for economic development. PlanCOS - Strategy TE-1.D-5
- Identify, accommodate, and provide supportive zoning for key sites for industrial uses with good multimodal access to highways, railroads, and the Airport. PlanCOS – Strategy TE-2.A-1
- Specifically continue to invest in and adapt facilities and services, including multimodal transportation improvements, in order to increase the number, range and cost-competitiveness of airline flights to and from the Colorado Springs Airport. PlanCOS – Strategy SC-1.A-7
- Provide convenient and inexpensive transit connections between the Colorado Springs Airport and key locations within the city. PlanCOS – Strategy SC-2.B-5

As these goals and associated development come to fruition, land use and zoning considerations will be critical in ensuring the Airport's airspace is protected while also supporting the needed development.

Figure 2-7: PlanCOS Areas of Capacity and Change



Source: Colorado Springs, Comprehensive Plan, 2019

2.4.4 Joint Land Use Study

In December 2018, the Pikes Peak Area Council of Governments completed and released the Colorado Springs Regional Joint Land Use Study Final Report. The Joint Land Use Study (JLUS) was funded by a grant issued in 2015 by the Department of Defense Office of Economic Adjustment.

The JLUS examined land use compatibility issues involving five military installations in the Colorado Springs area: the U.S. Air Force Academy (USAFA), Fort Carson, Peterson AFB, Cheyenne Mountain Air Force Station, and Schriever AFB.

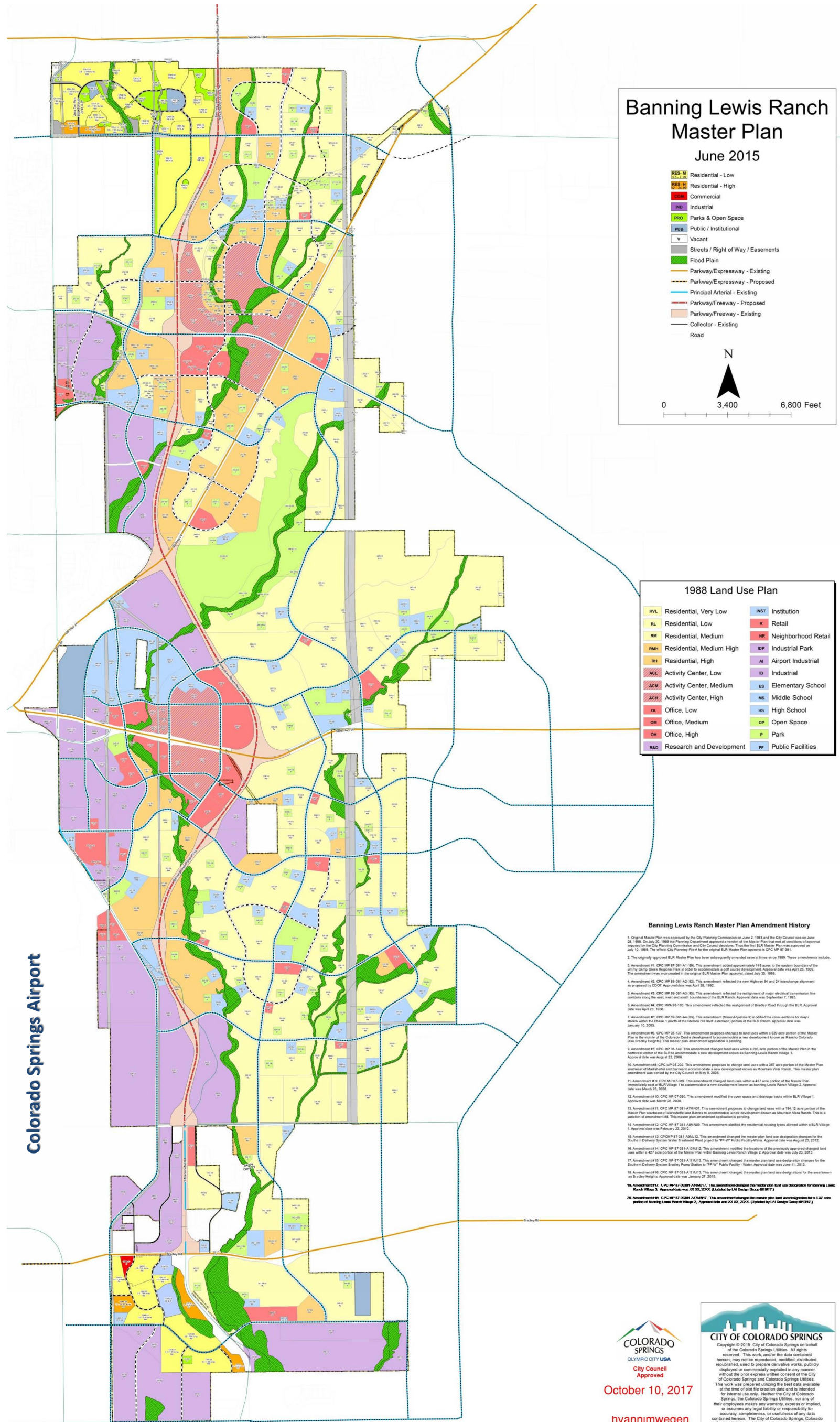
With respect to Peterson AFB, the JLUS considered a variety of compatibility issues, including the following: land use regulations, safety, noise, airspace, wildlife and environmental conditions. Most relevant for purposes of this study, the JLUS concluded “Residential land use and zoning pose safety concerns within accident potential zones (APZs), including developments proposed along Troy Hill Road.”

The JLUS specifically recommended that local governments notify Peterson AFB of potential changes in land use and zoning within an area greater than the two-mile zone prescribed by Colorado law. “This study found that the size of Peterson AFB’s operational footprint justifies expansion of the notification area beyond 2 miles, particularly because of nearby development (including Banning Lewis Ranch) that could impact utility infrastructure and transportation routes and may generate vertical obstructions beneath airspace utilized by flight operations.”

2.4.5 Other Development

As the region continues to grow both economically and in population, additional development throughout the region is expected. A large portion of future development is planned to occur in proximity to the Airport. Specifically, Banning Lewis Ranch; a 38-square mile, 24,000-acre development is planned for the area to the east of COS (see **Figure 2-8**). This area was originally annexed in 1988 with minimal development occurring since then; however, the annexation agreement was amended in 2018 with more amenable land use and zoning policies to development. It is anticipated that the development will be home to 62,000 residents. It should be noted that nearly the entire Banning Lewis Ranch is within the City and County AOs.

Figure 2-8: Banning Lewis Ranch



Source: City of Colorado Springs, Banning Lewis Ranch Master Plan, 2017

2.5 Environmental Considerations

Environmental considerations most often associated with land use and airport compatibility include noise and wildlife and bird attractants. Other environmental resources can be impacted by and influence development, although less frequently associated to land use, and are considered in airport master plans and specific environmental planning and analysis documents.

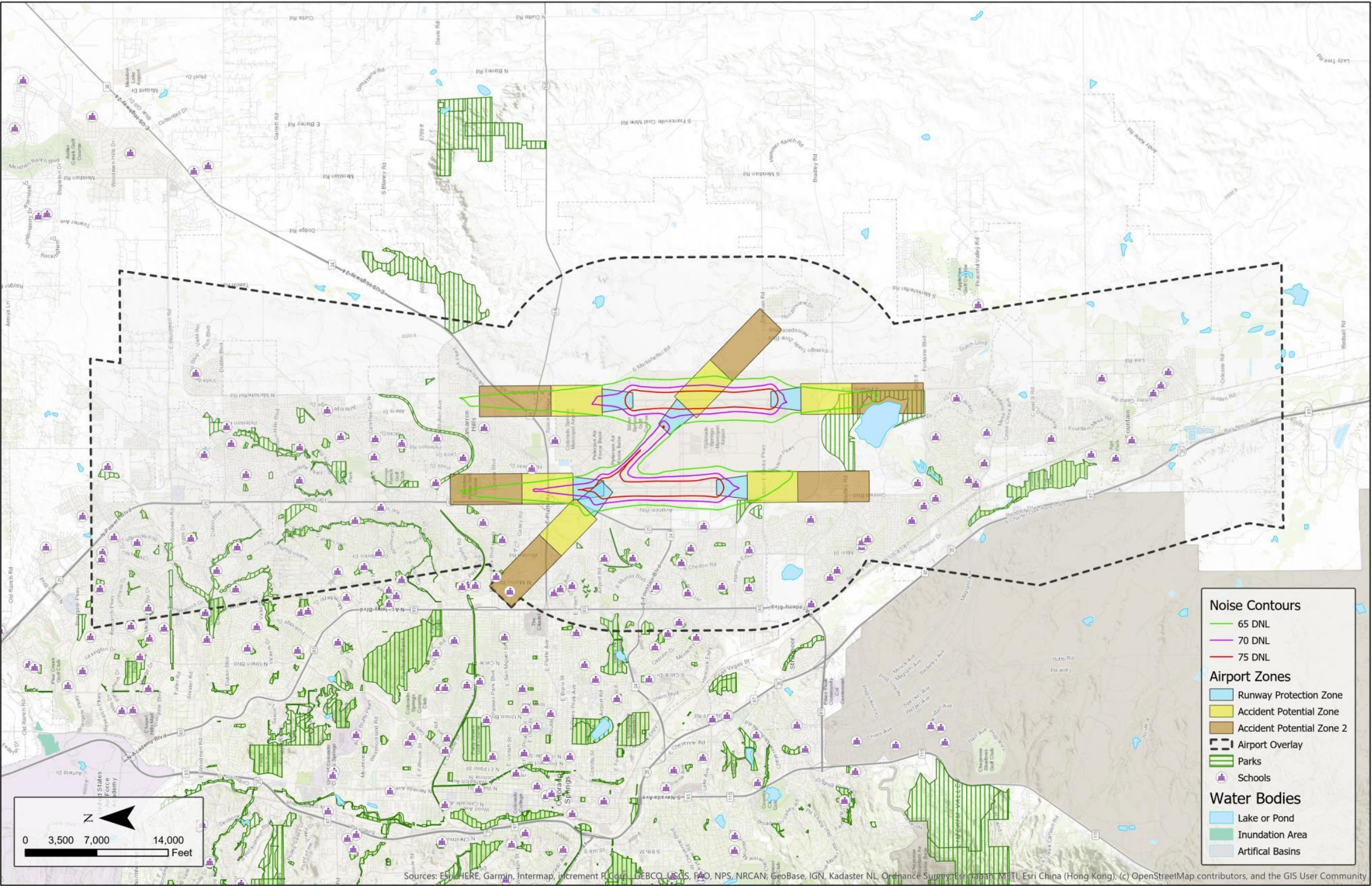
2.5.1 Noise

Aircraft noise is an area of primary concern for many people residing in proximity to an airport. Actions and development that may change runway configurations, airport operational patterns, aircraft fleet mix, flight patterns, among others, have the potential to alter noise impacts on communities located in the vicinity of an airport. Conversely, development near airports carry the potential of introducing potentially incompatible land uses. Incompatibility, whether the result of changes at the airport or encroachment by new development, has the potential to result in annoyed residents, lawsuits, and opposition to airport operations, growth, and development.

Both DoD and FAA use the same metric for calculating aircraft noise exposure. Day-night sound level (DNL) is the calculated, steady-state (or average) noise exposure caused by aircraft, with a weighting for aircraft noise that occurs at night (to account for the tendency of nighttime noise to disrupt sleep and annoy residents). DoD and FAA consider all land uses to be compatible with aircraft noise at levels below DNL 65 dB. As explained further below and in subsequent chapters, the federal government does not prescribe land use standards, and it remains within the discretion of local governments to determine which land uses are compatible at varying levels of aircraft noise.

The City last prepared Noise Exposure Maps for COS in 2001 which identified DNL 60-75 dB, as shown in **Figure 2-9**. The study determined that no incompatible land uses were exposed to DNL 65 dB or higher; however, residential zoning designations do occur within areas exposed to noise levels above DNL 65 dB. Updated noise contours will be prepared as part of this land use analysis and discussed in detail in Chapter 4.

Figure 2-9: Colorado Springs Airport Noise and Environmental Map



Source: Colorado Springs, 2019 Note: Noise contours shown above were created in 2001. These have been updated as a part of this study and are illustrated/discussed in greater detail in Chapter 4.

2.5.2 Wildlife and Bird Attractants

Wildlife on and around airports is a long-standing topic of concern, due to the risk of birds and other wildlife striking aircraft (on the ground or in flight) and potentially being ingested into an aircraft engine. Tall trees, standing water, certain land uses and habitat that attracts wildlife can create airspace hazards and jeopardize aircraft safety. Land use and zoning regulations can impose restrictions on these types of environments near airports and within airport overlays to reduce potential risks.

The FAA requires that airports maintain a safe operating environment which includes completing Wildlife Hazard Assessments (WHA) and Wildlife Hazard Management Plans (WHMP) when a significant wildlife strike has occurred. These studies help identify potential wildlife hazards by inventorying existing species and identifying potential habitat. They also provide recommendations for mitigating the hazards, often through habitat manipulation and wildlife control.

2.5.2.1 Wildlife Hazard Assessment

COS completed their last WHA in 2001; the WHA identified potential wildlife hazards on the Airport as well as within five miles of the Airport. It was found that COS and the surrounding area provide habitat for a variety of species which could create hazards at Airport. Three primary sources of habitat were also identified. These included water, vegetation, and structures. Local sources of water included:

- Water treatment plants located northwest of COS
- Ponds located on the golf course on Peterson Air Force Base
- Glycol retention pond located west of the terminal
- East fork of Sand Creek located northwest of COS
- Standing water on airport property after significant precipitation events
- Big Johnson Reservoir located two miles southwest of COS
- Ponds within Sand Creek and Cherokee Ridge golf courses (potentially closing)

The WHA identified vegetation as the source of food and cover for wildlife. COS is located in a grassland area; with maintenance conducted by mowing many of the areas. Located to the south of COS is also the Bluestem Prairie Open Space, a 650 acre prairie grassland and bird watching paradise. This open space is home to over 200 bird species as well as numerous mammals.

Lastly, the WHA determined that structures such as airport hangars, towers, signs, nearby baseball fields, and other structures can act as attractants for wildlife, specifically avian.

2.5.2.2 Wildlife Hazard Management Plan

COS recently completed their WHMP in 2018; the WHMP looked at wildlife attractants within the 5-mile separation zone. However, management efforts will be conducted within a 10,000-foot radius from the runway centerline as directed by FAA AC 150/5200-33. This area is where aircraft often operate at less than 500-feet altitude and where most wildlife strikes occur.

The goal of the WHMP is to eliminate or reduce wildlife hazards on airport property and work with adjacent landowners to discourage land uses that attract wildlife. The WHMP states that incompatible

land uses, in regard to wildlife attractants include open water, wetlands, wildlife refuges, and waste management facilities. A wildlife specialist from the U.S. Department of Agriculture is available to provide technical and operational assistance associated with proposed land use modifications that may result in wildlife attractants. The WHMP also states that the wildlife coordinator will work with a qualified airport wildlife biologist to participate in planning and development decisions that may establish wildlife habitat.

Similarly to the WHA, the WHMP addresses habitat, wildlife, and land use management. Specifically, it recommends the following:

- **Habitat Management**
 - Remove vegetation, such as early succession shrubs and trees, within safety areas and the entire airfield
 - Install proper exclusion materials for airfield culverts and perimeter fencing
 - Conduct fence inspections to identify wildlife access points
 - Remove or modify landscaping that is observed to be a wildlife attractant
 - Exclude or modify any standing water if deemed a hazardous wildlife attractant
 - Monitor water retention and detention areas for wildlife activity
 - Add wildlife exclusion grates to culverts giving access from “land side” to “air side” at COS
 - When applicable, install bird spikes to airfield signage in problem areas
- **Wildlife Management**
 - Harass and remove wildlife when necessary
 - When applicable, install exclusion devices on all navigational aids
 - Maintain a qualified airport wildlife biologist for prairie dog mitigation projects
- **Land Use Management**
 - Review proposed projects and land use changes within critical zone for wildlife hazards
 - Monitor off-site facilities that attract hazardous wildlife to the airport facility

2.6 Statutory and Regulatory Information

Statutory and regulatory requirements in relation to land use and zoning on and around airports are crucial in understanding what requirements are in place and how they affect development and compatibility with airport activities. The following sections provide a brief summary of federal, state, and local regulations currently in place as well as the institutional processes that implement and enforce them.

2.6.1 Federal (FAA)

Airports are regulated at the federal level by the FAA, principally through (i) the direct regulation of commercial service airports, like COS, under 14 C.F.R. Part 139, and (ii) the terms and conditions imposed

in connection with federal grant funding. FAA has established specific guidelines for airport safety and land use compatibility.

2.6.1.1 Grant Assurances

When funds administered from the FAA are accepted by an airport sponsor, the sponsor must agree to certain obligations as outlined in the grant agreement documents. These “Grant Assurances” are not negotiable but rather prescribed by Congress in the Airport and Airway Improvements Act of 1982, United States Code (USC), Title 49, Subtitle VII as amended. Included in these assurances is an obligation by the sponsor to maintain compatible land use within the vicinity of the airport. Grant Assurances 20 and 21 are directly relevant.

- Grant Assurance 20 – Hazard Removal and Mitigation. The assurance states the sponsor “will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.”
- Grant Assurance 21 – Compatible Land Use. This assurance requires sponsors to “take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.” The FAA generally considers “appropriate action” to include exercising zoning authority (where the sponsor has such authority), participation in local zoning activities and land use decisions (where the sponsor does *not* have zoning or permitting authority), and direct action by the airport (e.g., purchasing property, sound insulating homes, etc.).

2.6.1.2 FAA Design Standards

FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, defines precise safety areas that must be maintained for a safe and efficient airport operating environment. Airports must comply with these design standards for projects funded with FAA grants and to satisfy requirements for commercial service airports pursuant to Part 139. The AC sets requirements for the following safety areas:

- Runway Safety Areas (RSA): RSA are 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. The RSA dimensions are based on a historical analysis of the area impacted by these events. RSA should be cleared, graded, properly drained, and free of potentially hazardous surface variations. To ensure satisfaction of these requirements, the airport sponsor must own and control the RSA, which is the case at COS.
- Runway Object Free Areas (ROFA): ROFA are an area on the ground centered on a runway 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. Most often, ROFA are entirely located on airport property, as is the case at COS.

- **Runway Protection Zones (RPZ):** The RPZ is a trapezoidal shaped overlay centered about the extended runway centerline immediately beyond the end of the runway. The functions of the RPZ is to protect people and property on the ground immediately beyond the runway end. Per Colorado Springs Code, construction of a height greater than an imaginary surface extending outward and upward at a slope of one hundred to one (100:1) (i.e., 1 foot of height for each 100 feet of distance) from the nearest point of the nearest runway through the length of the RPZ requires notice to the FAA. The FAA further advises that the RPZ should be clear of all above ground objects, but recognizes that some limited activities may be compatible (e.g., farming, service roads, navigational aids, etc.). The FAA requires that its field office consult with Headquarters when potentially incompatible land uses may be introduced to an RPZ. The City owns all of the COS RPZ, except for a portion of the Runway 13 RPZ.

2.6.1.3 FAR Part 77

Federal Aviation Regulations (FAR), found in Title 14 of the Code of Federal Regulations, are formal rules established by the FAA. FAR Part 77 establishes standards for FAA notification of construction of proposed objects that may be obstructions or hazards to air navigation and allows for FAA review of the proposed objects to determine potential flight hazards. These regulations apply to civil airports/heliports and military airports, and includes COS.

Under these regulations, notice to the FAA is required for any object with a height that exceeds a 100:1 slope from the runway. This notice is given through the completion of FAA Form 7460-1 (Notice of Proposed Construction or Alteration). The FAA determines if an object is an airspace obstruction based on a set of imaginary surfaces defined in the air around each airport. These imaginary surfaces include:

- **Primary surface:** The primary surface must be clear of all obstructions except those fixed by function. The width of a primary surface ranges from 250 to 1,000 feet depending on the existing or planned approach and runway type (visual, nonprecision, or precision).
- **Approach surface:** The approach surface is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface. The approach slope has a ratio of 20:1, 34:1, or 50:1, depending on the approach type. The length of the approach surface varies from 5,000 to 50,000 feet and also depends upon the approach type. The inner edge of the approach surface is the same width as the primary surface and expands uniformly to a width ranging from 1,250 to 16,000 feet, depending on the type of runway and approach.
- **Transitional surface:** The transitional surface extends outward and upward at right angles to the runway centerline and extends at a slope of 7:1 from the sides of the primary and approach surfaces. The transitional surfaces extend to the point at which they intercept the horizontal surface at a height of 150 feet above the airport elevation.
- **Horizontal surface:** The horizontal surface is a horizontal plane located 150 feet above the airport elevation and includes an area from the transitional surface to the conical surface. The perimeter is formed by creating arcs from the center of each primary surface and connecting the adjacent arcs. The radius for utility and visual runway ends is 5,000 feet and 10,000 feet for precision and nonprecision runway ends.

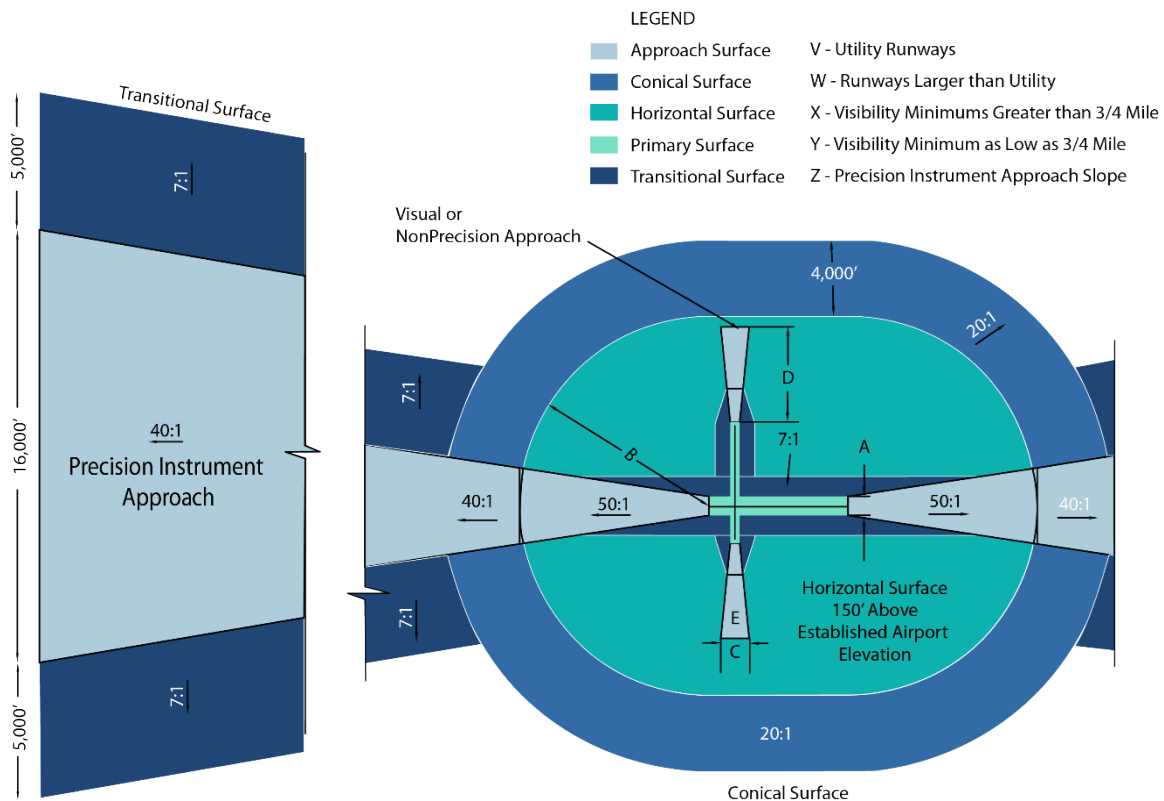
- Conical surface: The conical surface extends upward and outward from the edge of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- Outer horizontal surface (military airports only): The outer horizontal plane is a horizontal plane located 500 feet above the airport elevation and extends outward from the outer edge of the conical surface for a horizontal distance of 30,000 feet.

Part 77 surfaces are intended to provide aircraft a safe operating environment and differ from the protection offered by design standards as they protect the airspace around an airport rather than solely the ground areas on an airport. Part 77 also provides an opportunity to consider whether new structures might present hazards to air navigation from risks presented by, for example, electromagnetic interference with communications systems or glint/glare (such as from a solar array).

It is important to point out that although Part 77 authorizes the FAA to evaluate the construction of a structure and determine if it could be a hazard to air navigation, the FAA does not have the authority to regulate tall structures nor are they permitted to limit structure heights or determine which structures should be lit or marked. It is rather the state or local authorities' responsibility to control the appropriate use of property within the airport's airspace.

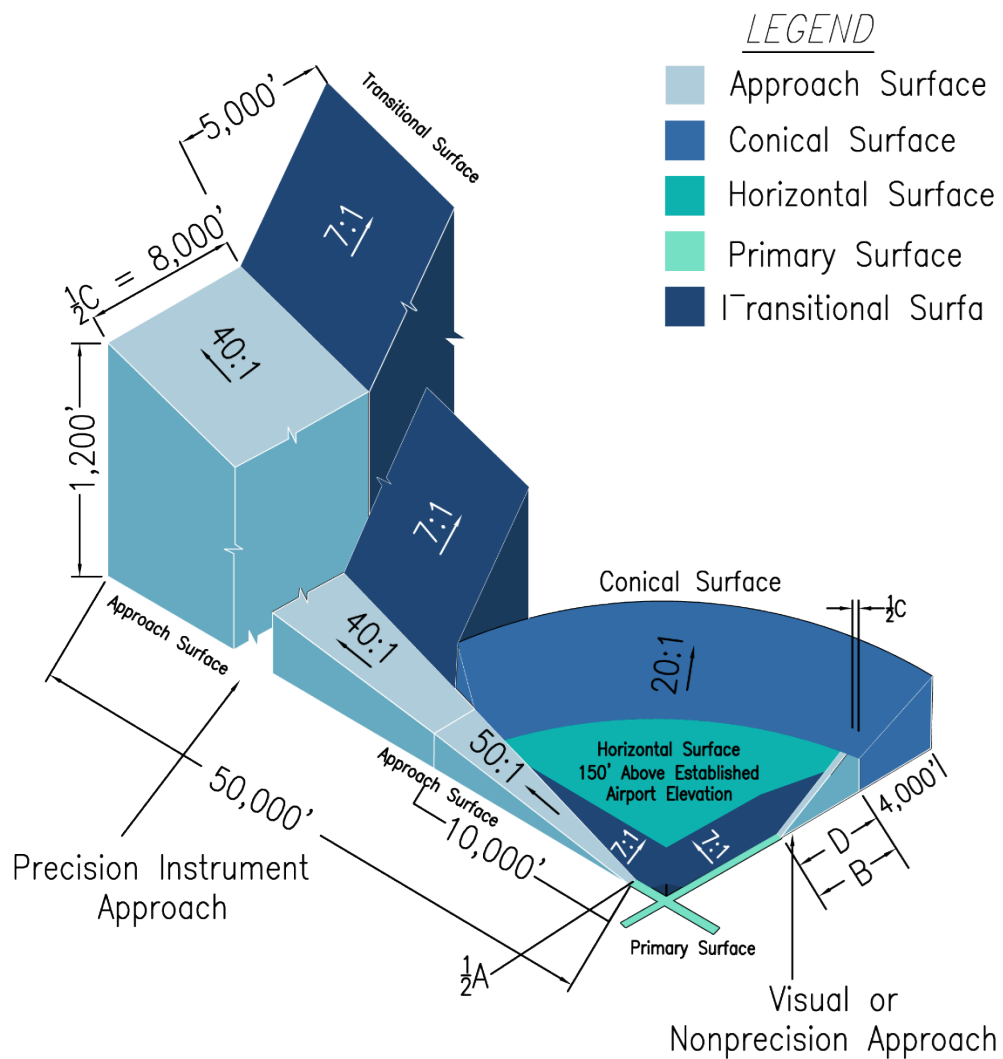
The typical Part 77 surfaces referenced above are illustrated in **Figure 2-10** and **Figure 2-11** below.

Figure 2-10 - Part 77 Plan View



Source: FAA

Figure 2-11 - Part 77 Perspective View



Source: FAA

2.6.1.4 FAR Part 150

14 C.F.R. Part 150 prescribes a formal process by which airports and surrounding communities can examine current and predicted future noise exposure associated with aircraft operations and to develop plans for abating and mitigation noise exposure.

The City has conducted studies under FAR Part 150 at various times, prepared Noise Exposure Maps, and adopted and updated a Noise Compatibility Program. The airport noise (ADNL) subzones in both the City of Colorado Springs' and El Paso County's codes are based on the DNL 65 dB noise contour included in the Noise Exposure Map prepared by the City in 2001.

2.6.1.5 Other FAA Standards and Guidance

The FAA has numerous AC's, standards, and policies that control incompatible land use in addition to those mentioned in the previous section. In 2010, the Airport Cooperative Research Program (ACRP) prepared guidance on land use compatibility, *Enhancing Airport Land Use Compatibility, Volume 1: Land Use Fundamentals and Implementation Resources*.¹ The guidance contains a summary of FAA regulations that pertain to land use planning in relation to airports. This section provides a brief list of the guiding documents. Additional information can be found in the ACRP document located at <http://www.trb.org/Publications/Blurbs/163344.aspx>.

- Planning and Design
 - FAA AC 70/7460-1K Change 2, *Marking and Lighting*
 - FAA AC 70/7460-2K, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*
 - FAA AC 150/5070-7, *Airport System Planning Process*
 - FAA AC 150/5190-4A, *Model Zoning Ordinance to Limit Height of Objects Around Airports*
 - FAA AC 150/5300-13 Change 14, *Airport Design*
 - FAA Form 7460-1, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*
 - FAA Form 7460-2, *Supplemental Notice of Actual Construction or Alteration*
 - FAA Form 7480-1, *Notice of Landing Area Proposal*
 - FAR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airport*
- Noise Related
 - FAA AC 150/5020-1, *Noise Control and Compatibility Planning for Airports*
 - FAA AC 150/5020-2, *Guidance on the Balanced Approach to Noise Management*
 - FAA AC 150/5320-14, *Airport Landscaping for Noise Control*
 - US Code Title 49 Transportation, Subtitle VII Aviation Programs, Part B, Chapter 471 *Airport Development*

¹ National Academies of Sciences, Engineering, and Medicine 2010. *Enhancing Airport Land Use Compatibility, Volume 1: Land Use Fundamentals and Implementation Resources*. Washington, DC: The National Academies Press. 2010

- Environmental Related
 - FAA AC 150/5200-34, *Construction or Establishment of Landfills near Public Airports*
 - FAA AC 150/5200-33, *Hazardous Wildlife Attractants on or near Airports*
 - FAR Part 139.337, *Wildlife Hazard Management Plan*
 - FAR Part 258, Subpart B, *Criteria for Municipal Solid Waste Landfills, CFR Title 40*
 - National Environmental Policy Act (NEPA) of 1969
 - FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*
 - FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*
- Land Acquisition Related Regulations
 - FAA AC 150/5100-17, *Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects*
 - The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- Operational and Management Related Guidance
 - FAA Order 5100.38, *Airport Improvement Program Handbook*
 - FAA Order 5190.6, *Airport Compliance Requirements*
 - FAA Order 7400.2, *Procedures for Handling Airspace Matters*

2.6.2 Federal (DoD)

DoD and the Air Force address land use compatibility for military airfields principally through the program known as Air Installations Compatible Use Zones (AICUZ). The AICUZ Program includes both standards for safety and noise as well as a process for studying land use compatibility. Because COS is owned by the City of Colorado Springs and used by Peterson AFB for its aviation mission pursuant to an agreement, the AICUZ study process technically does not apply. Historically, the City has taken the lead role, through prior Part 150 studies and now this Land Use Compatibility Study, with active support and coordination with Peterson AFB.

While the community has not examined land use compatibility at COS through the AICUZ study process, the standards for safety and noise under AICUZ are directly relevant. In particular, DoD and the Air Force have established standards and guidelines for safety areas surrounding runways, known as Clear Zones and Accident Potential Zones (APZ). The Clear Zone, APZ I and APZ II are more extensive geometrically than the FAA's RSA and RPZ summarized above but similarly based on a factual analysis of accidents and accident potential for varying military aircraft. DoD and the Air Force have issued land use compatibility guidelines for land use in the Clear Zone, APZ I and APZ II, reflecting the diminishing level of risk further away from the runway end. For more information, see Air Force Instruction AFI 32-7063, *Air Installations Compatible Use Zones Program* (Dec. 2015).

With respect to noise and height, DoDs standards and guidelines largely mirror the FAA standards and guidelines summarized above. DoD and the Air Force also use the DNL noise metric and consider all land uses to be compatible with aircraft noise at levels below DNL 65 dB. Additionally, DoD and the Air Force

employ the standards and process under FAR Part 77 for considering whether structures might constitute an obstruction or hazard to air navigation.

2.6.3 State Statutes

2.6.3.1 Colorado Revised Statutes

The State of Colorado, through the Colorado Revised Statutes (C.R.S.), designates land use authority to local governments, to include land use decisions and adoption of zoning and building codes. The following sections provide a summary of C.R.S. that apply to land use authority.

- Title 29, *Government – Local, Article 20-101, Local Government Land Use Control Enabling Act of 1974* grants counties and municipalities within the state of Colorado the authority to plan for and regulate the use of land within their jurisdiction. This specially includes the regulation of development and activities in hazardous areas.
- Title 29, Article 20 (Local Government Regulation of Land Use), Section 105.6(3), provides, “Each local government whose territorial boundaries are within two miles of all or any portion of a military installation shall timely provide to the installation commanding officer and the flying mission commanding officer, or their designees, information relating to proposed zoning changes, and amendments to the local government’s comprehensive plan, or land development regulations that, if approved, would affect the use of any area within two miles of the military installation. Nothing in this subsection (3) is intended to require submission of any information in connection with a site-specific development application under consideration by the local government.”
- Title 30, Article 28-106, *Government – County* and Title 31, Article 23-206 *Government - Municipal* grants counties and municipalities within the state of Colorado to prepare master plans or comprehensive plans for development within their communities. These plans include an analysis of land use and zoning codes and how they fit with future development.
- Title 30, Article 28-111 and 31, Article 23-301 also authorize Colorado counties and municipalities the authority to adopt local zoning regulations that promote the health, safety, morals, and welfare of their communities. Zoning designations are often used to protect current and future development from hazard areas.
- Title 30, Article 35-103 Articles XX and XIV of the Colorado Constitution, the Home Rule Powers, gives Colorado municipalities the power to tailor legislation to fit their local area and minimize state intervention. Colorado Springs is a home rule city, whose powers are recognized by the Colorado Constitution and defined by the City Charter. While the City does not derive its power from the Colorado Legislature, the City has the greatest authority on matters of local concern and less power on matters of statewide concern.
- Title 41, Article 1 (Aircraft), Section 107, provides, “The ownership of space above the lands and waters of this state is declared to be vested in the several owners of the surface beneath, subject to the right of flight of aircraft.”
- Title 43: *Transportation, Article 10, Aeronautics Division*, strives to promote the safe operation and accessibility of aviation in the state. The following statutes relate to state regulations as they pertain to land use near airports.

- Section 43-10-103 creates the Colorado Division of Aeronautics and defines their duties which include promoting safety and assisting the FAA and local governments in the identification and control of potentially hazardous obstructions to navigable airspace utilizing the standards described in the federal rules and regulations for identifying such hazardous obstructions.
- Section 43-10-104 creates the Colorado Division of Aeronautics and section 43-10-106 defines the powers of the board which includes the power to:
 - Acquire by gift, transfer, devise, or eminent domain such land which, in the opinion of the board, poses or may pose a potential hazard to navigable airspace. In determining whether land or any structure thereon poses a hazard to navigable airspace, the board shall use as a guide any applicable federal rules and regulations relating to identification of navigable airspace hazards.
 - Acquire land on behalf of the airport affected by such hazard. Upon acquisition of the land, the board shall transfer title to such land to the governmental entity operating such airport.
 - Consult with local governments, at the request of the board, so that decisions relating to local land use planning may be made in a manner which does not interfere with the state aviation systems plan, a regional system plan, or the provisions of article 65.1 of title 24, C.R.S., relating to areas and activities of state interest.
- Section 43-10-113 of Colorado statutes established safe operating areas around airports through the following declarations:
 - The general assembly declares commercial service airport, reliever airports, as defined in 49 U.S.C. sec. 47102, and the land areas surrounding such airports, as defined in 14 CFR part 77, to be a matter of state interest as provided in article 65.1 of title 24, C.R.S.
 - Governmental entities with zoning and building permit authority shall adopt and enforce, at a minimum, rules and regulations to protect the land areas defined in 14 CFR part 77.

2.6.4 Local Statutes

As discussed in the previous land use and zoning section, the local municipalities, Colorado Springs, El Paso County, and Fountain, all have land use and zoning ordinances in place as part of their City and County codes. As development is planned, requests for land use and zoning changes and variances occur; all three entities have review processes in place that allow flexibility in development but also maintains protection for existing uses such as the Airport. Requests for changes in land use and zoning and/or waivers are reviewed on a case-by-case basis.

New development within the City of Colorado Springs must be reviewed by the Land Use Review Division. This Division is responsible for ensuring that new development meets the land use and zoning codes and is consistent with the latest comprehensive plan. COS is provided with the opportunity to review changes

that occur within the Airport Overlay. Requests for changes or waivers to El Paso County zoning codes are reviewed by the Planning and Community Development Department; similarly ensures development will be compatible with other nearby land uses. Lastly, the City of Fountain's Planning Department reviews and coordinates proposed land use projects and ensures that they conform with City standards and community goals.

2.7 Techniques to Promote Compatible Land Use

There is no single approach to establishing land use, zoning and building standards to promote land use compatibility around civil airports and military airfields. At the federal level, the FAA published a Model Zoning Ordinance to Limit Height of Objects Around Airports in 1987 (see FAA Advisory Circular 150/5190-4A), and land use compatibility guidelines in FAR Part 150. The FAA does not prescribe any single approach by which local governments must address aircraft safety and noise.

Some states have mandatory and voluntary programs for promoting compatible land use; however, Colorado has not developed any such program. Most directly relevant, the Denver Regional Council of Governments published the Airport Compatible Land Use Design Handbook in 1998 containing recommendations by which local governments can examine and address aircraft safety and noise.

Notwithstanding the lack of prescriptive measures at the federal and state levels, the issue of land use compatibility has been examined comprehensively by government, academic and industry sources. In recent years, significant attention has been paid to this issue by the Transportation Research Board, Airport Cooperative Research Program (ACRP). In 2010, TRB published an exhaustive, two-volume study entitled, "Enhancing Airport Land Use Compatibility". Volume 1, Chapter 8 covers Tools and Techniques for Land Use Compatibility.

Table 2-6 (Table 1.8-1 from ACRP Study), presented immediately below, summarizes the various techniques that are available in the following categories: Planning and Zoning Techniques, Natural Features Techniques, Acquisition and Notification Techniques, and Noise Related Techniques. These techniques are too extensive to summarize faithfully here, and the reader is commended to the TRB report for background information. To the extent relevant, specific techniques are described in subsequent chapters of this report.

Table 2-6: Techniques for Land Use Compatibility Overview (Table 1.8-1 from ACRP Study)

	Runway Protection Zone (RPZ)	Approaches Areas	Areas Adjacent to Runway	Traffic Pattern Area
Planning and Zoning Techniques				
Community Comprehensive Plan	A	A	A	A
Area Plan	A	A	A	A
Joint or Regional Planning and Intergovernmental Agreements	A	A	A	A
Airport Land Use Compatibility Plan Including Zoning Ordinances for Land Use and Height	A	A	A	A
Airport Master Plan/Airport Layout Plan	A	A	A	O
Extraterritorial Zoning	A	A	A	A
Height Zoning Ordinance	A	A	A	A
Site Plan Review	A	A	A	O
Plat Review	O	O	O	O
Deed Restrictions	O	O	O	O
Natural Features Techniques				
Wildlife Management Plan	A	A	A	O
Natural Features Inventory and Mitigation Strategy	A	A	A	O
Acquisition and Notification Techniques				
Fee Simple Acquisition	A	O	O	L
Avigation and Noise Easements	A	A	O	O
Conservation Easements	A	A	O	O
Transfer of Development Rights	A	A	O	O
Purchase of Development Rights	A	A	O	O
Non-Suit Covenants and Hold Harmless Agreements	A	A	O	O
Disclosure Notice	A	A	A	A
Noise Related Techniques				
Noise Compatibility Program	A	A	A	A
Building Codes	A	A	A	O
Purchase Assurance	A	A	O	L
Sales Assistance	A	A	O	L
Sound Barriers	L	L	A	L
Sound Insulation	A	A	A	O

A = acceptable; O = optional; L = limited

Note: The success of any of these techniques has a significant dependence upon the location of the specific land use relative to the airport environs, as well as, the level of noise exposure. For example, noise barriers are only useful when the source of the noise is on the ground.

Source: National Academies of Sciences, Engineering, and Medicine, Enhancing Airport Land Use Compatibility, Volume 1: Land Use Fundamentals and Implementation Resources. Washington, DC: The National Academies Press, 2010

3 Aviation Activity Forecast

3.1 Introduction

Forecasts of aviation activity at the Colorado Springs Airport (COS) must be generated to support key elements of the Land Use Compatibility Study as well as the upcoming Airport Master Plan. As part of this planning effort, aircraft noise analyses for both current and future Airport conditions will be presented. To conduct these analyses, projections of aircraft operational patterns that occur at and around the Airport, aircraft fleet mix, and hourly aircraft operational projections for the 10- and 20-year periods are required. Thus, aviation activity forecasts for the Airport must be formally established to be used in the development of existing and future noise contours, as well as the determination of potential airport facility needs and land use requirements associated with this study. Specifically, projections of aviation demand from 2019 through 2039 were prepared in this study for commercial service and general aviation aircraft operations, passenger enplanements, cargo, based aircraft, and aircraft fleet mix for the Airport.

This forecast chapter includes methodologies that consider historical aviation trends being experienced at the Airport and throughout the nation. Local historical data were collected from the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) records and Airport records. In addition, demographic and socioeconomic data for the Colorado Springs Metropolitan Statistical Area (MSA) and the Airport's market area were used to track local trends and conditions that have the potential to impact demand levels. The base year for these forecasts is 2019, while the projections of aviation activity for the Airport were prepared for the near-term (2024), mid-term (2029), and long-term (2039) timeframes.

At the writing of this chapter (summer 2020), the 2020 coronavirus pandemic (COVID-19) is significantly impacting the aviation industry as well as most other industries across the world, hitting harder than any previous crisis. More cases of COVID-19 are still being reported and it is anticipated that non-essential travel will continue to be significantly reduced for the next several months. Airlines have made deep capacity cuts, grounded fleets, and massive layoffs have occurred. Aircraft production has come to a halt. According to Airports Council International-North America (ACI-NA), it is estimated passengers declined 73 percent in the March to June 2020 period and total enplanements in the U.S. decreased by 349 million for the year¹. General aviation activity and aircraft orders have also slowed drastically. Corporate travel is minimal, many flight schools have ceased flight training, skydiving operations are shut down, and airshows have been cancelled. Airport and FBO staff are working with skeleton crews. The biggest question for the aviation community, and the rest of the world, is how long the virus-induced global economic downturn will last. The aviation industry is, however, resilient and it is anticipated that activity will at some point return to pre-pandemic levels. The long-term implications of the pandemic on the aviation industry are largely unknown. COVID-19 has undoubtedly impacted aviation activity presented in this report, but it is difficult to quantify/project the impact it may have on long-term activity at COS at this time.

This chapter presents the findings and methodologies used to project aviation demand at COS for the next 20 years. Note that while forecasting considers the most accurate information available, it is not an exact science. Divergences from a prepared forecast can often occur due to any number of factors that simply cannot be anticipated. However, when soundly established, a forecast will provide a reasonable and

¹ <https://airportscouncil.org/wp-content/uploads/2020/03/Economic-Impact-of-Coronavirus-on-U.S.-Commercial-Airports.pdf>

defensible rationale for a projection of future Airport activity. The projections of aviation demand are documented in the following sections:

- Overview of the Airport Market Area
- Aviation Industry Trends
- Historical and Current COS Aviation Activity
- Forecast Methodologies
- Projections of Passenger Enplanements
- Projections of Cargo Volume
- Projections of Aircraft Operations
- Based Aircraft Projections
- Peak Hour Projections
- Critical Aircraft Determination
- Summary

3.2 Overview of the Airport Market Area

There is often a strong correlation between an area's demographic and economic factors and its resultant demand for aviation activities. This section defines the COS market area and the various factors that have the potential to drive its current and projected need for aviation services.

3.2.1 Airport Market Area Defined

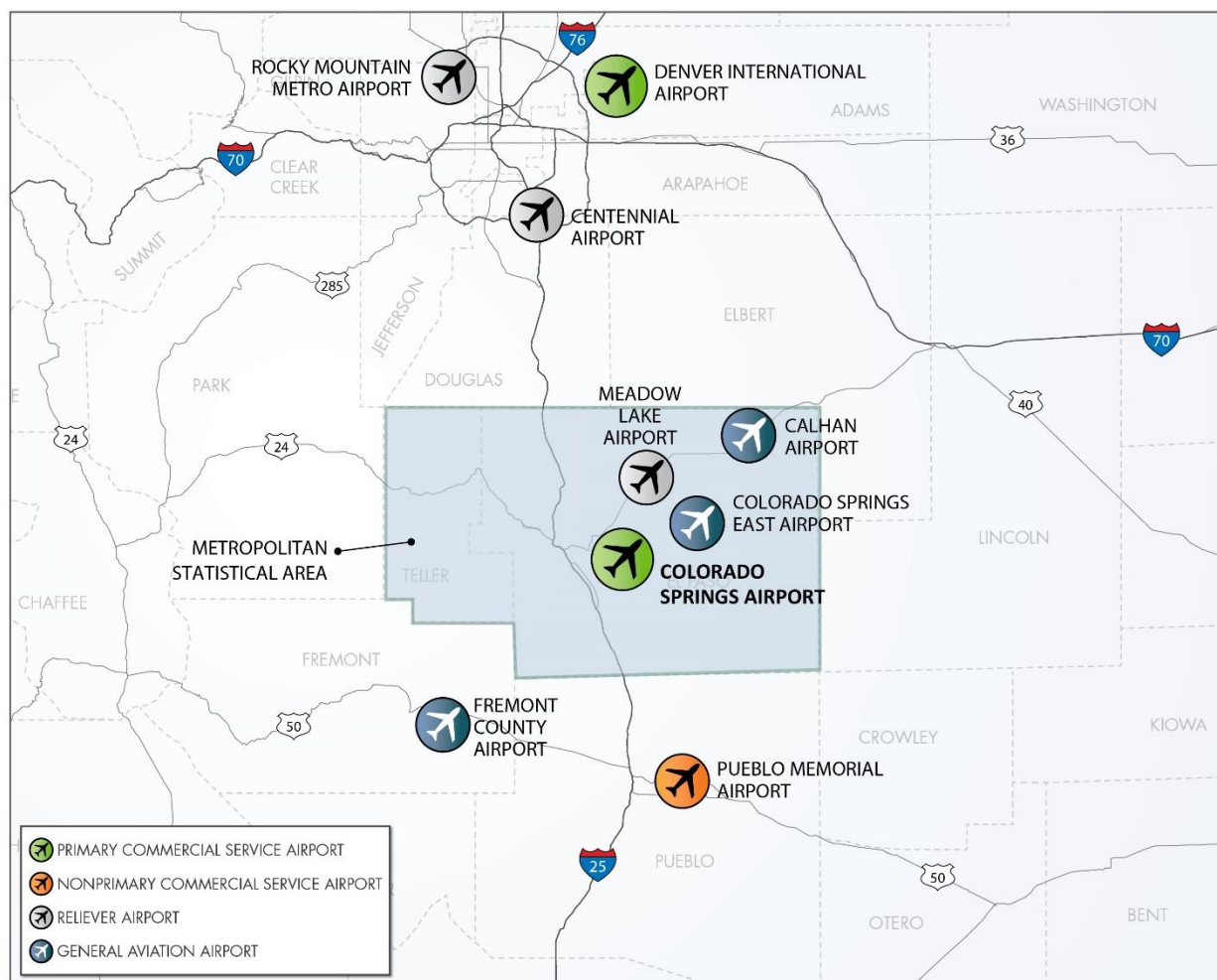
An airport's market area represents the geographic region from which a significant portion of aviation and commercial passenger demand originates. For COS, it can reasonably be assumed that most of the aviation-related demand originates in a two-county region (El Paso and Teller Counties) known as the Colorado Springs Metropolitan Statistical Area (MSA). This is particularly relevant for commercial airline passenger operations since proximity can be a primary consideration in passengers selecting an airport from which to travel, and COS is projected to remain as the MSA's only commercial service airport service airport throughout the planning period.

Counties surrounding the Colorado Springs MSA comprise the secondary market area for COS. Commercial airline passengers that originate from these extended areas are less proximate to COS and may be more inclined to also consider other factors such as specific flight characteristics, availability, cost, convenience, and others in choosing an airport. For example, at only 86 miles from Colorado Springs, Denver International Airport is the Rocky Mountain region's largest and most active commercial air service airport and frequently attracts passengers from the northern counties of the secondary COS market area (e.g., Lincoln, Elbert, Douglas, Jefferson, and Park counties) and beyond. Pueblo Memorial Airport lies south of COS and may draw passengers from southern counties of secondary market area including Crowley, Pueblo, and Fremont counties. It is important to remember that the exact market area that COS serves can change depending on the level of service and airfares offered at COS and the area's competing airports.

There are several other general aviation airports located within and surrounding COS's primary and secondary market areas that accommodate the region's general aviation demand. Although these airports do impact the COS market area with respect to general aviation, it is assumed that the existing general aviation usage pattern within the region will remain generally consistent. For COS, an exception to this may be in its increased utilization by corporate/business aircraft operators as regional economic development continues to evolve and grow.

Figure 3-1 illustrates the Colorado Springs MSA, surrounding counties and area airports.

Figure 3-1: Colorado Springs Airport Market Area



Source: Jviation

3.2.2 Socioeconomic Trends

The demand for air transportation at COS is largely driven by a combination of the trends currently being realized within the airline industry and the socioeconomic conditions within the market area. This section summarizes those recent trends and projections in the COS market area with respect to population, employment, and income.

3.2.2.1 Population

According to the latest population data prepared by the Colorado Department of Local Affairs (DOLA), the population of the COS market area in 2019 totaled 751,483 residents (See **Table 3-1**) with El Paso County accounting for over 96 percent of the total market area population. Teller County had a total population of 25,374 in 2019 and has grown at a one percent annual rate over the past 20 years. The COS market area accounted for 13 percent of Colorado's total 2019 population and is expected to increase in share over the next 20 years. While the population of the COS market area has increased at an average annual growth rate of 2.0 percent since 2000, that growth rate is projected to decline slightly over the next 20 years resulting in 1.6 percent annual growth rate. This results in a COS market area population of approximately 992,000 residents by 2039.

Table 3-1: Historical and Projected Population

	Teller County	El Paso County	COS Market Area	Colorado	Market Area % of Colorado
Historical					
2000	21,067	519,803	540,870	4,338,785	12.5%
2010	23,441	627,232	650,673	5,050,332	12.9%
2019	25,374	726,109	751,483	5,769,985	13.0%
Average Annual Growth Rate					
2000 - 2010	1.1%	2.1%	2.0%	1.6%	
2010 - 2019	0.9%	1.8%	1.7%	1.6%	
2000 - 2019	1.0%	2.1%	2.0%	1.7%	
Projected					
2024	27,260	784,414	811,674	6,165,395	13.2%
2029	28,406	845,283	873,689	6,601,706	13.2%
2039	29,757	962,041	991,798	7,390,824	13.4%
Average Annual Growth Rate					
2019 - 2024	1.5%	1.6%	1.6%	1.4%	
2024 - 2029	0.8%	1.6%	1.5%	1.4%	
2029 - 2039	0.5%	1.4%	1.4%	1.2%	
2019 - 2039	0.9%	1.6%	1.6%	1.4%	

Source: Colorado Department of Local Affairs, 2019

3.2.2.2 Employment

Table 3-2 presents historical and projected socioeconomic indicators for the COS market area. According to data provided by DOLA, estimated employment (total jobs) in the COS market area in 2010 was 335,618 and grew to 364,701 jobs in 2015. This represents an average annual growth rate of 1.7 percent, the highest growth rate in recent years. Overall employment in the COS market area is projected to reach 509,095 jobs by 2040, growing at an average annual growth rate of 1.3 percent over the next 20 years.

Based on the U.S. Bureau of Labor Statistics, the unemployment rate in the COS market area (at 3.0 percent in November 2019) is lower than the national average (3.5 percent in December 2019) but higher than the state unemployment rate (2.5 percent in December 2019). An increase of jobs in the services and educational sectors as well as the health care sector have been the primary contributors to the market area's overall employment growth. The largest employers in the market area are provided in **Table 3-3**.

3.2.2.3 Income

Personal income within the COS market area experienced a 4.9 percent average annual growth from 2000 to 2010, then regressing slightly to 4.2 percent between 2010 and 2015. Note that as the number of higher paying jobs increase within the region, personal income is expected to grow over 5 percent per year over the next 10 years, before returning to more conservative growth levels by 2040 (see **Table 3-2**).

Table 3-2: Historical and Projected Market Area Socioeconomic Indicators

	Employment	Total Personal Income (\$ millions)
Historical		
2000	324,076	\$ 16,337
2005	334,142	\$ 20,394
2010	335,618	\$ 25,401
2015	364,701	\$ 30,688
Average Annual Growth Rate		
2000 - 2005	0.6%	4.9%
2005 - 2010	0.1%	4.9%
2010 - 2015	1.7%	4.2%
2000 - 2015	0.8%	5.8%
Projection		
2020	406,117	\$ 38,765
2025	437,209	\$ 48,768
2030	466,514	\$ 62,024
2040	509,095	\$ 77,443
Average Annual Growth Rate		
2020 - 2025	1.5%	5.2%
2025 - 2030	1.3%	5.4%
2030 - 2040	0.9%	2.5%
2020 - 2040	1.3%	5.0%

Source: Colorado Department of Local Affairs, Woods & Poole, 2019

Table 3-3: Market Area Major Employers

Private Employers	Industry	Public Employers	Industry
The Broadmoor Hotel	Hospitality	Charter Spectrum West	Back Office/Customer Service
California Casualty Group	Back Office/Customer Service	City of Colorado Springs	City Government
CaptionCall LLC	Back Office/Customer Service	Colorado Springs Utilities	Power/Water/Wastewater/Gas
Cherwell Software	Information Technology	Discover Goodwill	Other Office
Cheyenne Mountain, Dolce Resort	Hospitality	El Paso County	County Government
Children's Hospital of Colorado	Health Care	Fort Carson	Military Installation
Cobham Semiconductor Solutions	Manufacturing	Lockheed Martin Corp.	Aerospace/Aviation
Colorado College	Higher Education	Microchip Technology	Information Technology
Compassion International	Nonprofit	Peterson Air Force Base	Military Installation
EviCore	Back Office/Customer Service	Pikes Peak Community College	Higher Education
Firstsource Solutions, Ltd.	Back Office/Customer Service	Progressive Insurance Company	Insurance
Focus on the Family	Nonprofit	School District #2	Public Education
Luce Research	Back Office/Customer Service	School District #3	Public Education
Parsons	Information Technology	School District #8	Public Education
Peak Vista Community Health	Healthcare	School District #11	Public Education
Penrose-St. Francis/Centura	Healthcare	School District #20	Public Education
UCHealth – Memorial Health	Healthcare	School District #49	Public Education
United Service Automobile Assoc.	Financial/Insurance Serv.	Schriever Air Force Base	Military Installation
Western Forge Corporation	Manufacturing	United States Air Force Academy	Higher Education/Military

Source: Colorado Springs Chamber & EDC

3.2.2.4 Business Climate

The COS market area offers many competitive advantages for area businesses including excellent transportation systems, communication networks, and utility infrastructure. Impressive growth in the market area is being experienced within a variety of business sectors. One important reason that companies are choosing to locate and/or grow offices in the region is that the City of Colorado Springs has consistently ranked at or near the top of the list for most desirable places to live in the U.S. by U.S. News and World Report among others. Another factor into the region's attractiveness for business growth is the proactive and aggressive approaches taken by the region's various economic development advocates and agencies, as well as the business-friendly policies advocated by its local governments.

COS is positioned to be not only a critical asset in attracting businesses to the region, but it also plays a key role in business and economic development. As home to the Peak Innovation Park, a 900-acre master planned business park that accommodates office, industrial, entertainment, recreation, and hospitality businesses and activities, COS is directly promoting regional economic growth by offering development opportunities that have the potential to be directly or indirectly integrated with Airport operations. One example of the growth and expansion of the Airport and region is through a recent announcement by COS and the U.S. Forest Service to build a \$17 million regional firefighting base that will allow air tankers to load retardant to fight forest fires within a 15-state region. Additionally, in December 2019, the President signed a law that would establish Space Force, a 6th independent military service branch to undertake missions and operations in the rapidly evolving space domain. Peterson Air Force Base, which shares COS airfield facilities, may be one of several locations to accommodate Space Force operations. Lastly, and more recently, Amazon purchased nearly 70 acres in the Park to construct a 4-million-square-foot fulfillment center, a commercial project that is already spurring additional development in the Park.

3.2.2.5 Tourism

For many tourists, COS serves as a convenient means to access the Rocky Mountain region for hiking, skiing, and other outdoor activities provided by the region's many well-known resort towns. In 2018, the region welcomed over 23 million visitors, generating more than \$6.6 million a day for the local economy. This represents a 7.0 percent increase over 2017. Showing continued signs of growth, in 2019, hotel demand in Colorado Springs grew 2.6 percent over 2018.

3.2.2.6 State and Local Incentives

The Colorado Springs MSA offers a wide variety of local and state tax incentives, tax credits, and employee training programs designed to incentivize business development and promote regional economic growth. Several of these initiatives have been codified in the tax codes of the state and local taxing authorities, including tax exclusions for manufacturing equipment, inventory stock, and others. There are also multiple aviation-related incentive programs that are highlighted below:

- **Aviation Development Zone Tax Credit** – This is a statewide, calendar year performance-based job creation incentive. The Colorado Springs Airport is a recognized Aviation Development Zone (ADZ) through the Colorado Office of Economic Development and International Trade. A business or any portion of a business that is involved in aircraft manufacturing or maintenance and repair, completion or modification of aircraft located within the boundaries of an ADZ may qualify for a state income tax credit of \$1,200 per net new full-time employee.
- **Colorado Sales and Use Tax Exemption on Aircraft and Aircraft Parts** – Aircraft used in interstate commerce by a commercial airline and parts permanently affixed to aircraft are exempt from state sales and use tax.
- **Commercial Aeronautical Zone** – The Airport is located within a regionally created Commercial Aeronautical Zone (CAZ), which recognizes significant tax incentives for aeronautical businesses. All local sales and use taxes are abated for companies located within the CAZ and specifically engaged in a variety of aeronautical activities.
- **Pikes Peak Enterprise Zone** – This program is designed to promote job creation, business growth and development opportunities in areas targeted for economic stimulation. The Airport is located within the Pikes Peak Enterprise Zone and nearby businesses may be eligible for one or several of the Colorado Business Income Tax Credits related to hiring new employees, making investments in equipment, training employees or conducting research and development activities.
- **Federal Opportunity Zone** – This program is a federal tax incentive to invest in low-income urban and rural communities through the favorable treatment of reinvested capital gains and forgiveness of tax on new capital gains. COS is located within this Zone.
- **Colorado Springs Foreign Trade Zone** – A Foreign Trade Zone is a restricted access area located within the United States and Puerto Rico that is considered legally outside the customs territory of the United States. The key benefits in a Foreign Trade Zone are duty deferral, duty reduction and duty avoidance for the transfer, use and storage of imported materials. Import duties are deferred until the materials physically leave the Foreign Trade Zone or reduced if used in a product with a lower duty rate. There is no import duty if the materials, or products in which imported materials are used, are re-exported. COS is within the Colorado Springs Foreign Trade Zone.

3.3 Aviation Industry Trends

In preparing a forecast of activity for COS, it is important to have an appreciation of recent and anticipated national aviation industry trends that have the potential to impact the development of aviation activity projections. These trends will have varying degrees of relevance for COS, so it is likely that some trends discussed below may ultimately have limited or no pronounced impact on the Airport.

3.3.1 Commercial Airline Trends Since 2000

Although the end of the 1990s marked some of the most profitable years for airlines, a new era of airline industry woes came on the heels of the economic downturn and the terrorist attacks of September 11, 2001. Passenger fears and hassle factors due to increased security led to an immediate decline in demand for air travel. This decline was exacerbated by the airlines' exorbitant fixed-cost structure. Major airlines had no choice but to reduce their schedules by as much as 20 percent to cut costs and restructure their business models. Across the country, aircraft were parked, retired, or returned to lessors or manufacturers; airport construction projects were canceled or delayed. In 2002, United and US Airways filed for Chapter 11 bankruptcy. US Airways emerged from Chapter 11 several months later, however, went back into bankruptcy in 2004. In November 2011, American Airlines filed for Chapter 11 bankruptcy. Compounding these problems, the wars in Iraq and Afghanistan further strained both passenger sensitivities and air carriers' bottom lines.

The decade spanning the early 2000s brought a dramatic increase in U.S. airline consolidation through mergers and acquisitions. American Airlines bought Trans World Airlines, and eventually reduced its hub operation at St. Louis. In 2005, America West and US Airways merged forming hub operations in Phoenix, Charlotte, and Philadelphia. In 2008, Delta purchased Northwest Airlines and currently operates eight domestic hubs and three international hubs. In 2010, the United and Continental Airlines merger resulted in eight domestic and two international hubs. In 2011, Southwest Airlines acquired AirTran Airways and reduced the AirTran hub operation in Atlanta. In 2015, American Airlines merged with US Airways, effectively creating the largest airline in the world. Many regional carriers that were aligned with these legacy carriers also became part of a larger airline as a result of these mergers and acquisitions. U.S. mainline carrier enplanement growth in the combined domestic and international market was 5.1 percent in 2015 while regional carriers carried 1.1 percent fewer passengers.

Throughout the first decade of the 2000s, low-fare carriers were able to capitalize on the slowing economy as businesses slashed travel budgets and underwent major airline loyalty and convenience in search of cheaper fares. In 2000, JetBlue became the newest entrant into the low-fare carrier market. As in previous years, the U.S. domestic enplanement market share continued to rise for low-cost carriers throughout the first half of this decade while the network and regional carrier share decreased. In this period, the domestic low-cost carrier enplanement share was 28 percent while the share of network carriers was 47 percent and regional carrier share was 25 percent.

In the early 2010s, major carriers were forced to lower fares in order to compete with the low-fare carriers and maintain market share, especially in the coast-to-coast markets. Domestic fares and yields continued to fall in first half of the decade. Fluctuations in the price of fuel put additional strain on financially-stretched carriers. To cope with competition, carriers dropped or reduced service to less successful markets in order to improve load factors.

According to the FAA, U.S. passenger carriers posted their tenth consecutive year of profits in 2018, with ancillary revenues a contributing factor to the favorable outcome even as energy and labor contracts listed costs higher. During 2018, domestic enplanements increased 5.0 percent to 778 million. As a result, the domestic average load factor reached 84.7 percent and yields increased for the first time since 2014. All network and low-cost carriers reported strong profits in 2018, as they raised prices and created ever more efficient operational structures. Expansion by ultra-low-cost carriers such as Spirit and Allegiant, as well as by mainline carriers such as United, helped to cap fare increases in the region.

The recent world-wide grounding of Boeing 737 Max aircraft has had an impact on operations for carriers that are heavily reliant on Boeing. While most customers have been re-accommodated on alternate aircraft, airlines have had to cancel thousands of flights and delay growth plans. The manufacture expects the aircraft to be approved for commercial service in mid-2020, although the FAA has no timeline for lifting the grounding.

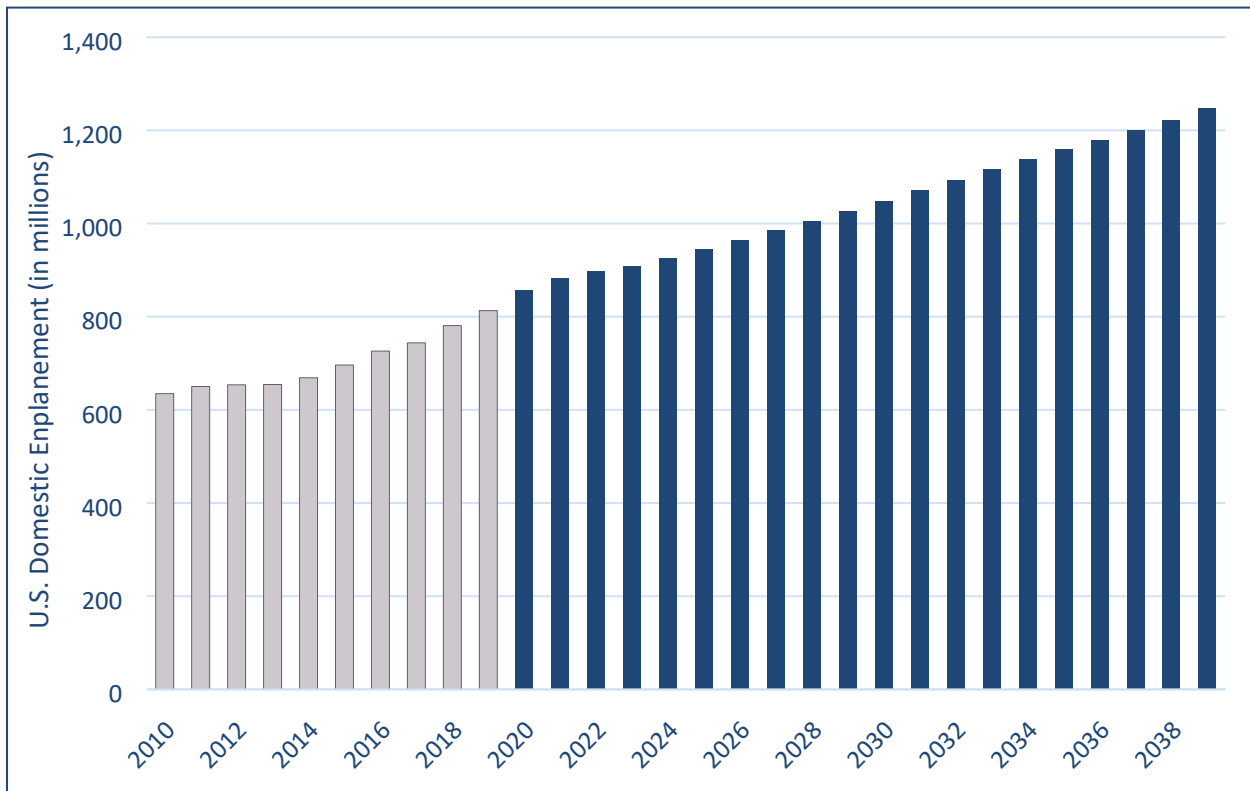
In addition to commercial passenger service, COS accommodates cargo freight and express services. FedEx is one of the Airport's largest and most active cargo operators, with multiple 757 aircraft operations daily. On a national level, domestic and international air cargo revenue ton miles have increased 2.2 percent annually from 2010 to 2018. All-cargo carriers, those that carry cargo exclusively, carry 42 percent domestically while the greater share goes international.

3.3.2 Anticipated Commercial Trends

The FAA develops forecasts of future levels of commercial passenger activity based on a combination of past commercial airline trends and national/world economic outlooks. The most recent forecasts of commercial passenger activity available is the FAA in *FAA Aerospace Forecasts, Fiscal Years 2019-2039*, which presents both near-term and long-term forecasts. In general, FAA forecasts for commercial passenger activity reflect a continued upward trend in domestic passenger traffic for the forecasted period. In the short-term, total passenger enplanements are projected to experience strong growth (over 6 percent between 2018 and 2020). In the mid-term, total domestic passenger enplanements are projected to reach over 1 billion by 2033.

According to FAA (*Aerospace Forecasts, Fiscal Years 2019-2039*), domestic air carrier load factors are projected to increase from 84.9 to 86.6 percent between 2019 and 2039. The FAA also projects that total domestic passenger enplanements on large U.S. carriers and regional/commuter carriers, combined, will increase from approximately 816 million in 2019 to approximately 1.12 billion in 2039, representing an average annual growth rate of approximately 1.6 percent. Historic and projected U.S. total domestic passenger enplanement data is depicted in **Figure 3-2**.

Figure 3-2: Projection of Total U.S. Enplanements 2010 - 2039



Source: FAA Aerospace Forecasts, *Fiscal Years 2019-2039*

Note: Historical years are in gray

For large domestic air carriers, the FAA forecasts that the average passenger trip length is expected to increase from 1,032 to 1,085 miles and average seats per aircraft departure will increase from 165 to 175 seats, indicating more efficient and profitable operations. Data for 2018 reveals large air carrier operations increased 2.7 percent annually since 2010. This is expected to increase at a lower rate of 2.5 percent by the end of 2029 and then continue to increase at an average annual rate of 1.7 percent until 2039.

The FAA also forecasts activity for regional/commuter carriers and projects that this group's average passenger trip length will increase from 489 to 530 miles. The number of seats per aircraft is also growing in the regional jet market, where it is expected 50-seat regional jets will continue to be phased out of the market (leaving in just a handful by 2030) and replaced by 70-90 seat aircraft. This fleet mix transition will result to the average seats per aircraft departure increasing from 65 to 75 and the average domestic load factor increasing from 80 to 81.4 percent. Regional/commuter aircraft operations are expected to decrease at an average annual rate of 2.2 percent through 2029, and then grow conservatively at an average annual growth rate of 1 percent over the remainder of the forecast period. The expected decline of regional jet operations in the intermediate period is the result of several factors including fewer contracts with larger carriers, ongoing pilot shortages, and changes in the fleet mix.

Finally, the FAA projects that the international air cargo industry will experience significant growth within the forecast period. Between 2019 and 2039, international all-cargo carriers are expected to see 4.5 percent average annual growth in revenue-ton miles. Although also positive, domestic air cargo that is transported on dedicated cargo aircraft as well as in passenger aircraft are expected to grow at a much more modest rate of 1.6 percent annually over the same period.

3.3.3 National General Aviation Trends

At the national level, fluctuating trends related to general aviation (GA) usage and economic uncertainty resulting from national and international business cycles all will have significant impacts on GA demand levels. This section provides an overview of those current GA trends, as well as some of the various factors that have influenced those trends throughout the U.S. These are important considerations in the development of projections of aviation demand for COS since GA accounts for a significant percentage of airport activity.

General aviation aircraft are classified as all aircraft not flown by commercial airlines or the military. This includes an incredibly diverse array of flying that ranges from a personal vacation trip in a small single engine plane to an emergency medical evacuation to business-related travel to flight instruction that trains new pilots to helicopter traffic reports that keep drivers informed of rush-hour delays. Simply stated, GA encapsulates all those individual unscheduled aviation activities that enrich, enhance, preserve, and protect the lives of citizens.

As defined by the FAA, GA activities are divided into six use categories:

- Personal – About a third of all private flying in the United States is for personal reasons, which may include practicing flight skills, personal or family travel, personal enjoyment, or personal business.
- Instructional – This category includes all private flight instruction for purposes ranging from private pilot to airline pilot.
- Corporate - About 12 percent of the total private flying in the U.S. is done in aircraft owned by a business and piloted by a professional pilot. Most of these flights are in turbine/jet aircraft and cover long distances, with some flying to intercontinental and international destinations. Businesses elect to fly these trips to save time and expand their geographic markets.
- Business – It is estimated that almost 11 percent of the total private flying in the U.S. is done by businesspersons flying themselves to meetings or other events, primarily in piston or turboprop aircraft. Most of the pilots own or work for relatively small businesses and use the aircraft to accomplish missions that would otherwise take more time or would be infeasible.
- Air Charter – When scheduled air service either is not available or inconvenient, businesses and individuals can charter aircraft from air charter providers. These flights save time and make it possible to fly directly to places that cannot be reached by scheduled passenger service airlines. These operators use GA facilities and are not considered air taxi operators, which are a commercial activity and discussed in more detail later in this chapter.
- Other – All other activities under GA are classified as being “other.” Given the diverse nature of GA, this includes aircraft performing a broad range of functions related to, but not limited to, disaster relief, search and rescue, police operations, news reporting, border patrol, forest fire fighting, aerial photography and surveying, crop dusting, and tourism activities.

3.3.3.1 Business Use of General Aviation

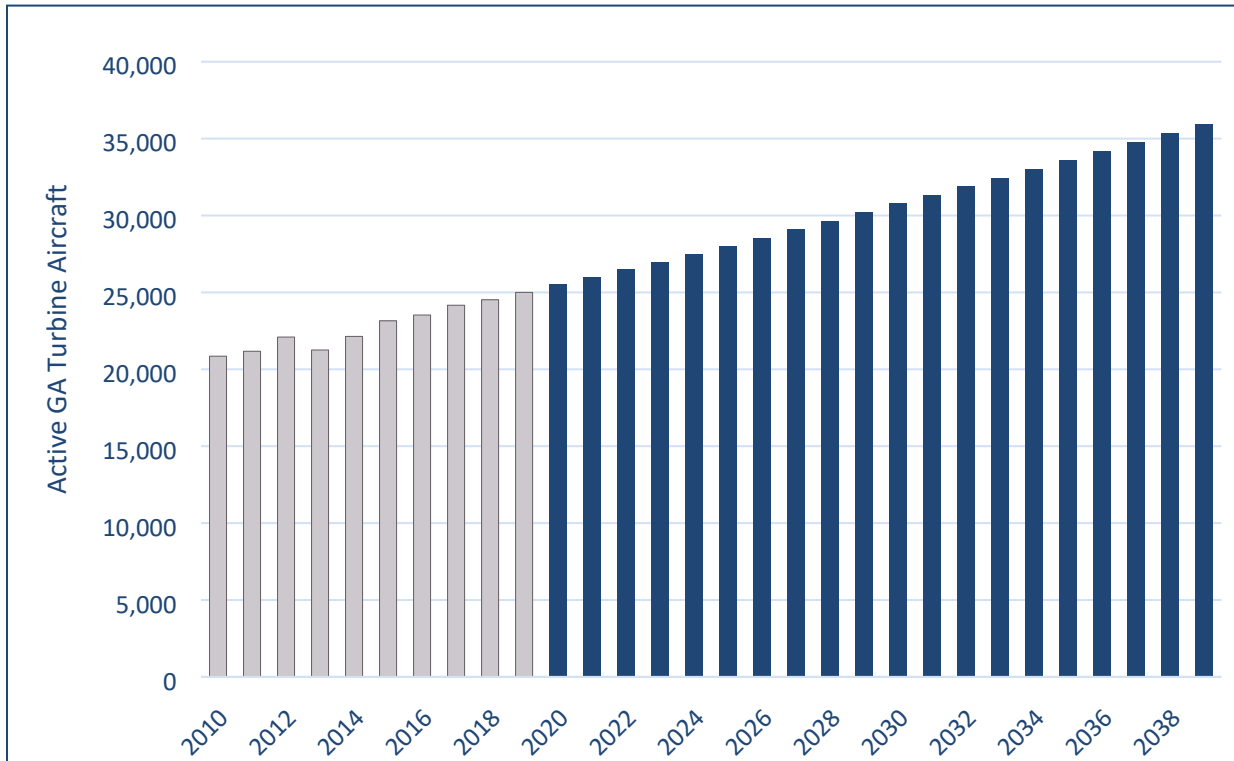
Business and corporate aviation are the fastest growing facets of GA, contributing \$150 billion to U.S. economic output annually and employing more than 1.2 million people. The difference between the facets is that corporate aircraft are flown by professional pilots carrying passengers for hire, whereas business aircraft are flown by pilots flying the aircraft on company business. Companies and individuals use aircraft as a tool to improve the efficiency and productivity of their business and personnel. Use of GA aircraft afford businesses and individuals direct control of their travel itineraries, destinations and significantly reduce travel times and inconveniences often associated with scheduled airline service.

It is important to note that corporate GA is not the exclusive concern of Fortune 500 companies. In fact, according to the NBAA's Business Aviation Fact Book 2019, only 3 percent of the approximately 15,000 business aircraft registered in the U.S. are flown by these companies. The remaining 97 percent are operated by a broad cross-section of organizations, including government, universities, charitable organizations, and businesses of all sizes. Most U.S. companies that utilize business aircraft (85 percent) are small- and mid-size businesses, many of which are based in communities across the country where commercial air service providers have reduced or eliminated service. Honeywell's 28th Annual Business Aviation Outlook, 2019 highlighted the following:

- Up to 7,700 deliveries of new business jets valued at over \$251 billion are expected through 2028
- Operators plan to replace 20 percent of their fleets with new jets within the next 5 years
- Large cabin jets account for more than 62 percent of new purchases
- 61 percent of worldwide sales originate in North America

Use of GA aircraft by business and corporate aviation ranges from small, single-engine aircraft rentals to multiple aircraft corporate fleets supported by dedicated flight crews and mechanics. Business aircraft usage by smaller companies has also escalated dramatically as various chartering, leasing, fractional ownership, interchange agreements, partnerships, and management contracts have emerged. The growth in this facet of the industry is reflected in **Figure 3-3** below that presents the FAA's historical and projected number of GA turbine aircraft.

Figure 3-3: Active General Aviation Turbine Aircraft 2010-2039



Source: FAA Aerospace Forecast 2019-2039

Note: Historical years are in gray

Of special note with respect to corporate and business aviation is the immense popularity of fractional ownership operations, which began in 1986 with the creation of programs that offered aircraft owners increased flexibility in the ownership and operation of aircraft, as well as providing a financially viable alternative to flying commercially. Such programs use alternative aircraft acquisition concepts over traditional methods, including shared or joint aircraft ownership, and provide for the management of the aircraft by an aircraft management company. The aircraft owners participating in a program like this agree not only to share their aircraft with others having a common interest in that aircraft, but also to lease their aircraft to other owners in the program. The aircraft owners use a common management company to provide aviation management services including maintenance of the aircraft, pilots, scheduling and administration of the leasing of the aircraft among the owners. Even during times of unsteady economic conditions, fractional operator businesses have consistently grown as existing and new customers increase or initiate their fractional aircraft usage.

One of the most important trends identified by the FAA in their forecasts is the strong growth anticipated in active GA jet aircraft. In terms of growth in the number of turbine aircraft (i.e., turboprop and jet), impacted by the economic recession and the resultant pressures on companies to reduce costs, the overall production of jet aircraft declined slightly in 2013. However, since that time, the production of jet aircraft has experienced substantial growth, increasing at over 2.0 percent annually on average from approximately 20,853 aircraft to 25,510 between 2010 and 2018. The active GA turboprop and jet aircraft fleet is anticipated to continue to increase dramatically over the projection period, to almost 30,000 aircraft in 2029, and the total number of jet aircraft specifically nearly doubling by 2039.

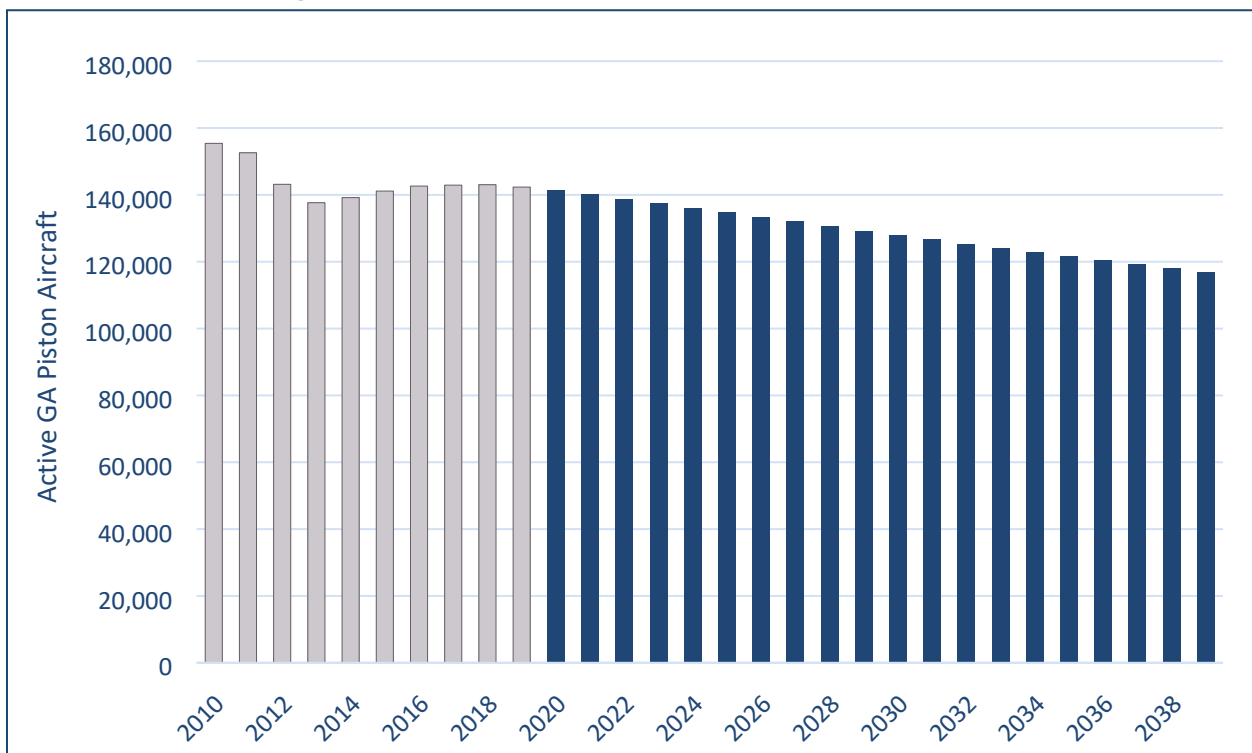
3.3.3.2 General Aviation Piston Operators

Single and multi-engine piston aircraft experienced a decline in the number of aircraft between 2010 and 2018. Although still the largest portion of aircraft in the active fleet, the number of single engine aircraft fell from 139,519 in 2010 to 129,885 in 2018, a 0.9 percent average annual decline. During that same period, multi-engine piston aircraft experienced a steeper decline, falling from 15,900 aircraft to 13,040, a 2.4 percent annual decrease. In total, active piston aircraft decreased at 1.0 percent annually over that time period. Much of this decline is attributed to the retirement of older aircraft in combination with the relatively high costs for new, replacement aircraft, fuel and maintenance services.

In its annual Aerospace Forecast, the FAA expects the number of active piston GA aircraft to continue to decline at a rate like that of the past decade. Specifically, the decrease in the number of piston aircraft is expected to be 0.9 percent per year and remain at that same rate over the next two decades. The resultant forecast shows total piston aircraft (combined single- and multi-engine) falling from 142,925 in 2018 to 117,280 in 2039. This is reflected in **Figure 3-4** below.

Light sport aircraft represents a relatively new category in FAA aircraft classifications. These small, lightweight aircraft are forecasted to see an increase of 4.2 percent a year in hours flown, primarily driven by growth in the fleet.

Figure 3-4: Active General Aviation Piston Aircraft 2010-2039



Source: FAA Aerospace Forecast 2019-2039

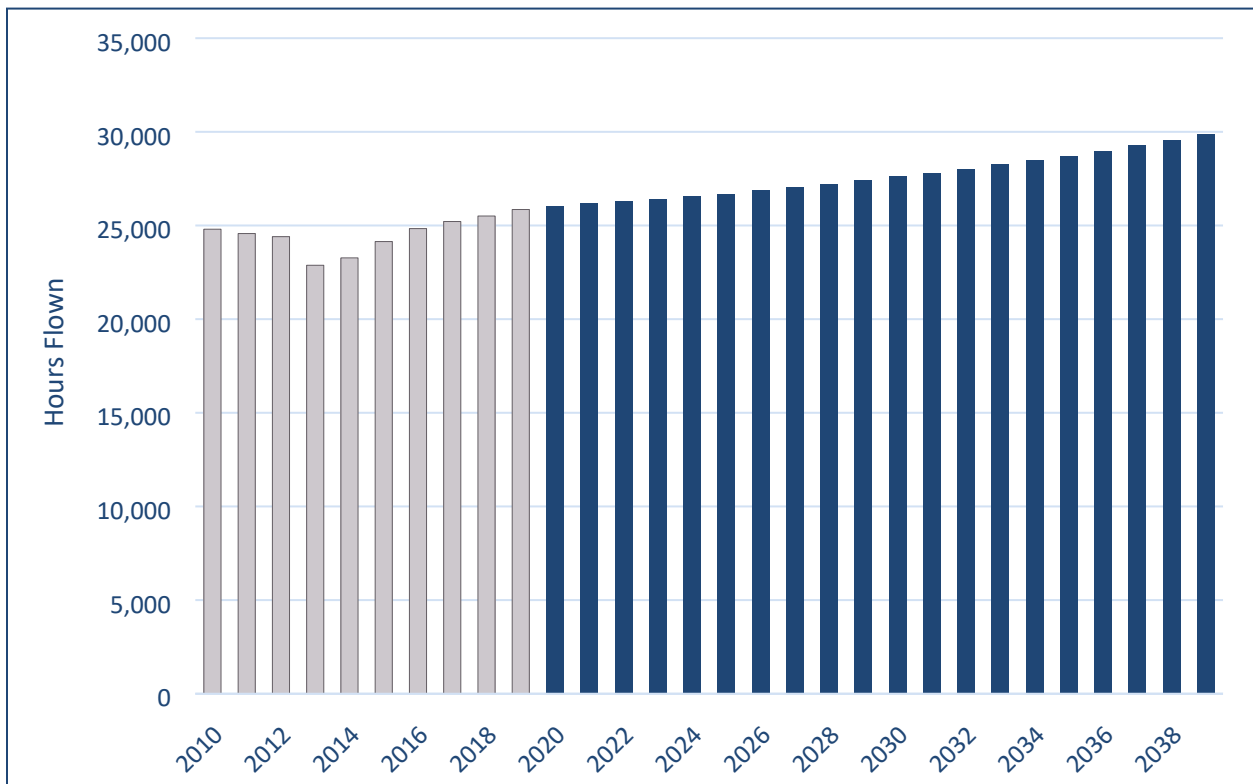
Note: Historical years are in gray

3.3.3.3 Other Forecasted Metrics

The FAA also tracks and projects an important metric known as Active GA and Air Taxi Hours Flown. This captures several activity-related data including aircraft utilization, frequency of use, and duration of use. From 2010 to 2018, hours flown in GA piston aircraft experienced a slight decline (0.3 percent annual average), which is expected to continue at an increasing rate over the 20-year planning period (1.0 percent annual average). Conversely, turboprop and jet aircraft hours flown are expected to continue to grow at relatively high rate of 2.3 percent on average annually from 2019 to 2039.

Figure 3-5 below depicts historical GA and air taxi hours flown from 2010 through 2018 as well as projected hours flown through 2039. Total hours flown by GA and air-taxi aircraft are estimated to reach 30.3 million by 2039, compared to 25.6 million in 2018. As shown in the graph, a decline was experienced from 2011 to 2013 spurred by the economic recession, much of which was realized by piston aircraft owners. However, since that time, hours flown totals have recovered and the FAA currently projects a steady increase of 0.46 percent on average through 2039. When comparing this to the FAA projected average annual growth rate of the GA active fleet (0.8 percent average annual growth rate), the difference represents an anticipated decrease in aircraft utilization.

Figure 3-5: Historical and Projected Total U.S. General Aviation and Air Taxi Hours Flown 2010-2039



Source: FAA Aerospace Forecast 2019-2039

Note: Historical years are in gray

3.3.3.4 Summary of National General Aviation Trends

The following excerpt from the *FAA Aerospace Forecast 2019-2039* summarizes the overall GA market:

The long-term outlook for general aviation is stable to optimistic, as growth at the high-end offsets continuing retirements at the traditional low end of the segment. The active general aviation fleet is forecast to remain relatively level between 2019 and 2039. 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 continues to shrink over the forecast. Against the stable fleet, the number of general aviation hours flown is projected to increase an average of 0.8 percent per year through 2039, as growth in turbine, rotorcraft, and experimental hours more than offset a decline in fixed wing piston hours.

Incentivized by time savings efficiencies and benefits, demand for business aviation is anticipated to far exceed that of private or recreational aviation, where the rising costs associated with aircraft operations and pilot proficiency have suppressed demand. This simply means that business aviation in the form of turboprops and jets will grow faster than that of piston aircraft, with an average annual growth of approximately 2 percent. But even with the projected robust growth in turbine aircraft, that increase is not anticipated to offset the entire decline of piston aircraft during the 20-year forecast. This will result in a slight overall decline of total GA aircraft of 0.04 percent annually on average per year through 2039.

3.4 Historical and Current COS Aviation Activity

Historical enplanement, cargo, operations and based aircraft data for COS provide the baseline from which future activity at the Airport can be projected. While historical trends are not always reflective of future periods, historical data can provide insight into how local, regional, and national demographic and aviation-related trends may be tied to a given airport. The following sections include historical overviews of COS's enplaned passengers (passengers boarding commercial flights departing COS), cargo (landed weights), aircraft operations (generally defined as either an aircraft landing or departure; thus, a takeoff and a landing would count as two operations), and based aircraft (generally defined as an aircraft that is permanently stored at an airport).

As a commercial service airport, COS collects and maintains detailed enplanement records for carriers using the Airport. These records have been utilized for reviewing historical enplanement activity at the Airport. For purposes of forecasting and determining related facility requirements, it is assumed that deplanement activity (passengers arriving on flights to COS) is equivalent to enplaned passengers. This method of passenger forecasting is consistent with FAA guidance and common practices.

Similar to passenger activity, COS management regularly records air cargo activity based on the "landed weight" of cargo aircraft that includes the weight of the aircraft, as well as its fuel and cargo. "Cargo service" airports are classified as such by being served by aircraft providing air transportation of only cargo with a total annual landed weight of more than 100 million pounds, in addition to any other air transportation services that may be available at the airport. With over 100 million pounds of landed weight on a regular basis, COS is categorized by the FAA as a cargo service airport as well as a commercial service airport.

Since COS has a dedicated staff for operations, planning and statistics, it has a formal mechanism for counting, recording and storing airport operations on a regular basis. That information is ultimately posted on the Airport website and provided to the FAA for storage in a centralized federal database for use by the FAA in the development of a Terminal Area Forecast (TAF) for the Airport. While Airport records are the primary source for historical activity, other sources can be utilized to establish and verify the historical activity records for COS including the following:

- FAA Terminal Area Forecast (TAF) data for COS (*Forecast Issued January 2020*)
- COS FAA 5010 Data (Inspection date 8/13/20)
- FAA Air Traffic Activity Data System (ATADS)
- FAA Traffic Flow Management System Counts (TFMSC)

3.4.1 Passenger Trends

Passenger activity at COS declined at an average annual rate of 1.3 percent between 2001 and 2019; however, when focusing more on recent historical activity, enplanements have had robust growth of 6.4 percent annual since 2014 (see **Table 3-4**). This is an indication that, despite recent shifts in airline operations at COS (prior to 2008, COS consistently enplaned over 1 million annual passengers), the region has the economic bases to support growing demand for commercial passenger service.

Table 3-4: Total Annual Enplanements 2001 - 2019

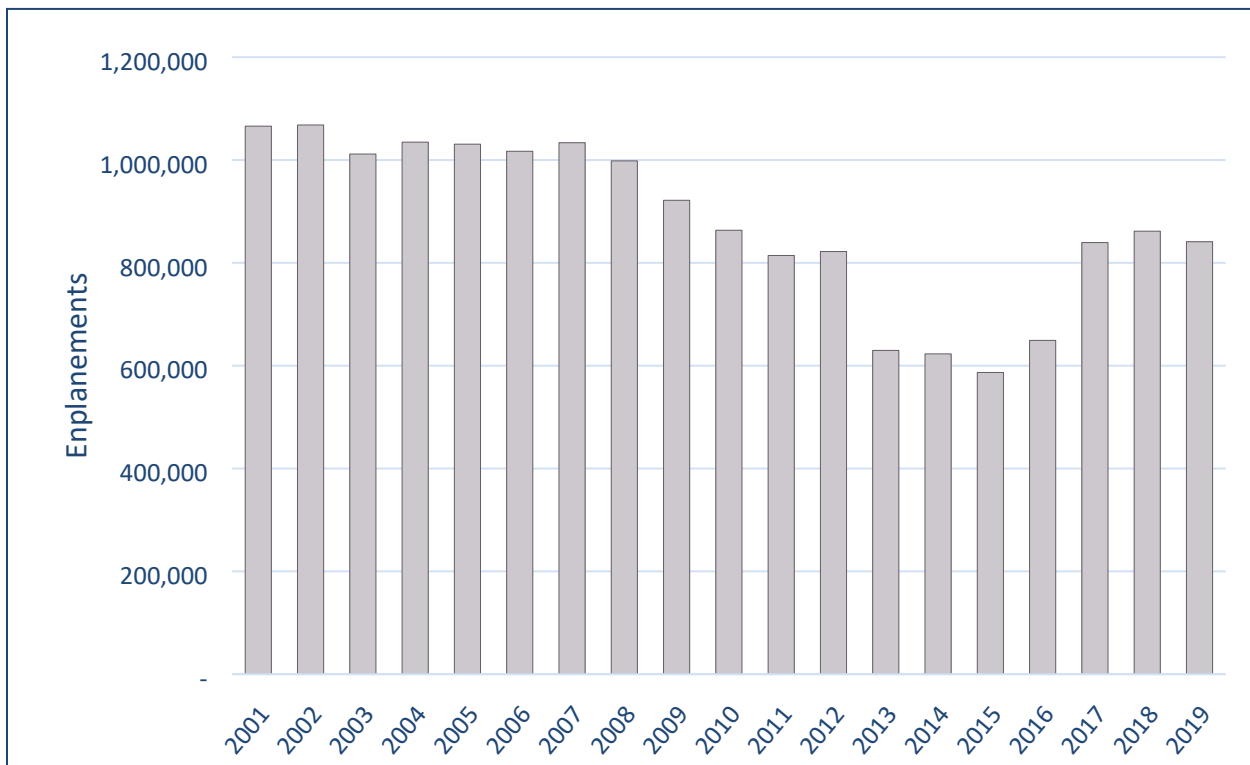
Year	Total Enplanements	Annual % Change
2001	1,065,854	
2002	1,068,157	0.2%
2003	1,011,643	-5.3%
2004	1,034,747	2.3%
2005	1,030,833	-0.4%
2006	1,017,016	-1.3%
2007	1,033,586	1.6%
2008	998,347	-3.4%
2009	921,681	-7.7%
2010	863,407	-6.3%
2011	814,336	-5.7%
2012	822,008	0.9%
2013	629,711	-23.4%
2014	622,982	-1.1%
2015	586,783	-5.8%
2016	649,190	10.6%
2017	839,438	29.3%
2018	861,625	2.6%
2019	841,059	-2.0%
Average Annual Growth Rates		
2001 – 2010	-2.3%	
2014 - 2019	6.2%	
2001 - 2019	-1.3%	

Source: Airport records

There have been several fluctuations in passenger activity at COS over the last 20 years spurred by the entrance and exit of Alaska Airlines and Allegiant, various levels of service provided by Frontier Airlines, changes in the patterns and level of regional airline activity, industry wide changes, and multiple events within the national economy.

At its peak, COS was served by 10 different scheduled commercial air carriers. After eight years of consistent activity and static growth from 2001 to 2008 at COS, airline mergers and consolidation led to an eight-year period of overall decline in enplanements. From 2008 to 2015, enplanements declined by over 40 percent (see **Figure 3-6**).

Figure 3-6: Historical Annual Enplanements 2001-2019



Source: Airport records

Additionally, when historical enplanements are analyzed by carrier, a shift in the carriers serving COS over the last 20 years can be recognized. The scheduled commercial passenger airlines serving COS and their annual enplanements are presented in **Table 3-5**.

However, since 2015, COS has begun to experience a recovery in its enplanements with the re-entrance of Frontier Airlines into the market in April 2016. By 2017, enplanements jumped 29.3 percent over 2016. Unfortunately, consistent with previous operational patterns of significant growth followed by withdrawals from the market, Frontier Airlines has again recently announced they will not be offering seasonal service at COS in 2020. This will likely have a short-term impact on enplanement levels at COS, but it does not diminish the underlying strength of the regional economy to support commercial air service demand given an appropriate level of air service quality and consistency of application.

Today, the Airport is served by four different scheduled commercial air carriers. Small regional carriers have come and gone while large airlines have retained service. As a result, mainline carriers have absorbed

much of the demand for passenger service in the region. American and United Airlines have long held a dominant role at COS, accounting for over 65 percent of enplanements in 2019. Delta Airlines has had declining enplanements throughout most of the past 20 years at COS.

Although airlines at COS have had wide and varied levels of enplanements, the expected growth in population and economic fundamentals throughout the market area will ultimately drive air carriers to increase their levels of passenger service.

Table 3-5: Total Annual Enplanements 2001 – 2019 by Airline

Year	Alaska	Allegiant	American	America West	Continental Express	Delta	Express Jet	Frontier	Great Plains	Mesa	Midwest	Northwest	US Airways	United	Vanguard	Charters	Total
2001			306,505	100,481	60,890	223,108			2,465	6,833		68,021		284,446	1,518	11,587	1,065,854
2002		18,152	275,207	97,701	71,957	198,886			13,052	5,085		66,214		283,933	26,635	11,335	1,068,157
2003		35,825	207,125	107,470	69,366	187,741			2,772	5,179		78,327		317,321		517	1,011,643
2004		37,440	173,322	107,428	69,767	222,155				4,643		86,261		332,448		1,283	1,034,747
2005		30,697	218,984	119,326	70,481	166,993				4,333		84,471		334,426		1,122	1,030,833
2006		35,224	234,930		79,723	139,485				2,886		77,794	94,078	351,779		1,117	1,017,016
2007		33,281	236,423		76,534	137,849	44,345				11,719	79,368	91,746	321,194		1,127	1,033,586
2008		33,543	213,341		71,763	105,057	48,050	62,316			4,793	72,884	82,577	302,857		1,166	998,347
2009		32,673	208,535		71,827	87,547		103,964				48,034	65,448	302,857		796	921,681
2010		38,258	190,462		70,194	127,924		110,371					517	325,112		569	863,407
2011		41,855	178,324			107,864		104,961						379,454		1,878	814,336
2012		38,834	177,505			96,392		154,743						352,371		2,163	822,008
2013	2,908	25,962	174,186			84,262								340,621		1,772	629,711
2014	21,121	29,771	180,342			82,410								306,916		2,422	622,982
2015	20,789	34,220	168,710			76,575								286,489			586,783
2016	21,953	29,221	167,565			77,488		66,516						286,447			649,190
2017	18,849	22,527	201,625			78,068		232,302						286,067			839,438
2018		3,796	240,036			72,253		259,946						285,594			861,625
2019			232,580			76,463		214,659						317,357			841,059

Source: Enplanements reported by airlines

3.4.1.1 Origin-Destination Passenger Base

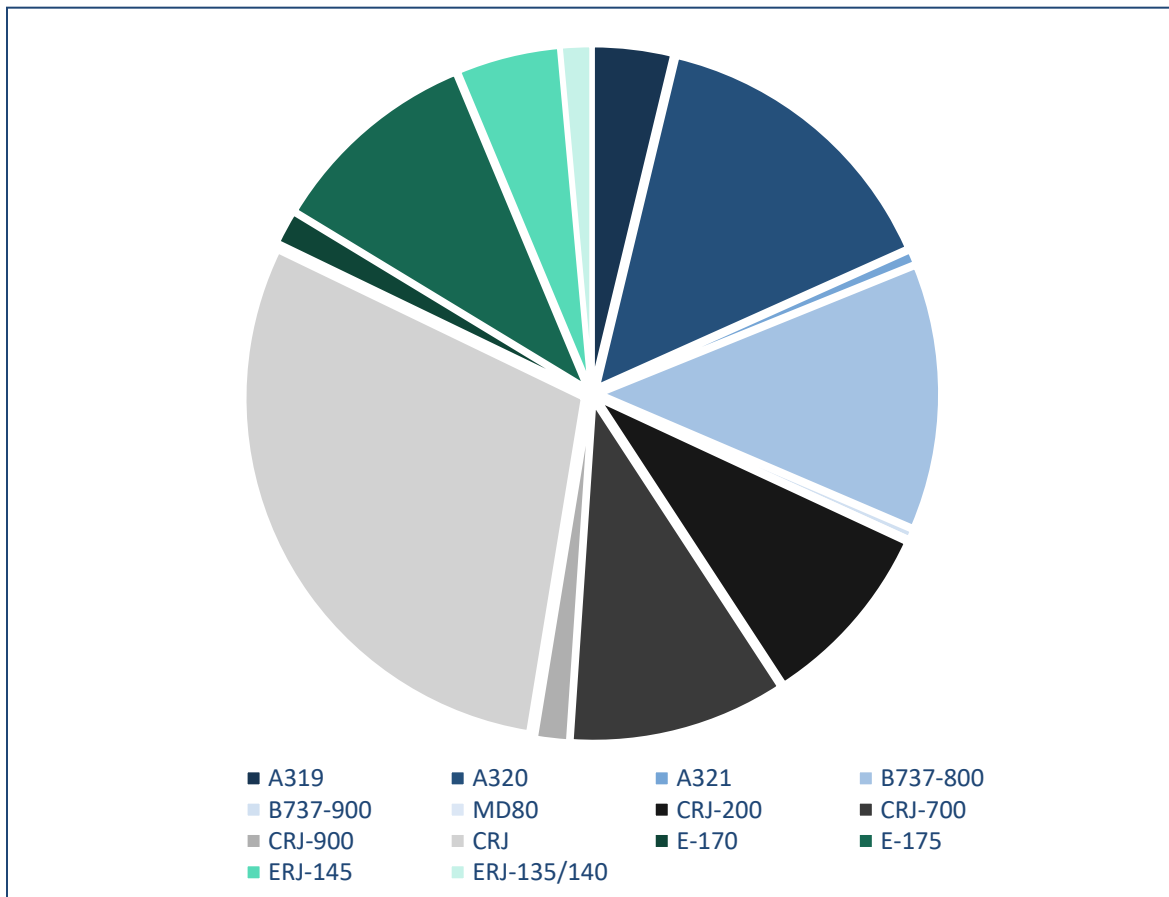
COS is primarily an origin-destination (O&D) airport, meaning that most enplaned passengers originate their air travel at COS and most deplaned passengers terminate the air travel at COS. Over 90 percent of the Airport's enplaned passengers originate in Colorado Springs, with less than 10 percent of passengers connecting onto other aircraft at COS.

Based on U.S. Department of Transportation statistics, the most common destinations for passengers traveling from COS in the first quarter of 2019 included airports located in Atlanta, Dallas, Denver, Houston, Los Angeles, Chicago, and Salt Lake City, all of which are also hubs for the major air carriers serving COS. As with most hub-and-spoke systems employed by the major air carriers, many passengers start their air travel at a spoke airport like COS and connect onto another aircraft at a hub airport in order to get to their final destination. That process is reversed for passengers arriving at COS.

3.4.1.2 Commercial Passenger Fleet Mix

The passenger airline fleet serving COS is made up primarily of narrowbody and regional jet aircraft. A breakdown of passenger aircraft serving COS in 2019 is provided in **Figure 3-7**. (Note that although the CRJ, E and ERJ aircraft are classified as regional jets, some may meet or exceed the 60-seat capacity and be classified as an air carrier aircraft and not air taxi, by FAA definition.)

Figure 3-7: Passenger Carrier Fleet 2019



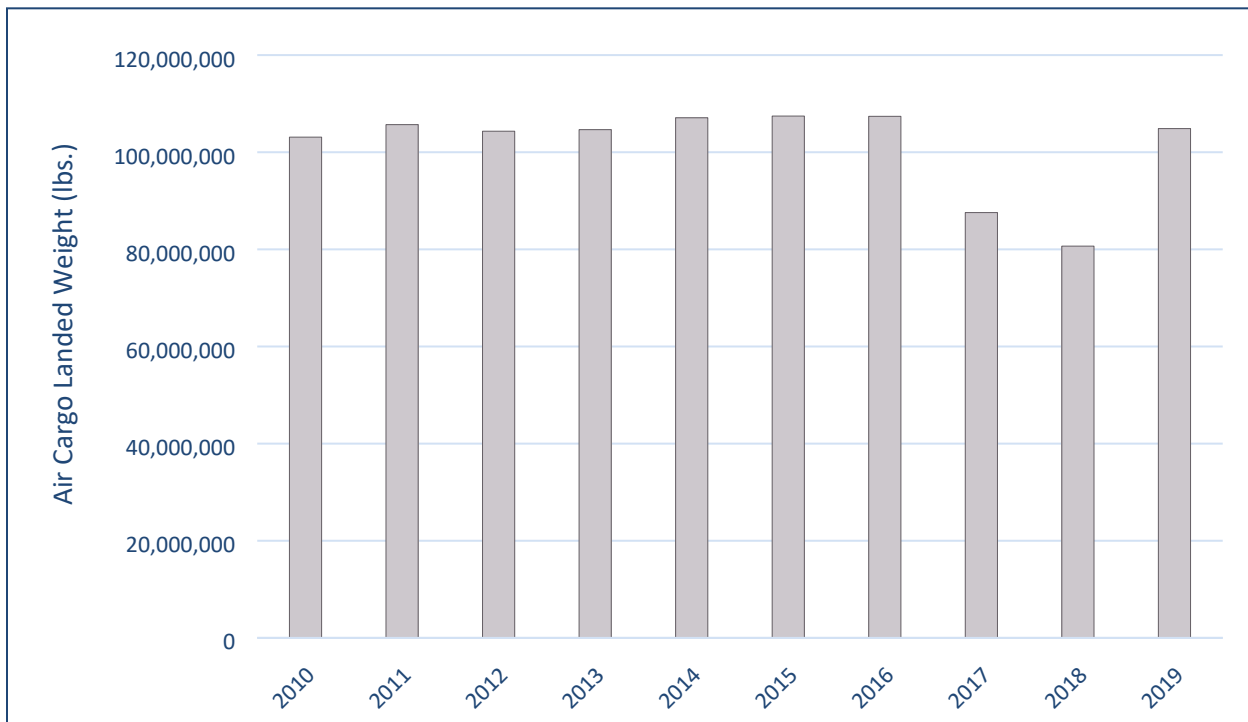
Source: Colorado Springs Airport

Note: "CRJ" represents a general classification with no model number provided.

3.4.2 Cargo Activity

COS projects that it will accommodate over 104 million pounds of landed weight in air cargo in 2019 (Dec 2019 estimated), up from 80.6 million in 2018 which itself was the lowest amount in 10 years (see **Figure 3-8**). Despite the economic recession of the late 2000s and subsequent recovery, the overall past 10 years of cargo activity at COS has remained consistent with a 0.2 percent average annual increase. FedEx serves COS with multiple cargo flights per day, accounting for 95 percent of the Airport's landed cargo weight. FedEx operates a fleet of widebody aircraft including Boeing 757 (majority), 767, and 777 as well as DC-10 and MD-11 aircraft. A small percentage of landed weight is carried by Key Lime Air using Fairchild Swearingen Metro aircraft.

Figure 3-8: Historical Landed Weight 2010 - 2019



Source: Airport records

3.4.3 Aircraft Operations

Annual aircraft operations represent the number of aircraft takeoffs and landings occurring at an airport during a calendar year. Colorado Springs Airport serves a wide range of users and classifies airport operations by air carrier, air taxi, GA, and military. The historical operations data for the Airport includes operations conducted both by based aircraft, and itinerant aircraft (i.e., those aircraft arriving from or departing to airports outside the local area).

The basis for COS's historical operational counts is the records maintained by Airport management, which is considered to be the best airport operational data currently available since it is based on actual aircraft operations counted by staff. Using data provided by the Airport, **Table 3-6** and **Figure 3-9** show historical aircraft operations for COS broken down by aircraft operational categories, as detailed in the following:

3.4.3.1 Air Carrier

Air carrier operations are those performed by passenger and all-cargo airlines serving the Airport. Included are scheduled flights, charter flights (including those commercial aircraft destined for the Department of Defense's Arrival/Departure Airfield Control Group (A/DACG) facility), diverted flights, and ferry operations (empty flights). The FAA defines an air carrier aircraft, for traffic counting purposes, as capable of carrying more than 60 passengers.

Over the past 20 years, air carrier operations at COS have declined 3.5 percent annually and are currently almost half of what they were in 2001. However, operations in this category have recently stabilized and experienced some indications of recovery since 2014.

3.4.3.2 Air Taxi

Air taxi and commuter operations consist of unscheduled operations of "for hire" air taxis and the scheduled operations of commuter airlines, including regional affiliate airlines operating aircraft with less than 60 seats.

During the 2000s, air taxi operations ranged between 20,000 and 30,000 per year. As part of the decline in commercial service operations at COS, these operations have likewise experienced a decline, currently ranging between 10,000 and 20,000 annually. A contributing factor to this decline is the transition that regional and commuter airlines are making from 50-60 passenger seat aircraft to 70+ passenger seat aircraft, which effectively puts larger commuter aircraft into the air carrier category.

3.4.3.3 General Aviation

As discussed earlier, GA operations encompass all civil aircraft operations not classified as air carrier or air taxi and commuter operations. GA operations have been the most dominant category of aircraft operations at COS over the past 20 years. Similar to the air carrier category, GA operations today are roughly half of what they were in 2001. However, since 2014, GA operations have experienced robust growth of 4.1 percent annually.

3.4.3.4 Military

Military flights at COS include missions and training operations to/from Peterson Air Force Base (PAFB) as well as exercises that use the facilities at COS that may not be based at PAFB. PAFB is home to the North American Aerospace Defense Command (NORAD), 21st Space Wing, 302nd Airlift Wing and centers of military operations. Military aircraft activity levels are dictated by national defense objectives but have seen steady average growth of 2.3 percent annual over the past 20 years.

Table 3-6: Historical Aircraft Operations 2001-2019

Year	Air Carrier	% Air Carrier	Air Taxi	% Air Taxi	General Aviation	% General Aviation	Military	% Military	Total	Annual % Change
2001	25,783	13%	17,423	8%	140,954	68%	22,061	11%	206,221	
2002	22,932	11%	26,381	12%	144,024	66%	24,829	11%	218,166	5.8%
2003	19,571	10%	28,609	14%	105,525	53%	46,831	23%	200,536	-8.1%
2004	18,467	11%	30,684	18%	92,090	53%	33,668	19%	174,909	-12.8%
2005	20,618	12%	27,466	17%	88,295	53%	29,532	18%	165,911	-5.1%
2006	20,162	14%	23,475	17%	74,729	53%	22,592	16%	140,958	-15.0%
2007	20,338	13%	21,497	14%	88,330	57%	25,523	16%	155,688	10.4%
2008	22,742	16%	20,291	14%	73,286	50%	29,014	20%	145,333	-6.7%
2009	20,017	14%	18,318	13%	68,250	47%	38,427	26%	145,012	-0.2%
2010	19,116	14%	17,833	13%	59,124	42%	43,974	31%	140,047	-3.4%
2011	18,831	15%	16,076	13%	55,750	44%	36,107	28%	126,764	-9.5%
2012	17,952	13%	15,013	11%	58,218	43%	42,887	32%	134,070	5.8%
2013	14,521	11%	13,712	11%	60,331	47%	39,092	31%	127,656	-4.8%
2014	13,535	10%	13,830	11%	57,530	44%	45,498	35%	130,393	2.1%
2015	13,921	11%	9,870	8%	57,530	45%	45,498	36%	126,819	-2.7%
2016	12,912	10%	12,287	9%	61,307	47%	43,848	34%	130,354	2.8%
2017	13,628	11%	12,198	10%	59,980	48%	39,576	32%	125,382	-3.8%
2018	13,263	10%	13,418	11%	63,913	50%	37,072	29%	127,666	1.8%
2019	13,566	10%	15,248	12%	70,433	53%	32,977	25%	132,224	3.6%
Average Annual Growth Rate										
2001 – 2010	-3.3%		0.3%		-9.2%		8.0%		-4.2%	
2014 – 2019	0.0%		2.0%		4.1%		-6.2%		0.3%	
2001 – 2019	-3.5%		-0.7%		-3.8%		2.3%		-2.4%	

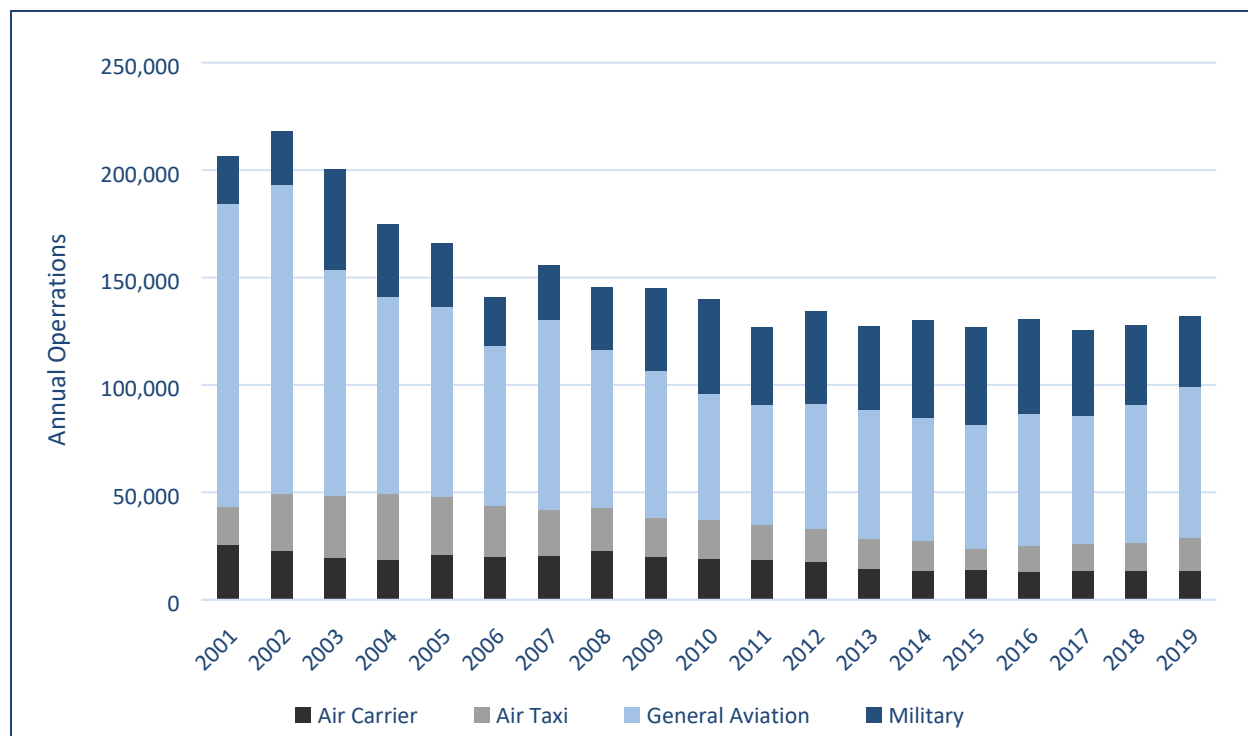
Source: Airport records

Note that the share of each aircraft category as a percent of the total number of operations is shown in the table above. This is an important consideration in forecasting future operations because the historical trends and future projections on the share of each category will help determine the number of forecasted operations in each category.

Over the past 20 years, the share of air carrier operations at COS have generally declined but steadied at 10-11 percent over the past seven years. Since 2015, the share of air taxi operations at COS have grown from 8 percent to 12 percent of total operations. Similarly, the share of GA operations at COS has grown 9 percent over the past six years. Military operations at COS, although a significant part of COS activity, have started to decline as a share of total operations since 2015.

Although the share of operations within each category have changed over time, they follow patterns that can be extended into future years or allow for variations given the anticipated profile of activity at COS. Projections of the continuing market share trends of operations at COS will be applied to future operational projections. Changes in future market share will be based anticipated changes in the airline industry, classifications of air taxi/commuter aircraft, growing interest of GA at COS, and possible wing/unit growth of Peterson AFB.

Figure 3-9: Annual Operations by Category 2001-2019



Source: Airport records

3.4.4 Based Aircraft

Historically, the number of based aircraft at Colorado Springs Airport, as reflected in the FAA Terminal Area Forecast (TAF) database, have seen a shallow incline over the past 20 years (see **Table 3-7**). Because COS is considered a primary airport, it does not follow the requirements of the National Based Aircraft Inventory Program.

Table 3-7: Historical Based Aircraft 2001-2019

Year	Based Aircraft	Year	Based Aircraft
2001	239	2010	246
2002	172	2011	246
2003	169	2012	284
2004	261	2013	230
2005	261	2014	230
2006	292	2015	194
2007	292	2016	250
2008	292	2017	242
2009	292	2018	247
		2019	252
Average Annual Growth Rates			
2001 – 2010			0.3%
2014 – 2019			1.8%
2001 – 2019			0.3%

Source: FAA TAF

The current breakdown of based aircraft at COS (shown in **Table 3-8**) is provided in the Airport's Master Record (Form 5010) and deviates slightly from the TAF records shown above. Most based aircraft are small, single engine piston aircraft and encompasses a wide variety of uses including small business flights, recreational/private flying, flight training, and other activities. Multi-engine piston and jet aircraft represent most business and corporate based tenants.

Table 3-8: Breakdown of COS Based Aircraft

Type	Based Aircraft
Single Engine	148
Multi-Engine	40
Jet/Turboprop	32
Helicopter	5
Gliders/Other	1
Military	25
Total	251

Source: COS Airport Master Record (Form 5010)

3.5 Forecast Methodologies

Projections of aviation activity are typically generated by employing historical data, incorporating assumptions, and considering likely future conditions and trends. In truth, forecasting of any type is as much an "art" as a "science", and no matter how sophisticated, it represents an "educated" estimation rooted in the prevailing conditions at the time they are created. Therefore, forecasts must be updated periodically and revised as necessary to reflect new conditions and developments.

During a master planning effort, aviation activity forecasts are typically established by using a variety of assumptions that result in a wide range of outcomes. This is intentionally done in order to provide a broad view of future airport utilization potentials. Once that broad view has been established, then a careful examination of those assumptions can be undertaken to determine which could be most reasonably applied given that airport's current situation.

For COS, several forecasts were developed based on a variety of different analytical techniques including direct correlation projections, regression analyses, a market share analysis, and various trendline analyses. Consistent with industry standards, these methodologies incorporate national trends and consider the FAA's Terminal Area Forecast to create projections for COS aircraft activity categories including **passenger enplanements, air cargo, aircraft operations, and based aircraft**. Not all methodologies are applicable to each category and may be duplicative with other methodologies. From the methodologies used for each category of activity, *a select group of projections was chosen to represent low, medium, and high growth scenarios*. A description of each methodology and the category of activity it applies to are discussed below.

- **FAA Terminal Area Forecast (TAF) (2019-2039):** The TAF is the official FAA forecast of aviation activity for U.S. Airports, both in aggregate and individually. It addresses historical and forecasted airport operations, based aircraft, enplanements, and air cargo tonnage. This methodology applies to all categories of activity.

- **Colorado Airport System Plan (CASP) Forecasts 2018-2038 (Operations and Based Aircraft AAGR):** The 2020 CASP included enplanement, operational and based aircraft forecasts for airports throughout Colorado. These are based on local and regional data from socioeconomic and aeronautical sources. This methodology applies to operations and based aircraft categories of activity.
- **FAA Historical Scheduled Domestic Passenger Traffic 2010-2018 (FAA Aerospace Forecasts FY 2019-2039):** FAA Aerospace Forecasts for the U.S. are published annually and developed using statistical models to explain and incorporate emerging trends of the different aviation sectors. This forecast is based on historical enplaned passenger traffic growth or decline percentages. This methodology applies to enplanement projections.
- **FAA Forecast Scheduled Domestic Passenger Traffic 2019-2039 (FAA Aerospace Forecasts FY 2019-2039):** FAA Aerospace Forecasts are published annually and developed using statistical models to explain and incorporate emerging trends of the different aviation sectors. This methodology is based on projected domestic passenger traffic growth or decline percentages and applies to enplanement projections.
- **FAA Active General Aviation and Air Taxi Total Hours Flown (FAA Aerospace Forecasts FY 2019-2039):** This forecast includes all general aviation and air taxi hours which include both piston and turbine aircraft. Note that air taxi includes general aviation air charter operations and applies to operations and based aircraft projections.
- **FAA Active General Aviation and Air Taxi Turbine Hours Flown (FAA Aerospace Forecasts FY 2019-2039):** This forecast includes all general aviation and air taxi hours flown for turbine aircraft only. Note that air taxi includes general aviation air charter operations and applies to operations and based aircraft projections.
- **FAA Forecast of Jet Fuel Prices 2019-2039 (FAA Aerospace Forecast FY 2019-2039):** This forecast is based on projected growth or decline rates of Jet Fuel (Jet-A) pricing during the 20-year forecast period within the United States. This methodology applies to all categories of activity.
- **Jet-A Fuel Flowage Forecast (FAA Aerospace Forecast FY 2019-2039):** This forecast is based only on Jet-A fuel estimated to be pumped nationally during the forecast period. Jet-A is the fuel utilized by turbine aircraft, including all commercial passenger air carriers at COS. This methodology applies to all categories of activity.
- **Total Combined Fuel Flowage Forecast (FAA Aerospace Forecast FY 2019-2039):** This forecast is based on combined totals of Jet-A and 100LL fuel estimated to be pumped nationally during the forecast period. Jet-A is the fuel utilized by turbine aircraft while 100LL is the fuel utilized by piston-powered aircraft. This methodology applies to all categories of activity.
- **Active General Aviation Aircraft (FAA Aerospace Forecast FY 2019-2039):** This forecast is based on all estimated levels of active general aviation aircraft operating in the United States during the forecast period. This methodology applies to based aircraft projections.
- **FAA Forecast Active Turbine Aircraft (FAA Aerospace Forecast FY 2019-2039):** This forecast is based on estimated levels of active turbine general aviation aircraft operating in the United States during the forecast period. This methodology applies to all categories of activity.

- **Market Area Historical Population Growth 2000-2019:** This forecast is based on growth rates from Colorado DOLA historical population data for the airport market area which includes both El Paso and Teller Counties. This methodology applies to all categories of activity.
- **Market Area Forecasted Population Growth 2019-2039:** This forecast is based on growth rate founded on forecasted Colorado DOLA population data for the airport market area. This methodology applies to all categories of activity.
- **Market Area Historical Employment 2000-2015:** This forecast is based on growth rates from Colorado DOLA historical employment data for the airport market area. This methodology applies to all categories of activity.
- **Market Area Forecasted Employment 2020-2040:** This forecast is based on growth rates from Colorado DOLA forecasted employment data for the airport market area. This methodology applies to all categories of activity.
- **Woods and Pool - Monte Carlo Simulation Forecast:** A Monte Carlo simulation was utilized to model the probable forecasted result when combining all Woods and Poole socioeconomic data elements. Note that a Monte Carlo simulation generally is a process in which random numbers are used to approximate a solution rather than fitting an equation to the data or simply projecting relevant growth rates. This process is a simulative method as opposed to an explicit solution and allows for the evaluation of probability for any outcome. 10,000 simulation runs were carried out to establish this methodology and have been applied to all activity categories.
- **FAA Historical ATADS - Monte Carlo Simulation Forecast:** This simulation rate was based on historical FAA air traffic data for COS. As above, 10,000 simulation runs were carried out to establish this methodology and have been applied to all activity categories.
- **Monte Carlo Simulation Forecast Average:** This forecast was based on a combination of both the Woods & Poole socioeconomic and COS ATADS data elements. This approach was employed as a means of weighing and balancing the actual historical operational trends at the Airport with the anticipated regional socioeconomic patterns. As above, 10,000 simulation runs were carried out to establish this methodology and have been applied to all activity categories.
- **Trend Analysis:** This forecast methodology assumes that the historical trend of activity in each category will continue. This methodology may be applied to all activity categories based on the reasonableness of the projection given expected national industry trends and an understanding of local influencing factors.

3.6 Projections of Passenger Enplanements

3.6.1 Projection Assumptions

In developing the projections of enplaned passengers at COS the following assumptions were made:

- The quality of service will improve at COS, particularly with expanded service to medium-haul domestic markets and low fare carrier service, thereby stimulating traffic in many COS O&D markets.

- The major U.S. airlines will maintain hub operations at their primary U.S. airports; if one or more of the major U.S. airlines were to experience a dramatic change (such as a merger), other carriers will continue to serve the demand associated with the COS market area.
- The existing role of the Airport will remain the same in the future- that is, the growth of Airport's use will be reflective on the growth of the market area.
- Frontier Airlines will have a reduced and lessening effect on market area passengers as COS gains additional low fare service and is impacted by the carriers' new fare structures.
- The Airport's level of air service and traffic will continue to be based on local demand and O&D in nature; the level of connecting service at COS will continue to be minimal. If an airline located a hubbing operation at COS, it would increase the level of scheduled service at the Airport.
- Little nonstop scheduled international service will be introduced at COS.
- If the Airport could attract one or more high volume low fare carriers (e.g., JetBlue, Southwest Airlines, etc.) to provide extensive service, then an increase in passenger volumes could be expected from an increased propensity of local residents to fly.
- The capacity of the COS airside and groundside facilities will not constrain the realization of air travel potential during the forecast period.

3.6.2 Enplanement Projections

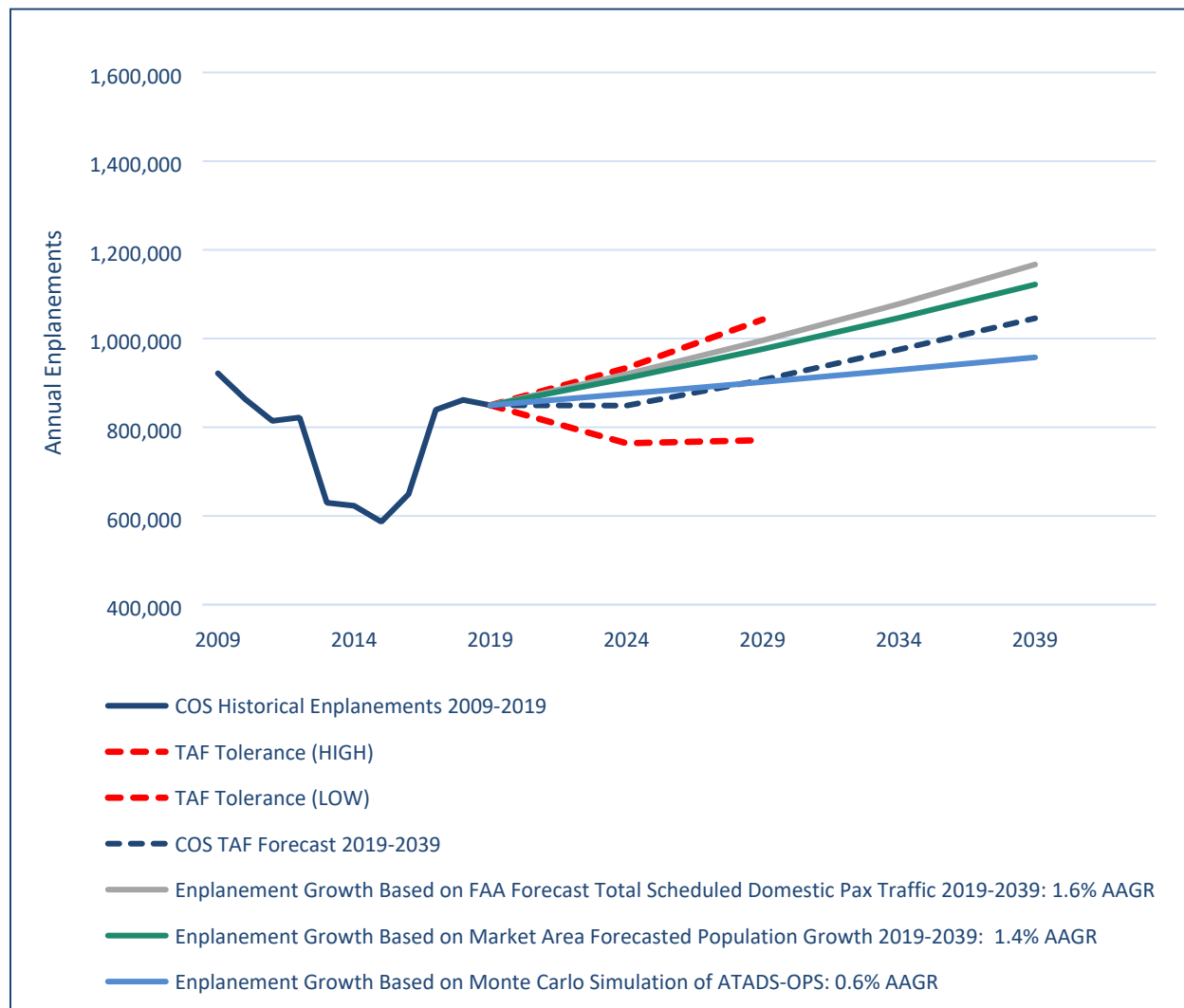
The various methodologies discussed in the previous section were applied to the 2019 base year enplanement levels to produce a series of 20-year projections. This produced a broad range of enplanement projections that range from approximately 884,000 to over 1.4 million passengers by the end of the planning period.

The FAA requires that study-related forecasts show their consistency with the existing TAF or demonstrate the rational for any significant deviation. Specifically, the FAA considers a forecast to be consistent with its TAF for forecasts differing by less than 10 percent within five years of the base forecast year, and 15 percent within 10 years of the base year. The TAF projection, as well as the high and low variance ranges, are reflected in the graph and represented by blue and red dashed lines, respectively.

3.6.2.1 Scenario Based Forecasting

In an effort to narrow the range of forecasting options noted above, three of the forecast scenarios shown in **Figure 3-10** were selected as being representative of the reasonable range of enplanement forecasts available for COS. Note that the COS forecast be portrayed as a "range" in order to better account for the variabilities that are inherent in any forecasting effort.

Figure 3-10: Scenario-Based Enplanement Forecast 2019-2039



Source: Jviation

The three forecasts shown above were selected to represent high-, medium-, and low-growth enplanement forecast scenarios. These are reflected in the following:

1. **High-Growth Scenario** – This scenario is based on the FAA forecast of total scheduled domestic passenger traffic (FAA Aerospace Forecast FY 2019-2039), which represents a 1.6 percent average annual growth rate throughout the 20-year planning period. This forecast is a key indicator of the FAA’s positive national outlook on the growth of passenger activity, including that of air carrier and air taxi operators. Since this projection is focused on passenger levels, it is reasonable to include anticipated national passenger projections as one of the scenarios representing COS’s potential future passenger growth.

This growth scenario projects a total of 1,167,044 enplanements by the year 2039 and represents a return to levels reached in the early 2000s. In order to achieve these levels, large mainline carriers at COS would likely have to open new routes or expand service at COS or a new entrant would have to enter the market.

2. **Medium-Growth Scenario** – This scenario is based on the forecasted population growth in the COS market area, as projected by the Colorado DOLA. The market area forecasted population methodology represents a 1.4 percent average annual growth rate. This forecast applies the expected growth in market area population to the historical COS enplanement data for 2019 to project an expected level of 1,121,946 enplanements by 2039. This scenario is slightly more conservative than the high-growth scenario but would also likely require expanded service at COS that would come with a growth in the local population base. Based on the focus of growth within the region and the integration of population as a common forecasting variable, it is reasonable to include this as one of the scenarios representing COS’s potential future growth.
3. **Low-Growth Scenario** – This scenario is based on the Monte Carlo Simulation on ATADS operations data, represented by a 0.6 percent annual growth rate. Enplanements projected in this scenario would reach 957,575 by 2039 and are only slightly above current levels. This simulation rate was based on historical FAA air traffic data for COS. This projection is consistent with the short-term projections found in the FAA TAF, which assumes that enplanements will remain almost static over the next five years or so. However, in later years, the TAF exceeds this projection.

3.6.2.2 Preferred Enplanement Forecast

The Medium-Growth Scenario (Market Area Forecasted Population Growth) was selected as the preferred forecast since it considers anticipated population growth generated by the Colorado Department of Local Affairs containing a reasonable basis of local and regional input. Population within the region likely has a strong correlation to the demand for air carrier service at COS. As the area expands, so too does the need for reliable, effective air passenger service.

While some area residents may be willing to travel to Denver International Airport (DEN) for additional flight options or more competitive fares, growth in the market area will attract additional service which may counteract the attraction of DEN. As the Denver metroplex expands and travel up the I-25 corridor becomes more congested, traveling to DEN will become less attractive and flight options to/from COS more appealing. The preferred passenger enplanement forecast for short, medium and long-term intervals within the 20-planning horizon is compared to the 2019 FAA TAF for COS in **Table 3-9**.

Table 3-9: Preferred Enplanement Forecast

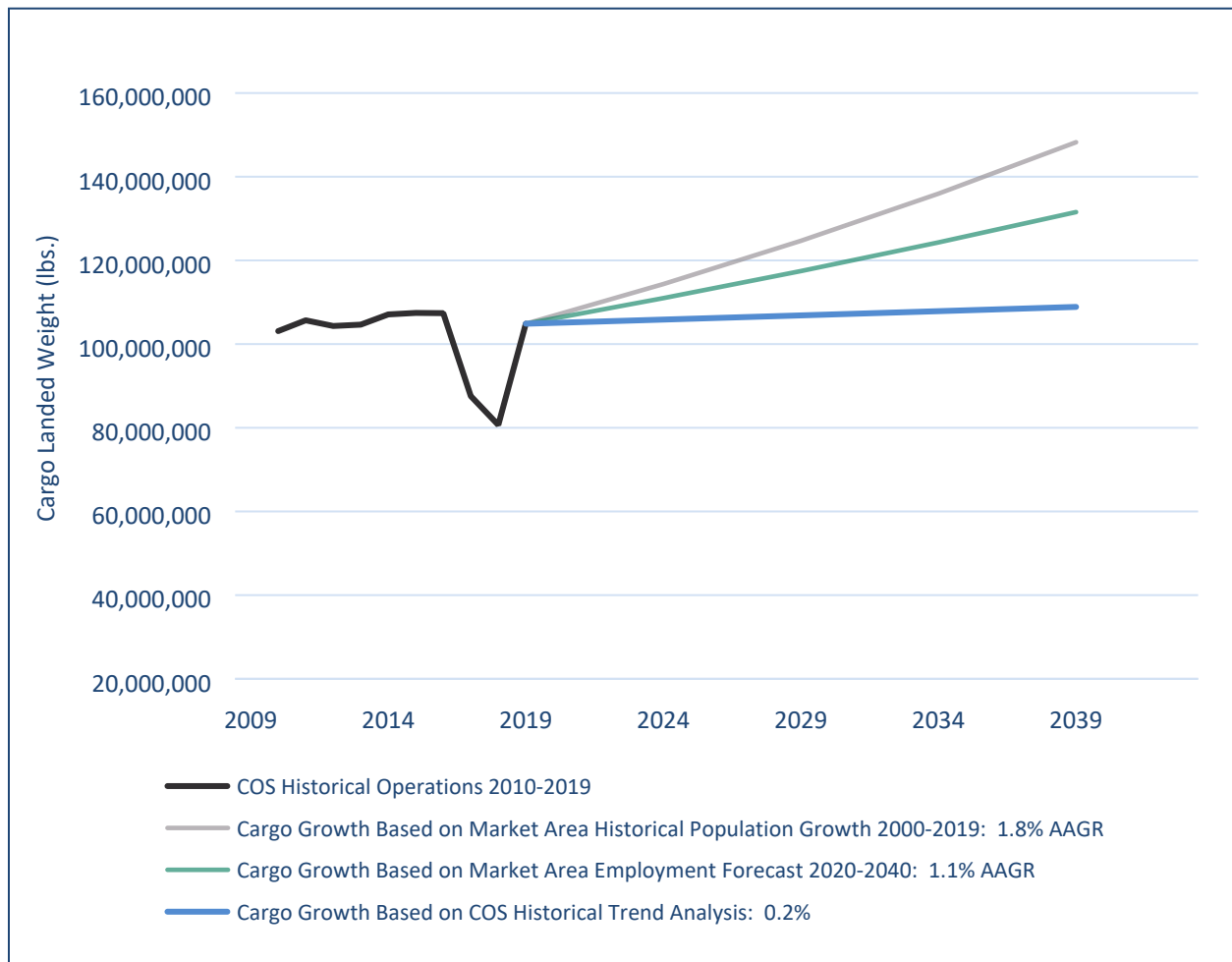
Year	Preferred Forecast	2019 FAA TAF	Variance
2019	849,597	849,597	7.3%
2024	910,757	848,797	7.7%
2029	976,321	906,883	7.3%
2034	1,046,604	975,224	7.3%
2039	1,121,946	1,045,783	7.3%
Average Annual Growth Rate			
2019 - 2039	1.4%	1.0%	

Source: Jviation and FAA TAF

3.7 Projections of Air Cargo Volume

A similar broad range of methodologies applied to enplanement projections were applied to air cargo landed weight in order to forecast 20-year cargo levels at COS. **Figure 3-11** shows the high-, medium-, and low-growth scenarios resulting from the application of those methodologies. The FAA does not forecast individual airport air cargo activity or volume, so TAF projections and recommended tolerances from it, as shown in the enplanement projections, are not shown.

Figure 3-11: Scenario-Based Air Cargo Forecast 2019-2039



Source: Jviation

The three growth scenarios selected for air cargo landed weight are described below:

1. **High-Growth Scenario** – This scenario is based on the historical population growth experienced in the market area from 2000 to 2019 and represents a 1.8 percent average annual growth rate throughout the 20-year planning period. This forecast is indicative of large-scale expansion of the air cargo market in COS and the market area, with possible air cargo hubbing activity or a new entrant. This growth scenario projects a total of almost 150 million pounds of landed weight by the year 2039.

2. **Medium-Growth Scenario** – This scenario is based on the forecasted employment growth in the COS market area, as projected by the Colorado DOLA. The market area forecasted employment methodology represents a 1.1 percent average annual growth rate. This forecast applies the expected growth in market area employment to the historical COS cargo landed weight for 2019 to project an expected level of over 131 million pounds by 2039. This scenario may require expanded service at COS that would come with a growth in the local population and employment base. Based on the focus of growth within the region and the integration of employment as a common forecasting variable, it is reasonable to include this as one of the scenarios representing COS’s potential future growth.
3. **Low-Growth Scenario** – This scenario is based on the continued historical growth trend of landed air cargo weight at COS from 2010 to 2019, resulting in a 0.2 percent annual growth rate. Air cargo volume projected in this scenario would reach almost 109 million pounds of landed weight by the year 2039. This level is only slightly above current levels and represents minor growth by existing carriers.

3.7.1 Preferred Air Cargo Forecast

The Medium-Growth Scenario (Market Area Forecasted Employment Growth) was selected as the preferred forecast since it considers anticipated growth generated by market area businesses (many of which utilize cargo services). Employment within the region likely has a strong correlation to the demand for air cargo service at COS. As the area expands and local businesses grow, so too does the need for reliable, effective air cargo service. The preferred air cargo forecast for short, medium and long-term intervals within the 20-planning horizon is shown in **Table 3-10**.

Table 3-10: Preferred Air Cargo Forecast

Year	Preferred Forecast
2019	104,867,294
2024	110,982,578
2029	117,454,471
2034	124,303,770
2039	131,552,482
Average Annual Growth Rate	
2019 - 2039	1.1%

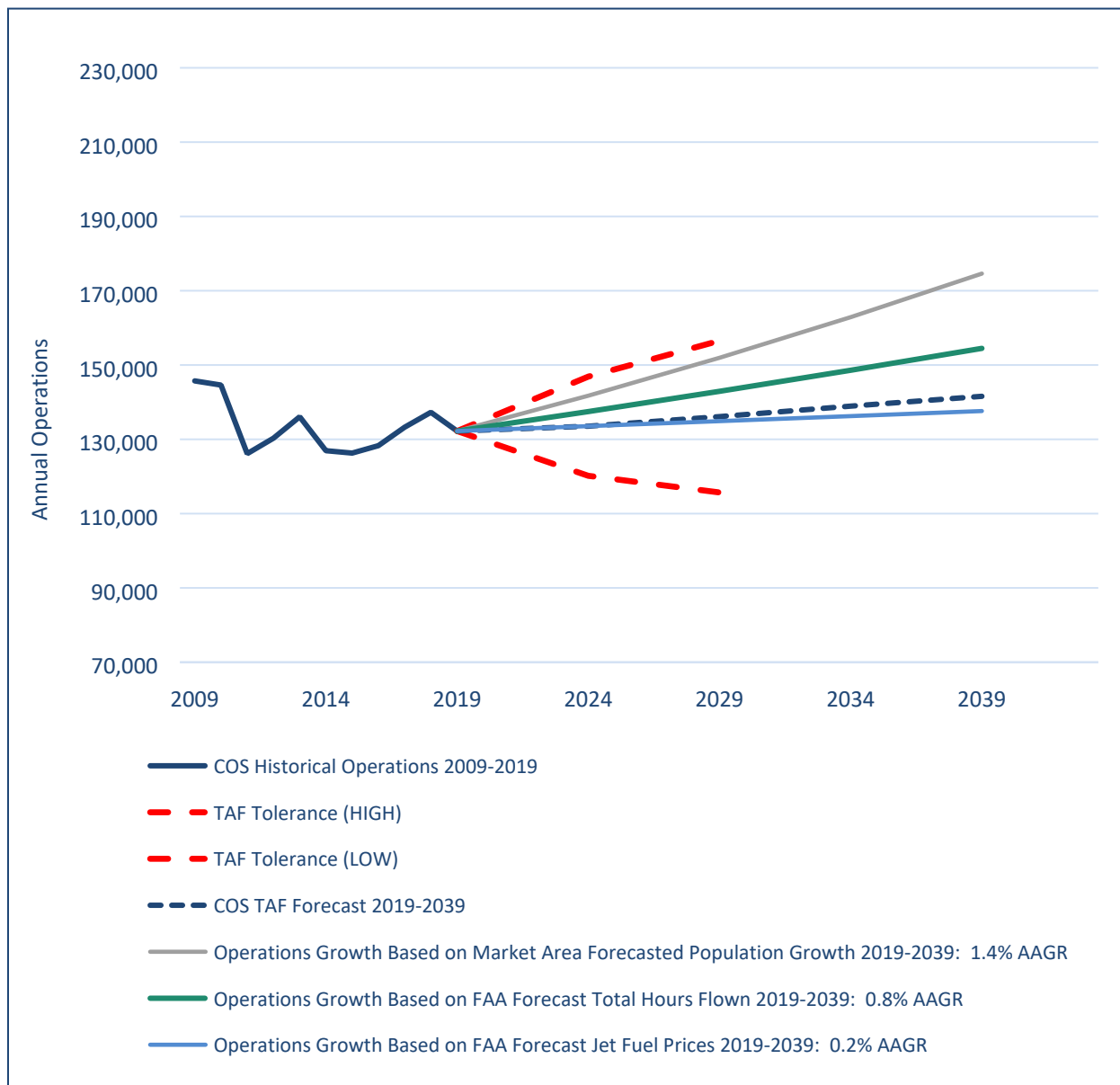
Source: Jviation

3.8 Projections of Aircraft Operations

Generally, the most important activity forecast for airfield planning is the level and type of aircraft demand generated at the airport, which is measured by aircraft operations. An aircraft operation is defined as either a takeoff or a landing of an aircraft, and ultimately serves as the basis for selecting the critical aircraft, discussed later in the chapter.

Based on the forecast methodologies presented in a previous section, aircraft operational forecasts for COS were generated. From those, scenario-based projections were selected and shown in **Figure 3-12** to represent the range of forecasting options.

Figure 3-12: Scenario-Based Aircraft Operations Forecast 2019-2039



Source: Jviation

The three growth scenarios selected for total aircraft operations at COS are described below:

1. **High-Growth Scenario** – This scenario is based on the forecasted population growth for the market area over the 20-year planning period and represents a 1.4 percent average annual growth rate. This forecast assumes aircraft activity at the Airport will grow at a rate consistent with the forecast of enplaned passengers and the number of residents in the market area. Growth of this magnitude would likely be consistent with airline expansion, business jet growth, and increased mission activity from Peterson Air Force Base. This growth scenario projects a total of almost 175,000 total aircraft operations at COS by the year 2039.

2. **Medium-Growth Scenario** – This scenario is based on the FAA’s forecast of total hours flown by all aircraft in the country. It is symbolic of the expected growth of all categories of aviation and incorporates the utilization of aircraft by their owners. The FAA Hours flown methodology represents a 0.8 percent average annual growth rate. This forecast applies the expected growth rate to the current total operation level at COS to project a level of almost 155,000 operations by 2039. This scenario may require some level of expanded service, as well as increased GA and military activity at COS, but to a lesser degree than the high-growth scenario.
3. **Low-Growth Scenario** – This scenario is based on the forecasted increase of jet fuel prices, represented by a 0.2 percent annual growth rate. Total COS aircraft operations projected in this scenario would reach over 137,000 by 2039 and are only slightly above current levels. Aviation activity throughout the country is largely driven by the price of jet fuel, which is why this methodology is included. This scenario suggests that operations at COS rise slowly, essentially leading one to believe that the cost of operating aircraft and the tolerance aircraft owners are willing to accept will be consistent throughout the planning period. Although conservative, this projection is consistent with projections found in the FAA TAF.

3.8.1 Preferred Operations Forecast

The High-Growth Scenario (Market Area Forecasted Population Growth) was selected as the preferred forecast since it considers anticipated growth of the region as a whole and includes all categories of activity at COS. While some categories of activity at COS may decline throughout the 20-year planning period, others may increase and counteract the declining segment.

Population growth within the region likely has a strong correlation to the demand for aviation at COS. As mentioned through this study, the region is heavily reliant on the Airport for service, transportation, jobs and opportunities. It is reasonable to assume that, as the region expands, the contribution COS provides to the community will expand in kind.

The preferred passenger enplanement forecast for short-, medium-, and long-term intervals within the 20-planning horizon is compared to the 2019 FAA TAF for COS in **Table 3-11**. As with the enplanement projections, the FAA requires that operational forecasts show their consistency with the existing TAF or demonstrate the rationale for any significant deviation. Specifically, the FAA considers a forecast to be consistent with its TAF for forecasts differing by less than 10 percent within five years of the base forecast year, and 15 percent within ten years of the base year.

Table 3-11: Preferred Operations Forecast

Year	Preferred Forecast	2019 FAA TAF	Variance
2019	132,224	137,589	-4.1%
2024	141,742	133,530	5.8%
2029	151,946	136,113	10.4%
2034	162,884	138,935	14.7%
2039	174,610	141,850	18.8%
Average Annual Growth Rate			
2019 - 2039	1.4%	0.3%	

Source: Jviation

3.8.2 Breakdown of Operations by Category

Future aircraft operations can be broken-down by category (air carrier, air taxi, GA, and military) to provide additional definition on the forecasted level of operations by certain user groups. By applying historical market share percentages as well as possible changes in the classification of aircraft and focus of aviation by certain COS user groups, estimated operations by category were established and are shown in **Table 3-12**.

Table 3-12: Operations Forecast by Category

Year	Air Carrier	% Air Carrier	Air Taxi	% Air Taxi	General Aviation	% General Aviation	Military	% Military	Total
2019	13,566	10%	15,248	12%	70,433	53%	32,977	25%	132,224
2024	15,592	11%	15,592	11%	73,706	52%	36,853	26%	141,742
2029	18,234	12%	13,675	9%	77,492	51%	42,545	28%	151,946
2034	21,175	13%	11,402	7%	81,442	50%	48,865	30%	162,884
2039	24,445	14%	10,477	6%	87,305	50%	52,383	30%	174,610
Average Annual Growth Rate									
2019 – 2039	3.0%		-1.9%		1.1%		2.3%		1.4%

Source: Jviation

3.8.2.1 Air Carrier

As the region grows and the demand for air service expands, the number of air carrier operations will likely expand accordingly. COS has had long-standing commercial passenger service and the region has demonstrated that demand for reliable scheduled service is significant enough to support multiple air carriers. As air carriers in general focus on becoming more efficient and profitable, larger aircraft will become more prevalent for the airlines. Aircraft such as the Boeing 737, Airbus A319/A320, and larger regional jets (60+ seats) will increase in frequency throughout the 20-year period. It is estimated that air carrier aircraft will increase in the share of total airport operations from 10 percent to 14 percent.

3.8.2.2 Air Taxi

Air taxi and commuter operations consist of unscheduled operations of “for hire” air taxis and the scheduled operations of commuter airlines, including regional affiliate airlines operating aircraft with less than 60 seats. Regional and commuter airlines are making a transition from 50-60 aircraft to 70+ aircraft, which effectively puts larger commuter aircraft into the air carrier category. This transition is evident in the forecasted decline of air taxi operations. While there may continue to be a significant number of operations in this category throughout the planning period, their percent share of total operations at COS may likely be reduced by half. However, much of this reduction is simply due to the categorization of aircraft. Airlines will simply be using larger aircraft in years ahead.

3.8.2.3 General Aviation

General aviation is the largest and most varied category of operations at COS. That trend is expected to continue, although with a different focus. As the national trend to larger business jet aircraft expands, and smaller private/recreational aircraft declines, the GA landscape at COS will likely change accordingly. Business and corporate tenants at COS will see opportunities to build large hangars to accommodate one

or more business aircraft. Although smaller GA tenants will continue to play a role in COS's future, private aircraft owners may investigate aircraft storage options at other area airports that are less congested and have more facilities for smaller aircraft.

3.8.2.4 Military

The role of the military at COS is difficult to predict, given the uncertainty of mission priorities and Department of Defense objectives. In late 2019, however, President Trump signed the National Defense Authorization Act for Fiscal Year 2020 that authorizes a budget to support the U.S. Space Force, a newly created branch of the military. Being that PAFB is home to the 21st Space Wing (among other groups), there is a strong probability that military operations at COS could expand in the future. Given this possibility and the on-going interest by PAFB to expand into areas surrounding the Airport, the share of future military operations at COS are estimated to increase from 25 to 30 percent by the year 2039.

3.8.3 Split of Local and Itinerant Operations

This forecast also includes a breakdown of forecasted operations into local and transient activities. Local operations are those performed by aircraft that are based at COS and operate in the local traffic pattern and/or within sight of the Airport. These operations also include simulated instrument approaches, and departures to or arrivals from practice areas within a 20-mile distance from the Airport. Itinerant or transient operations are operations by aircraft that leave the local airspace, including those based at other airports. The results from preferred scenarios for local and itinerant operations at COS for the planning period (2019-2039) are presented in **Table 3-13**. Changes in the split between local and itinerant operations are an indication of a change in nature of operations at the Airport. That change is not expected at COS and is reflected in the continued split of operational shares.

Table 3-13: Local and Itinerant Split

Year	Local	Itinerant	Total
2019	35,700	96,524	132,224
2024	38,270	103,472	141,742
2029	41,025	110,921	151,946
2034	43,979	118,905	162,884
2039	47,145	127,465	174,610
Percent Share	27%	73%	

Source: Jviation

3.8.4 Operations by Runway End

Using annual flight track data collected as part of this study, it is possible to estimate the number of existing and forecasted operations by runway end. **Table 3-14** utilizes a full year (Oct 2018 to Sept 2019) flight track data from the FAA to estimate the overall percentage of use for each runway at COS. The percentages of existing use are applied to future years to predict the number of operations for each runway end at key points within the planning period.

Table 3-14: Operations by Runway End

	Runway 13	Runway 31	Runway 17L	Runway 17R	Runway 35L	Runway 35R	
Year	5%	4%	26%	29%	18%	18%	Total
2019	6,611	5,290	34,378	38,345	23,800	23,800	132,224
2024	7,086	5,670	36,853	41,105	25,514	25,514	141,742
2029	7,596	6,078	39,506	44,046	27,350	27,350	151,946
2034	8,145	6,515	42,350	47,236	29,319	29,319	162,884
2039	8,730	6,984	45,399	50,637	31,430	31,340	174,610

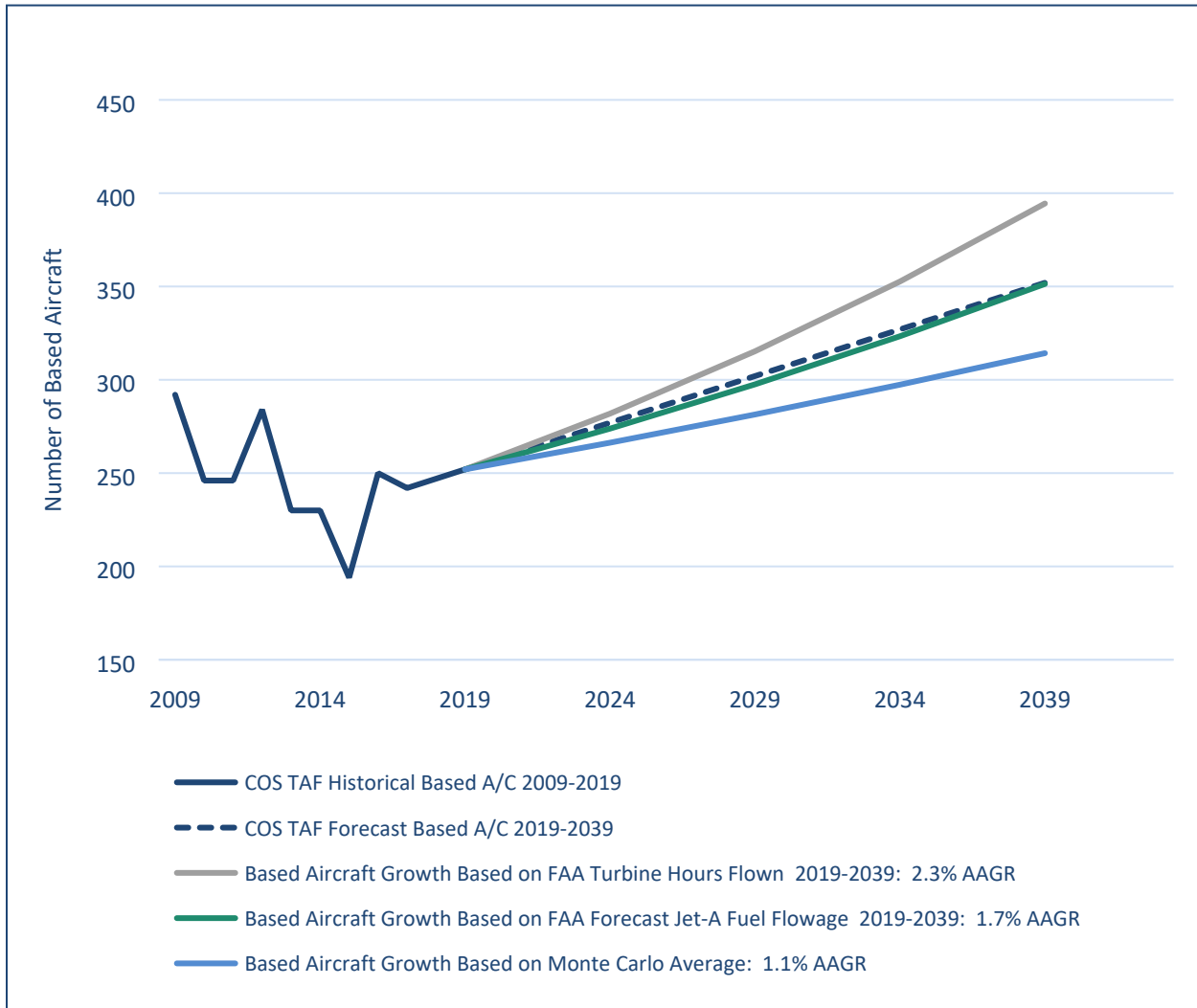
Source: Jviation, ATAC

3.9 Based Aircraft Projections

The based aircraft forecast helps determine the future activity levels and the potential requirement for expanded or improved airport facilities. Based aircraft are defined as those that are permanently stored at an airport. Estimating the number and types of aircraft expected to be based at COS over the 20-year study period will impact the planning for future airport facility and infrastructure requirements, particularly as they relate to GA. As the number of aircraft based at an airport increases, so too does the aircraft storage required as well as supporting infrastructure and services.

According to the Airport's Master Record (Form 5010), COS currently has 251 based aircraft which was used as the baseline for projecting future-based aircraft totals. The results for the High-Growth, Medium-Growth, and Low-Growth scenarios for based aircraft at COS for the master planning period (2019-2039) are presented graphically **Figure 3-13**.

Figure 3-13: Scenario-Based Based Aircraft Forecast 2019-2039



Source: Jviation

The Medium-Growth model (FAA Forecast Jet-A Fuel Flowage) was selected as the preferred forecast for the total based aircraft fleet at COS. This model best represents both regional socioeconomic data projections (reflecting growth over 1 percent annually), and national aviation industry expectations for Jet-A fuel sales (reflecting the growth of turbine aircraft based at COS). The total based aircraft projected for COS over the planning period were then allocated to six general aircraft categories (single-engine piston, multi-engine piston, turbine/jet, military, helicopter, and other) to develop a projection of COS's based aircraft fleet mix throughout the planning period. The existing fleet mix was developed based on the fleet mix percentages reported by the Airport Master Record in 2019. Through the forecasting process, and based on anticipated migrations of the fleet, those percentages are anticipated to change over the long-term. The preferred existing based aircraft fleet mix percentages for COS are shown in **Table 3-15**.

Table 3-15: Based Aircraft Forecast by Type

Year	2019	2024	2029	2034	2039
Single Engine	148	153	161	165	169
Percent of Total	59%	56%	54%	51%	48%
Multi-Engine	40	38	42	42	42
Percent of Total	16%	14%	14%	13%	12%
Jet/Turboprop	32	41	48	58	70
Percent of Total	13%	15%	16%	18%	20%
Helicopter	5	7	7	10	14
Percent of Total	2%	2.40%	2.4%	3%	4%
Glider/Other	1	2	2	3	4
Percent of Total	0.40%	0.60%	0.60%	1%	1%
Military	25	33	39	45	53
Percent of Total	10%	12%	13%	14%	15%
Total Aircraft	251	274	298	323	351

Source: Jviation

Given the business development opportunities being presented in this business-friendly community through proactive economic initiatives and the anticipated resultant market area benefits, it is likely that COS will follow national trends with respect to aircraft market share and experience an influx of business aircraft and helicopters. The fleet mix projection shows an increasing role for turbines/jets at the Airport over the planning period, which is consistent with FAA projections within the GA market segment where the declining market share of single and multi-engine piston aircraft will be replaced by turbines/jet aircraft used for business travel. The forecast also includes an increase in military presence and activity at COS as reflected in a doubling of military based aircraft within the 20-year planning period.

3.10 Peak Hour Projections

Peak period activity is important in the process of determining the facility requirements at an airport in that it helps determine the size of terminal facilities, landside facilities, airfield capacities, and other areas. In this analysis, three specific peak periods were used to determine what size facilities may be needed to meet forecasted demand; these included peak month, peak month's average day, and peak hour operations and enplanements. Definitions for these are as follows:

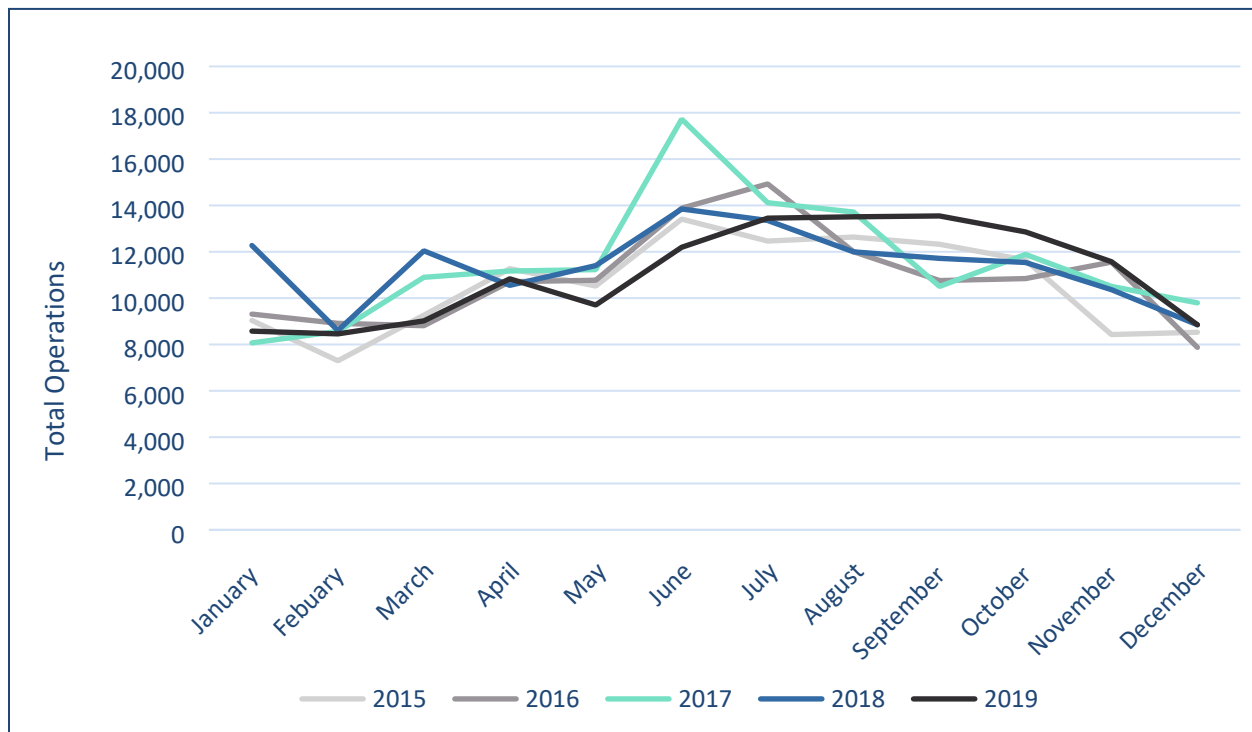
- **Peak Month** – The month during which the most aircraft operations/enplanements occur.
- **Peak Month Average Day (PMAD)** – Aircraft and passenger activity that can be expected on a typical day during the peak month.
- **Peak Hour** – The hour during which most activity occurs within the average day of the peak month.

These peaking characteristics are estimated for aircraft operations and passenger activity for current levels as well the planning years 2024, 2029, 2034 and 2039.

3.10.1 Seasonality of Operations

Determining the seasonality of operations is an important part of determining the peak level of activity for an airport. **Figure 3-14** illustrates the seasonal nature of operations at COS over the past five years. Specifically, the figure shows that the June/July timeframe is typically the peak season of flight activity with the share of operations during those months averaging 11 percent of annual operations. Activity slightly declines during the winter months and typically represents six to seven percent of annual operations. If evaluating seasonality by each aircraft operational category, seasonality reflects that of overall operations.

Figure 3-14: Seasonality of Total Operations 2015-2019



Source: Airport records

3.10.2 Peak Hour Aircraft Operations

Airport traffic displays peaking characteristics by month of the year, by day of the week, and by the hour of the day. Operational traffic levels at COS are fairly spread out over the year, although summer months represent the busiest season due to increased summer vacation leisure travel and fair-weather flying conditions. Total PMAD operations are projected to increase from an estimated 485 to 640.

Table 3-16 shows the peak period operations for each category of traffic at COS: Air Carrier/Air Taxi (combined), GA, and Military. In order to develop peak hour estimates, discussions with the Air Traffic Control Tower (ATCT) revealed strong operational peak periods during the morning hours followed by slower periods until the afternoon. Based on this and the general rule of thumb that calls for 12 to 20 percent of daily activity assigned to the peak hour, a 15 percent allocation was applied to PMAD level to determine peak hour levels. Based on the peak hour calculation for each segment of traffic, the total peak hour PMAD operations are projected to increase from 73 to 96 from 2019 to 2039.

Table 3-16: Peak Period Operations Projections

Category Year	Annual	Peak Month	Peak Month Average Day	Peak Hour
Air Carrier & Air Taxi				
2019	28,814	3,170	106	16
2024	31,183	3,430	114	17
2029	31,909	3,510	117	18
2034	32,577	3,583	119	18
2039	34,922	3,841	128	19
General Aviation				
2019	70,433	7,748	258	39
2024	73,706	8,108	270	41
2029	77,492	8,524	284	43
2034	81,442	8,959	299	45
2039	87,305	9,604	320	48
Military				
2019	32,977	3,627	121	18
2024	36,853	4,054	135	20
2029	42,545	4,680	156	23
2034	48,865	5,375	179	27
2039	52,383	5,762	192	29
Total Operations				
2019	132,224	14,545	485	73
2024	141,742	15,592	520	78
2029	151,946	16,714	557	84
2034	162,884	17,917	597	90
2039	174,610	19,207	640	96

Source: Jviation, Airport records, ATCT

3.10.3 Peak Hour Enplanements

Peak hour enplanements are determined in a similar way as operations but differ in that they are based on an understanding and application of airline schedules. Hourly flight data was collected from airline schedules for several of days in 2019. Similar, to operations, airline enplanement data show June/July as the busiest passenger travel months in the year, with approximately 10 percent of all passenger enplanements occurring during each of those summer months.

Applying daily airline schedule data to PMAD enplanements shows peak hour passengers represent 18 percent of the total daily passenger activity, with most typically taking place in the early morning (6-7am). Using those measures, the combined air carrier and air taxi peak hour enplanements were calculated and are presented in **Table 3-17**. Peak hour enplanements are expected to grow from 510 passengers in 2019 to 673 passengers by the year 2039.

Table 3-17: Peak Period Enplanement Projections

Category Year	Annual	Peak Month	Peak Month Average Day	Peak Hour
Air Carrier & Air Taxi				
2019	849,597	84,960	2,832	510
2024	910,757	91,076	3,036	546
2029	976,321	97,632	3,254	586
2034	1,046,604	104,660	3,489	628
2039	1,121,946	112,195	3,740	673

Source: Aviation, Airport records, Airline schedules

3.11 Critical Aircraft Determination

The ultimate design and development of airport facilities is directly impacted by the demand for those facilities. Aircraft-related activities (in the form of based aircraft, operational levels, and types of operations) typically serve as the basis for that demand since aircraft tend to generate the most challenging and specific operational requirements. In general, airport infrastructure components are designed to accommodate the most demanding aircraft type that will utilize the infrastructure on a regular basis. The FAA refers to this aircraft type as the Critical Design Aircraft, which it defines as being the most demanding airplane, or family of airplanes, that accounts for at least 500 annual itinerant operations at a given airport within the planning period.

This Critical Design Aircraft designation is important since it will serve as the basis of the Airport Reference Code (ARC) and/or Runway Design Code (RDC), which are facility classification systems given to aircraft based on its maximum approach speed and wingspan/tail height. The letters of the ARC and RDC (ranging from A-E) are for Aircraft Approach Category (AAC) and represent progressively faster landing airspeeds, with “A” being the slowest. Similarly, the roman numerals are the Airplane Design Group (ADG) and represent wingspans and tail heights, with “I” being the smallest wingspan and lowest tail height (see **Figure 3-15** below for examples of ARC/RDC aircraft types). The FAA then uses this classification to apply specific airport design criteria that are appropriate to operational and physical characteristics of the aircraft types operating at that airport.

Figure 3-15: ARC/RDC Aircraft Examples



Source: FAA

To project the current and future Critical Design Aircraft for COS, an itinerant aircraft operations analysis was conducted. As seen in **Table 3-18**, aircraft operations data from the FAA's Traffic Flow Management System Counts (TFMSC) database was used to evaluate historical operations at COS in order to identify an appropriate critical design aircraft. The TFMSC data represents actual flights recorded and validated by the FAA through means of flight plans, instrument flight operations, and/or other radar-based tracking applications. It is the most accurate FAA flight data publicly available, and identifies aircraft type, flight dates, flight origins and destinations, etc.

Table 3-18: COS TFMSC Counts (2015-2019)

	2015	2016	2017	2018	2019
ARC/RDC					
A-I	3,197	2,636	2,765	2,953	3,229
A-II	621	504	518	506	617
A-III	0	2	3	5	4
B-I	3,068	3,238	2,574	3,076	3,289
B-II	4,836	4,724	4,900	4,965	5,245
B-III	943	70	24	33	56
B-IV	399	403	330	277	347
C-I	792	829	881	855	660
C-II	11,388	11,716	10,935	12,904	13,365
C-III	4,730	6,424	9,400	7,879	7,104
C-IV	3,195	2,738	2,664	2,434	2,753
C-V	16	14	37	52	39
C-VI	13	50	63	52	40
D-I	1,044	1,237	1,292	1,007	782
D-II	205	227	184	162	173
D-III	2,306	2,303	3,063	3,448	3,352
D-IV	16	38	23	45	29
D-V	79	45	51	52	92
TOTAL	36,848	37,198	39,707	40,705	41,176
Approach Category					
A	3,818	3,142	3,286	3,464	3,850
B	9,246	8,435	7,828	8,351	8,937
C	20,134	21,771	23,980	24,176	23,961
D	3,650	3,850	4,613	4,714	4,428
TOTAL	36,848	37,198	39,707	40,705	41,176
Design Group					
I	8,101	7,940	7,512	7,891	7,960
II	17,050	17,171	16,537	18,537	19,400
III	7,979	8,799	12,490	11,365	10,516
IV	3,610	3,179	3,017	2,756	3,129
V	95	59	88	104	131
VI	13	50	63	52	40
TOTAL	36,848	37,198	39,707	40,705	41,176

Source: FAA TFMSC

In reviewing the COS TFMSC data currently available, several observations can be made:

- The highest number of operations being experienced at COS is by C-II, which is reflective of medium and large corporate aircraft as well as regional jets used in commercial air carrier and air taxi service. This has been historically the most predominant aircraft type using the Airport.
- C and D category aircraft activities continue to grow at the Airport. Currently, the D-III (737-800) and C-IV (757-200) designations are the most demanding single ARC types that meet the FAA's 500-annual itinerant operation threshold. This trend is anticipated to continue into future years.
- COS has historically and will continue to occasionally accommodate more demanding aircraft than the established ARC/RDC (such as Boeing 747 and 777 aircraft), but just not at a frequency to warrant facility design changes (i.e., 500 annual itinerant operations). However, when considering the most demanding aircraft type and calculating the annual itinerant operational threshold, the FAA does allow for those more demanding aircraft types to be included in lesser demanding aircraft operational totals as a means of incorporating their occasional use into the overall calculation.

Greater examination of the TFMSC data also shows that aircraft in the D approach category and IV design group, individually, consistently exceed the 500-annual itinerant level threshold. In lieu of identifying a specific critical design aircraft, the FAA also allows for the grouping of aircraft in the most demanding AAC and ADG to represent a composite critical design aircraft. In this approach, the most demanding AAC that meets the 500-operational threshold is identified as being the representative AAC of the composite design aircraft as is the case with the most demanding ADG. As shown in the preceding table, there were 4,428 operations of Category D aircraft in 2019 at COS, as well as 3,129 Design Group IV aircraft operations.

With respect to identifying a particular aircraft model to serve as the representative of the Airport's critical design aircraft, there is not one D-IV aircraft model that operates frequently enough at COS to meet the 500-annual operation threshold. However, through examination and application of the AAC and ADG components independently, a composite critical design aircraft with an ARC/RDC designation of D-IV is well supported. A common aircraft within this ARC is the Boeing 757, 767 and MD-11 and will be used as the Airport's existing ARC and RDC.

While historical trends and recent data can provide a good perspective on the current conditions at an airport, the Critical Design Aircraft determination must also consider patterns forecasted to occur within the planning period. When operational growth rates are applied to the FAA TFMSC data for COS, the results continue to show an ARC/RDC of D-IV throughout the 20-year planning period. Operations by larger aircraft operations will continue to increase, but not to a level justifying a higher ARC/RDC.

3.12 Summary

It is anticipated that COS will experience moderate growth during the 20-year planning period that generally reflects the regional aviation industry trends and the socioeconomic development growth of the area. Most market demographic trends indicate that the Airport will outpace prevailing national and state growth trends, while other key economic indicators project continued robust growth in the area economy, and by extension, business-related GA. Enplanements are projected to grow from approximately 850,000 to over 1,120,000. The Airport will also realize an increase in the number of operations with almost 175,000 operations anticipated by the end of the planning period. Additional operations could be

experienced in future years should additional aviation businesses and airlines locate to the Airport. Based aircraft are expected to increase from approximately 250 to 350 aircraft by 2039, which includes a continued shift in the fleet mix towards business aviation aircraft. **Table 3-19** summarizes the projections for the preferred forecast contained in this chapter.

Table 3-19: Summary of Preferred Aviation Activity Forecasts

	2019	2024	2029	2034	2039
Enplanements					
Peak Hour	510	546	586	628	673
Annual	849,597	910,757	976,321	1,046,604	1,121,946
TAF	849,597	848,797	906,883	975,224	1,045,783
TAF Variance	0.0%	7.3%	7.7%	7.3%	7.3%
Cargo					
Landed Weight (lbs.)	104,867,294	110,982,578	117,454,471	124,303,770	131,552,482
Operations					
Category					
Air Carrier	13,566	15,592	18,234	21,175	24,445
Air Taxi	15,248	15,592	13,675	11,402	10,477
General Aviation	70,433	73,706	77,492	81,442	87,305
Military	32,977	36,853	42,545	48,865	52,383
TOTAL	132,224	141,742	151,946	162,884	174,610
TAF	137,589	133,530	136,113	138,935	141,850
TAF Variance	-4.1%	5.8%	10.4%	14.7%	18.8%
Local vs. Itinerant					
Local Operations	35,700	36,270	41,025	43,979	47,145
Itinerant Operations	96,524	103,472	110,921	118,905	127,465
Based Aircraft					
Type					
Single Engine	148	153	161	165	169
Multi-Engine	40	38	42	42	42
Jet/Turboprop	32	41	48	58	70
Helicopter	5	7	7	10	14
Glider/Other	1	2	2	3	4
Military	25	33	39	45	53
TOTAL	251	274	298	323	351
TAF	252	277	302	327	352
Variance	0.0%	-1.1%	-1.3%	-1.2%	-0.3%

Source: Jviation

Additionally, and as described previously, to secure FAA approval for the activity projections, FAA requires a comparison of the forecasts to the annually produced TAF, preferring that airport planning forecasts not vary significantly from the TAF. Specifically, the FAA looks at the airport's recommended passenger enplanements and operations forecasts be within 10 percent of their five-year TAF and within 15 percent of their 10-year TAF. A comparison between the forecasts (included in the table above) shows that the preferred projections lie within of the FAA tolerances.

Finally, it is also important to recognize that the Preferred Forecast for COS is unconstrained, meaning that all facilities necessary to accommodate the forecasted growth could and will be constructed, regardless of potential constraints to development or other possible limiting factors.

4 Noise Fundamental

4.1 Introduction

The measurement and human perception of sound involve two basic physical characteristics: intensity and frequency. Intensity is a measure of the acoustic energy of sound vibrations, expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder the perception of that sound. The second important physical characteristic is sound frequency, which is the number of times per second the air vibrates or oscillates.

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level), which is measured in decibels (dB). On this scale, zero dB corresponds roughly to the threshold of human hearing and 140 dB corresponds to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound. Noise is commonly defined as unwanted sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts on humans, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency weighting and is typically applied to community noise measurements.

4.1.1 General Characteristics of Sound

Outdoor sound levels decrease as a function of distance from the source and as a result of wave divergence, atmospheric absorption, and ground attenuation. If sound is radiated from a source in an undisturbed manner, the sound travels as spherical waves. As the sound wave travels away from the source, the sound energy is distributed over a greater area, dispersing the sound power of the wave. Spherical spreading of the sound wave reduces the noise level, for most sound sources, at a rate of 6 dB per doubling of the distance.

Atmospheric absorption also influences the levels that are received by the observer. The greater the distance sound travels, the greater the influence of atmospheric effects. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption is a function of the sound frequency, as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest at high humidity and higher temperatures. Absorption effects in the atmosphere vary with frequency. The higher frequencies are more readily absorbed than the lower frequencies. Over large distances the lower frequencies become the dominant sound.

4.1.2 Aircraft Noise Metrics

The description, analysis, and reporting of aircraft noise levels is made difficult by the complexity of human response to sound and the myriad of sound-rating scales and metrics that have been developed for describing acoustic effects. Various rating scales have been devised to approximate the human response to the “loudness” or “noisiness” of a sound. Noise metrics have been developed to account for additional parameters, such as duration and cumulative effect of multiple events.

Noise generated by aircraft is getting quieter. The FAA regulates the maximum noise level that an individual civil aircraft can emit through requiring aircraft to meet certain noise certification standards. These standards designate changes in maximum noise level requirements by "stage" designation. In 1990, Congress passed the Aviation Noise and Capacity Act, which required that by the year 2000 all jet and large turboprop aircraft at civilian airports be Stage 3. The FAA Modernization and Reform Act of 2012 includes a prohibition on operating certain aircraft weighing 75,000 pounds or less not complying with Stage 3 noise levels. The current FAA noise standards applicable to new type certifications of jet and large turboprop aircraft is Stage 4.

Noise metrics can be categorized as single-event metrics and cumulative metrics. Single-event metrics describe the noise from individual events, such as an aircraft flyover. Cumulative metrics describe the noise in terms of the total noise exposure over a period of time. The primary noise descriptors/metrics that are used in this study are described below.

A-Weighted Sound Pressure Level (dBA) – the decibel is a unit used to describe sound pressure level. When expressed in dBA, the sound has been filtered to reduce the effect of very low and very high frequency sounds, much as the human ear filters sound frequencies. Without this filtering, calculated and measured sound levels would include events that the human ear cannot hear (e.g., dog whistles). With A-weighting, calculations and sound monitoring equipment approximate the sensitivity of the human ear to sounds of different frequencies. The relative perceived loudness of a sound doubles for each increase of 10 dBA, although that change in the sound corresponds to a factor of 10 changes in relative sound energy. Generally, single-event sound levels with differences of 2 dBA or less are not perceived to be noticeable. Common sound levels expressed in dBA are included in **Table 4-1**.

Table 4-1: Common Sounds on the A-Weighted Decibel Scale

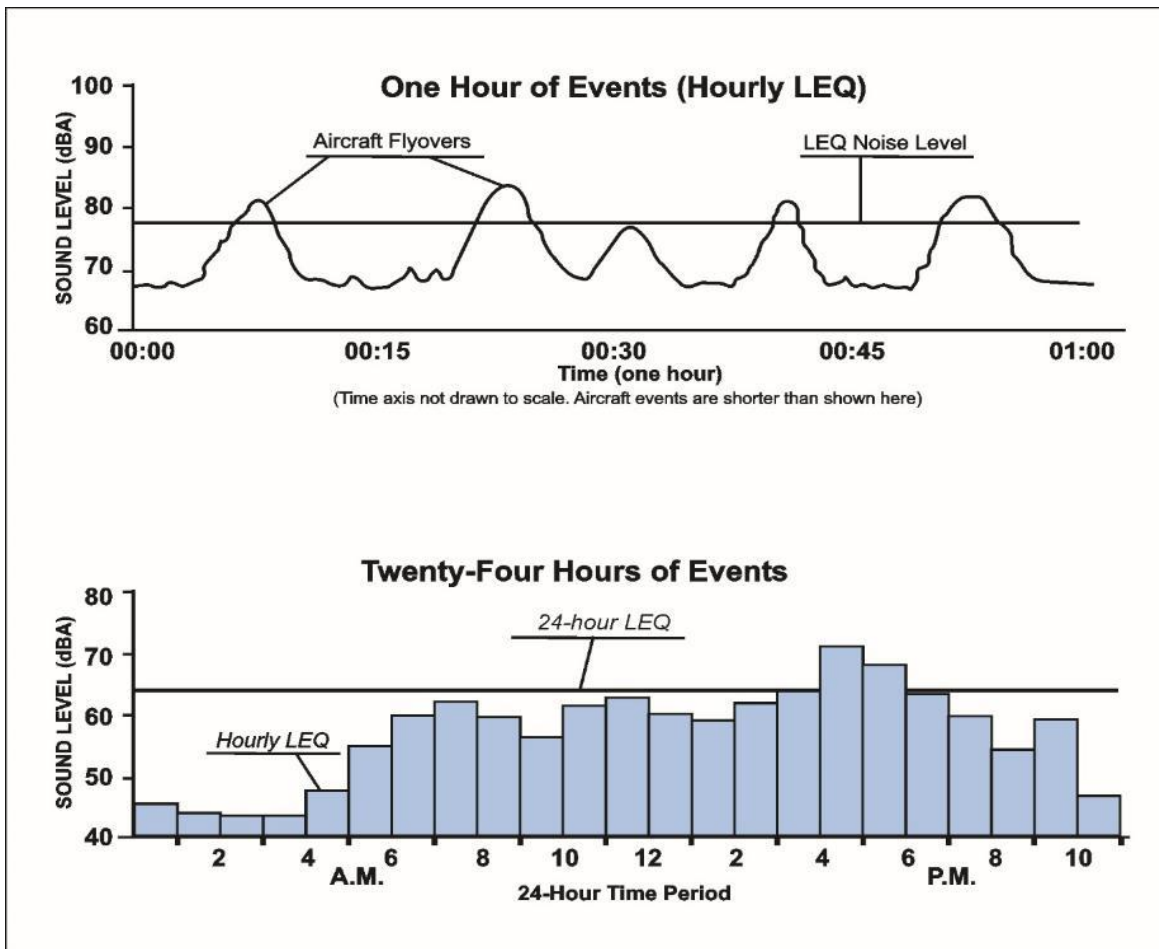
Sound	Sound level (dBA)	Relative loudness (approximate)	Relative sound energy
Rock music, with amplifier	120	64	1,000,000
Thunder, snowmobile (operator)	110	32	100,000
Boiler shop, power mower	100	16	10,000
Orchestral crescendo at 25 feet	90	8	1,000
Busy street	80	4	100
Ordinary conversation, 3 feet away	60	1	1
Quiet automobiles at low speed	50	1/2	.1
Average office	40	1/4	.01
City residence	30	1/8	.001
Rustle of leaves	10	1/32	.00001
Threshold of hearing	0	1/64	.000001

Source: U.S. Department of Housing and Urban Development, Aircraft Noise — Planning Guidelines for Local Agencies, 1972.

Maximum A-Weighted Sound Level (L_{max}) – is the maximum, or peak, sound level during a noise event. The metric only accounts for the highest A-weighted sound level measured during a noise event, not for the duration of the event. For example, as an aircraft approaches, the sound of the aircraft begins to rise above ambient levels. The closer the aircraft gets, the louder the sound until the aircraft is at its closest point. As the aircraft passes, the sound level decreases until the sound returns to ambient levels.

Equivalent Noise Level (Leq) – is the sound level corresponding to a steady state, A-weighted sound level containing the same total energy as a time-varying signal over a given sample period. Leq is the “energy” average noise level during the time period of the sample. It is based on the observation that the potential for a noise to impact people is dependent on the total acoustical energy content of the noise. It is the energy sum of all the sound that occurs during that time period. This is graphically illustrated on **Figure 4-1**. Leq can be measured for any time period, but is typically measured for 15 minutes, 1 hour, or 24 hours.

Figure 4-1: Equivalent Noise Level



Source: KB Environmental Sciences, Inc

4.1.3 Day-Night Average Sound Level (DNL)

Day-Night Average Sound Level (DNL), formerly referred to as L_{dn}, is expressed in dBA and represents the noise level over a 24-hour period. DNL includes the cumulative effects of a number of sound events rather

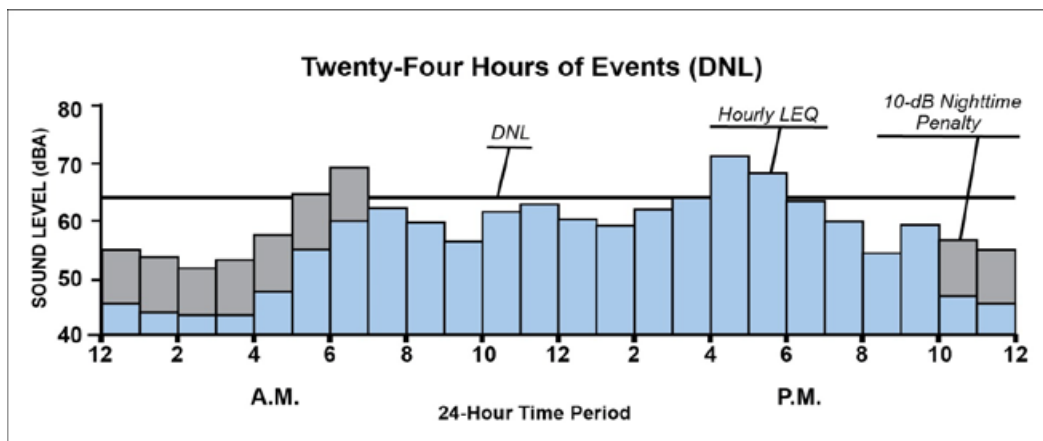
than a single event. It also accounts for increased sensitivity to noise during relaxation and sleeping hours. In the calculation of DNL, for each hour during the nighttime period (10:00 p.m. to 6:59 a.m.), the sound levels are increased by a 10 decibel-weighting penalty (equivalent to a 10-fold increase in aircraft operations) before the 24-hour value is computed. The weighting penalty accounts for the more intrusive nature of noise during the nighttime hours. The weighting penalty is illustrated on **Figure 4-2**.

DNL is expressed as an average noise level on the basis of annual aircraft operations for a calendar year. To calculate the DNL at a specific location, the SELs at that location associated with each individual aircraft operation (landing or takeoff) are determined. Using the SEL for each noise event and applying the 10-dB penalty for nighttime operations as appropriate, a partial DNL is then calculated for each aircraft operation. The partial DNLs for each operation are added logarithmically to determine the total DNL.

DNL is used to describe existing and predicted noise exposure in communities in airport environs based on the average daily operations over the year and the average annual operational conditions at the airport. Therefore, at a specific location near an airport, the noise exposure on a particular day is likely to be higher or lower than the annual average noise exposure, depending on the specific operations at the airport on that day. DNL is widely accepted as the best available method to describe aircraft noise exposure and is the noise descriptor required for aircraft noise exposure analyses and land use compatibility planning under 14 CFR Part 150 and for federal environmental reviews of airport improvement projects.

Guidelines regarding the compatibility of land uses within various DNL contour intervals are specified in *Appendix A of 14 CFR Part 150*. As shown in **Table 4-2**, the FAA has determined that all the land uses listed in the table are normally compatible with aircraft noise exposure below the DNL 65 dB contour.

Figure 4-2: Day-Night Average Sound Level



Source: KB Environmental Sciences, Inc

Table 4-2: FAA Land Use Compatibility Guidelines

Land Use	DNL expressed in dB(A)					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Notes: SLUCM=Standard Land Use Coding Manual. Y (Yes) = Land Use and related structures compatible without restrictions. N (No) = Land Use and related structures are not compatible and should be prohibited. NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure. 25, 30, or 35=Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design/construction of structure.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems. (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low. (5) Land use compatible provided special sound reinforcement systems are installed. (6) Residential buildings require an NLR of 25. (7) Residential buildings require an NLR of 30. (8) Residential buildings not permitted.

Source: 14 CFR Part 150

4.2 AEDT Input Data

In the development of DNL contours, the Aviation Environmental Design Tool (AEDT) Version 3b, uses both default and airport-specific factors. The default factors include engine noise levels, thrust settings, aircraft arrival and departure flight profiles and aircraft speed. The airport-specific factors include the number of aircraft operations, the type of aircraft, runway use, the assignment of aircraft operations to flight tracks, operational time (day/night), and, for departures, the stage (i.e., trip) length. The following describe these data.

4.2.1 Meteorological Data

The AEDT accounts for the influences of meteorological conditions on aircraft performance and atmospheric sound absorption. Meteorological conditions affect the transmission of aircraft noise through the air. Humidity and temperature materially affect the transmission of air-to-ground sound through absorption associated with the instability and viscosity of the air.

The AEDT uses temperature and relative humidity to calculate atmospheric absorption coefficients, which in turn are used to adjust aircraft performance and noise propagation. The average-annual meteorological conditions included in the AEDT for COS are:

- Temperature: 47° Fahrenheit
- Barometric pressure: 1015.5 millibars
- Relative humidity: 49.9%

The 2019 and 2039 DNL contours were prepared using these meteorological data.

4.2.2 Aircraft Operations and Fleet

The 2019 and 2039 COS annual operations were developed using data in the COS Land Use Compatibility Study Aviation Activity Forecast. The annual aircraft operations by category is provided in **Table 4-3**. As shown, annual operations in 2019 totaled 132,224 (an average of 362 operations per day). In 2039, operations are forecast to increase to a total of 174,610 (an average of 478 per day).

Table 4-3: Annual Aircraft Operations

Year	Air Carrier	Air Taxi	GA	Military	Total
2019	13,566	15,248	70,433	32,977	132,224
2039	24,445	10,477	87,305	52,383	174,610

Source: Aviation Activity Forecast, COS Land Use Compatibility Study.

For the purposes of preparing DNL contours, operational data were segregated by aircraft type. To develop the year 2019 aircraft fleet mix, FAA data for fiscal year 2019 (October 1, 2018 through September 30, 2019) was obtained. The data included the FAA-generated information about aircraft operations that occurred at COS. This information included the aircraft type, the operation type (i.e., an arrival or a departure), a flight identification number (identifying the airline and the airline's flight number), the day and time at which the operation occurred, the aircraft's arrival or departure path (i.e., track), and the

runway end where the operation occurred. For the 2039 operations, the fleet mix that occurred in 2019 up gauged to match the 2039 forecasted operations.

This information was then used to identify the corresponding AEDT aircraft. The 2019 and 2039 aircraft fleet of itinerant and local operations are provided in **Table 4-4** and **Table 4-5**, respectively. The table identifies the AEDT aircraft assignment for each represented in the data provided and reflects a transition in the passenger fleet to a growing share of narrowbody air carrier aircraft as well as increases in cargo operations demonstrated by growth in 757 and 767 aircraft.

Table 4-4: 2019 and 2039 AEDT Annual Operations - Itinerant

Category	Aircraft Type(s)	Percent of Category	AEDT Noise ID	2019	2039
Air Carrier	Airbus A-320 (including NEO)	23.3%	A320-232	3,160	5,694
	Bombardier CRJ-700/900	22.0%	CRJ9-ER	2,989	5,386
	Boeing 737-800	20.8%	737800	2,822	5,086
	Embraer ERJ 170/175	19.1%	EMB170	2,588	4,663
	Boeing 757-200	7.9%	757PW	1,069	1,926
	Boeing 737-700	2.6%	737700	352	633
	Airbus A-319	1.6%	A319-131	222	401
	Boeing 767-300/400	0.9%	767300	125	225
	Airbus A-321	0.9%	A321-232	117	211
	Boeing 747-400	0.6%	747400	84	151
	Boeing 777-200	0.3%	777200	38	69
	Air Carrier Total	100.0%		13,566	24,445
Air Taxi	Bombardier CRJ-200, Challenger 300/600	69.3%	CL600	10,561	7,256
	Embraer ERJ 135/140/145	9.4%	EMB145	1,431	983
	King Air/Super King Air, Swearingen Metroliner	5.5%	DHC6	833	572
	Cessna Citation Jet, Phenom 300	3.5%	CNA500	534	367
	Learjet 35/40/45/55/60/75	2.6%	LEAR35	398	273
	Cessna 560 Excel / Ultra	2.6%	CNA560U	389	268
	Cessna 680 Citation Sovereign	2.3%	CNA680	350	241
	Cessna 750 Citation X, Dassault Falcon 2000	1.9%	CNA750	290	199
	Gulfstream GIV, GV	1.5%	GV	224	154
	Cessna 550, Beechjet 400	0.6%	CNA55B	87	60
	IA 1125 Westwind, Gulfstream 150	0.3%	IA1125	51	35
	Pilatus PC-12, Cessna 208 Caravan	0.2%	CNA208	37	25
	Bombardier BD-700 Global Express	0.2%	BD-700-1A10	34	24
	Dassault Falcon 900	0.2%	FAL900EX	29	20
	Air Taxi Total	100.0%		15,248	10,477
General Aviation	Cessna 172 /177, Lancair 360	25.2%	CNA172	8,740	10,105
	Beechcraft Bonanza 33/35/36, Mooney M20C	23.9%	GASEPV	8,287	9,581
	Cirrus SR20/22	12.0%	COMSEP	4,154	4,803
	King Air/Super King Air	7.0%	DHC6	2,426	2,805
	Piper Twin Comanche	6.4%	PA30	2,226	2,574
	Cessna Citation Jet, Phenom 300	4.7%	CNA500	1,615	1,868
	Eclipse 500	3.5%	ECLIPSE500	1,200	1,388

Category	Aircraft Type(s)	Percent of Category	AEDT Noise ID	2019	2039
	Pilatus PC-12, Cessna 208 Caravan	2.7%	CNA208	946	1,094
	Cessna 560 Excel / Ultra	2.2%	CNA560U	759	877
	Learjet 35/40/45/55/60/75	2.1%	LEAR35	738	853
	Cessna 441 / 425	1.4%	CNA441	478	552
	Cessna 550, Beechjet 400	1.2%	CNA55B	428	495
	IA 1125 Westwind, Gulfstream 150	1.2%	IA1125	407	471
	Cessna 750 Citation X, Dassault Falcon 2000	0.9%	CNA750	319	369
	Challenger 300/600	0.8%	CL600	294	340
	Dassault Falcon 900	0.8%	FAL900EX	263	304
	Gulfstream GIV, GV, G650	0.7%	GV	245	283
	Cessna 680 Citation Sovereign	0.5%	CNA680	167	193
	Bombardier BD-700 Global Express	0.1%	BD-700-1A10	43	50
	AgustaWestland A119	1.9%	A109	660	763
	Aerospatiale/Airbus AS350	1.0%	SA350D	338	391
	General Aviation Total	100.0%		34,733	40,160
Military	Lockheed C-130 Hercules	23.3%	C130E	3,146	5,034
	UV18 / De Havilland DHC-6	13.9%	DHC6	1,884	3,013
	F-16, F-22, F-35	11.1%	F16PW0	1,504	2,405
	Cirrus SR20/22	9.0%	COMSEP	1,216	1,944
	Pilatus PC-12	7.9%	CNA208	1,066	1,704
	C-17 Globemaster	6.3%	C17	858	1,371
	C-21 / LearJet 35	6.0%	LEAR35	808	1,291
	F-18	5.6%	F-18	752	1,203
	C37A / Gulfstream V	2.7%	GV	369	590
	Northrop T-38 Talon	2.6%	T-38A	347	555
	Boeing KC-135 Stratotanker	2.4%	KC135R	325	519
	Fairchild Republic A-10	2.3%	A10A	314	501
	Boeing 737-700	2.2%	737700	294	470
	Boeing 767-300	1.4%	767300	191	306
	Bombardier /De Havilland DHC-8	1.1%	DHC830	144	231
	Boeing 747-400	1.0%	747400	139	222
	Sikorsky S-70 / UH-60 Blackhawk	1.0%	S70	136	217
	CH-47 Chinook	0.2%	CH47D	33	53
	Military Total	100.0%		13,526	21,629
All Aircraft Itinerant				77,073	96,711

Source: FAA Data; KB Environmental Sciences, Inc.

Table 4-5: 2019 and 2039 AEDT Annual Operations - Local

Category	Aircraft Type(s)	Percent of Category	AEDT Noise ID	2019	2039
General Aviation	Cessna 172 /177, Lancair 360	39.0%	CNA172	13,923	18,387
	Beechcraft Bonanza 33/35/36, Mooney M20C	36.0%	GASEPV	12,852	16,972
	Cirrus SR20/22	18.0%	COMSEP	6,426	8,486
	Cessna 441 / 425	7.0%	CNA441	2,499	3,300
	General Aviation Total	100.0%		35,700	47,145
Military	Lockheed C-130 Hercules	100.0%	C130E	19,451	30,754
	Military Total	100.0%		19,451	30,754
All Aircraft Local				55,151	77,899

Source: FAA Data; KB Environmental Sciences, Inc.

4.2.3 Time of Day

Aircraft operations modeled in AEDT are assigned as occurring during daytime (7:00 A.M. to 9:59 P.M.) or nighttime (10:00 P.M. to 6:59 A.M.). As previously stated, DNL values are calculated such that aircraft operations during the night are penalized by the addition of 10 dBA to each operation. The time-of-day percentages of operations modeled by aircraft category are summarized in **Table 4-6**.

Table 4-6: 2019 and 2039 Percent Operations by Time of Day

	Departures	
	Daytime (7:00am-9:59pm)	Nighttime (10:00pm-6:59am)
Air Carrier	81%	19%
Air Taxi	92%	8%
General Aviation	94%	6%
Military	97%	3%
	Arrivals	
	Daytime (7:00am-9:59pm)	Nighttime (10:00pm-6:59am)
Air Carrier	87%	13%
Air Taxi	91%	9%
General Aviation	96%	4%
Military	96%	4%

Source: FAA Data; KB Environmental Sciences, Inc.

4.2.4 Runway Use

Runway use refers to the frequency with which aircraft utilize each runway end for departures and arrivals. The more often a runway is used, the more noise is generated in areas located off each end of that runway. Wind direction and speed dictate the runway directional use (or flow) of airports. From a safety and operational standpoint, it is preferable for aircraft to arrive and depart into the wind. Wind direction changes may also necessitate the need to switch an airport's flow. Under certain weather conditions, this change can occur several times a day. At COS, the airport flow is either to the north (i.e.,

aircraft arrive on Runways 35L, 35R, or 31 and depart on Runways 35L, 35R, or 31) or to the south (i.e., aircraft arrive on Runways 17R, 17L, or 13 and depart on Runways 17R, 17L, or 13).

Overall modeled runway use is included in **Table 4-7**. The average airport flow used in the AEDT was 60 percent south flow and 40 percent north flow.

The runway utilization rates are forecast to remain constant for the 2039 study year. **Table 4-8**, **Table 4-9**, and **Table 4-10** provide a summary of departure, arrival and local runway utilization by aircraft category for daytime and nighttime.

Table 4-7: Modeled Overall Runway Use

Runway	Percent Use
North Flow	
35L	18%
35R	18%
31	4%
Total	40%
South Flow	
17R	29%
17L	26%
13	5%
Total	60%

Source: FAA Data; KB Environmental Sciences, Inc

Table 4-8: Modeled Runway Use by Aircraft Category - Departures

	Runway							
	Daytime							
	North Flow				South Flow			
Category	35L	35R	31	Total	17R	17L	13	Total
Air Carrier	6%	33%	<1%	39%	6%	55%	<1%	61%
Air Taxi	10%	31%	1%	42%	16%	41%	1%	58%
General Aviation	29%	2%	9%	40%	44%	3%	13%	60%
Military	13%	8%	9%	30%	44%	17%	9%	70%
	Nighttime							
	North Flow				South Flow			
Category	35L	35R	31	Total	17R	17L	13	Total
Air Carrier	13%	60%	<1%	73%	4%	23%	<1%	27%
Air Taxi	11%	65%	1%	77%	3%	20%	<1%	23%
General Aviation	64%	1%	12%	77%	20%	1%	3%	23%
Military	24%	33%	5%	62%	10%	26%	2%	38%

Notes: (1) Totals may be subject to rounding.

Source: FAA Data; KB Environmental Sciences, Inc.

Table 4-9: Modeled Runway Use by Aircraft Category - Arrivals

	Runway							
	Daytime							
	North Flow				South Flow			
	35L	35R	31	Total	17R	17L	13	Total
Category								
Air Carrier	5%	33%	<1%	38%	7%	55%	<1%	62%
Air Taxi	10%	28%	1%	39%	20%	41%	<1%	61%
General Aviation	25%	3%	4%	32%	53%	9%	6%	68%
Military	15%	11%	5%	31%	28%	34%	7%	69%
	Nighttime							
	North Flow				South Flow			
	35L	35R	31	Total	17R	17L	13	Total
	Category							
Air Carrier	26%	42%	1%	70%	6%	24%	<1%	30%
Air Taxi	6%	53%	1%	61%	8%	31%	<1%	39%
General Aviation	58%	6%	10%	74%	18%	5%	3%	26%
Military	39%	34%	3%	77%	5%	14%	4%	23%

Notes: (1) Totals may be subject to rounding.

Source: FAA Data; KB Environmental Sciences, Inc.

Table 4-10: Modeled Runway Use by Aircraft Category – Local

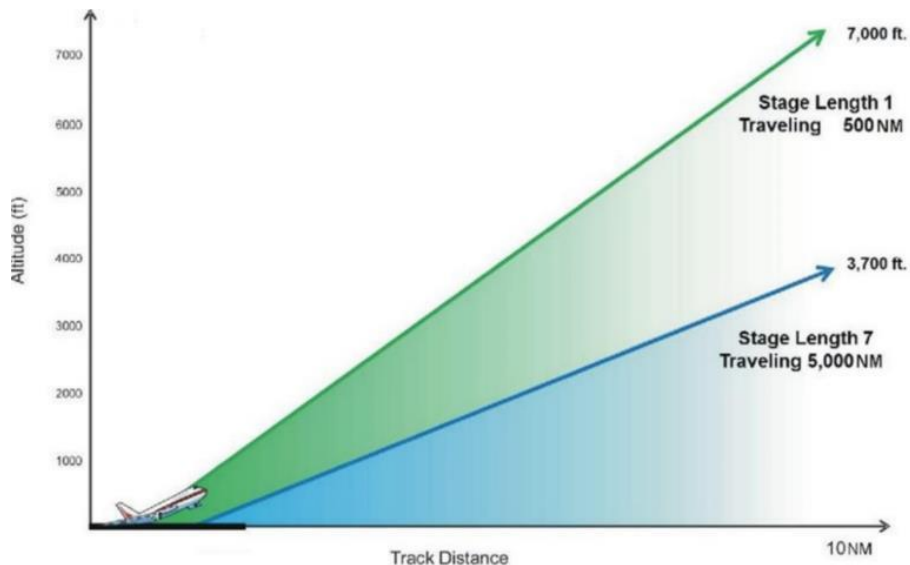
	Runway							
	Daytime							
	North Flow				South Flow			
	35L	35R	31	Total	17R	17L	13	Total
Category								
General Aviation	38%	2%	<1%	40%	55%	4%	<1%	60%
Military	5%	30%	<1%	35%	15%	50%	<1%	65%
	Nighttime							
	North Flow				South Flow			
	35L	35R	31	Total	17R	17L	13	Total
	Category							
General Aviation	77%	2%	<1%	78%	21%	1%	<1%	22%
Military	10%	59%	<1%	69%	5%	26%	<1%	31%

Source: FAA Data; KB Environmental Sciences, Inc

4.2.5 Departure Stage Length

The noise exposure from aircraft departures varies depending on takeoff weight. For example, a fully-loaded aircraft departing on a long-haul flight typically weighs more on departure than the same fully-loaded aircraft departing on a short-haul flight, due to the weight of the additional fuel needed to travel a longer distance. A heavier aircraft typically requires higher power (thrust settings) to reach its takeoff speed, uses more runway length, and climbs at a slower rate than lighter aircraft (see **Figure 4-3**). To account for this, the AEDT contains 11 departure climb profiles (corresponding to different departure weights), depending on the type of aircraft. These profiles represent aircraft origin-to-destination trip lengths from less than 500 nautical miles to over 8,500 nautical miles. The distances for each stage length and the percent of operations modeled for the air carrier aircraft are shown in **Table 4-11**. All air taxi and general aviation aircraft were modeled with a Stage Length 1.

Figure 4-3: Departure Stage Length Comparison



Source: KB Environmental Sciences, Inc

Table 4-11: Percent Stage Length by Aircraft Type

Aircraft Type(s)	Stage Length 1 <500nm	Stage Length 2 501nm – 1,000nm	Stage Length 3 1,001nm – 1,500nm	Stage Length 6 3,501m – 4,500nm	Total
Airbus A-320	29%	32%	39%		100%
Bombardier CRJ-700/900	25%	75%			100%
Boeing 737-800		100%			100%
Embraer ERJ 170/175	47%	53%			100%
Boeing 757-200	21%	79%			100%
Boeing 737-700	87%	13%			100%
Airbus A-319	54%	33%	13%		100%
Boeing 767-300/400		82%	18%		100%
Airbus A-321		100%			100%
Boeing 747-400		21%		79%	100%
Boeing 777-200			100%		100%

Source: FAA Data; KB Environmental Sciences, Inc

4.2.6 Flight Tracks

The AEDT uses airport-specific ground tracks and vertical flight profiles to compute three-dimensional flight paths for each modeled aircraft. The “default” AEDT vertical profiles, which consist of altitude, speed, and thrust settings, are compiled from data provided by aircraft manufacturers. Flight tracks refer to the route an aircraft follows when arriving to or departing from a runway. To identify flight tracks that represent annual average day conditions, FAA aircraft arrival and departure flight track data were reviewed for fiscal year 2019. The data was used to develop the flight tracks for use in the AEDT.

Flight corridors utilized by arriving and departing aircraft to and from each runway end were reviewed and a series of centerlines of the flight corridors (backbone tracks) were established. These tracks were dispersed within the AEDT to generate sub-tracks in order to distribute the aircraft within each of the primary flight corridors. The modeled AEDT flight tracks are depicted on **Figure 4-4**, **Figure 4-5**, and **Figure 4-6**. The flight track utilization by category is provided in **Table 4-12** and **Table 4-13**. Civilian and military helicopters were modeled operating from a helipad on the west side of the airfield. The civilian helicopters were modeled to and from the helipad in either a northwest or southeast direction. The military helicopters were modeled following a straight-in/straight-out flight track from the ends of Runway 17R and 35L. The modeled local touch and go tracks (“T” tracks) are also shown on the figures. The smaller tracks are the general aviation aircraft tracks and the larger represent the military (C-130) tracks.

Table 4-12: Modeled Flight Track Use by Aircraft Category - Departures

Category	Modeled Flight Track Use Percentages					
	North Flow					
Runway 35L Track:	35LD1	35LD2	35LD3	35LD4	35LD5	Total
Air Carrier	33%		67%			100%
Air Taxi/GA Jet	49%		51%			100%
General Aviation Prop	27%	65%		4%	4%	100%
Military	15%	85%				100%
Runway 35R Track:	35RD1	35RD2	35RD3			Total
Air Carrier	30%	48%	22%			100%
Air Taxi/GA Jet	18%	82%				100%
General Aviation Prop	45%	55%				100%
Military	17%	83%				100%
Runway 31 Track:	31D1	31D2	31D3	31D4	31D5	
Air Carrier			48%	52%		100%
Air Taxi/GA Jet			2%	98%		100%
General Aviation Prop	8%	10%	20%	35%	27%	100%
Military	9%	5%	13%	37%	36%	100%
	South Flow					
Runway 17R Track:	17RD1	17RD2	17RD3	17RD4	17RD5	Total
Air Carrier	49%	42%	9%			100%
Air Taxi/GA Jet	40%	39%	5%		16%	100%
General Aviation Prop	26%	23%	5%	26%	20%	100%
Military	38%	36%	13%	3%	10%	100%
Runway 17L Track:	17LD1	17LD2	17LD3	17LD4		Total
Air Carrier	32%	30%	38%			100%
Air Taxi/GA Jet	8%	81%	11%			100%
General Aviation Prop	19%	37%	12%	32%		100%
Military	13%	47%	40%			100%
Runway 13 Track:	13D1					
Air Carrier	100%					100%
Air Taxi/GA Jet	100%					100%
General Aviation Prop	100%					100%
Military	100%					100%

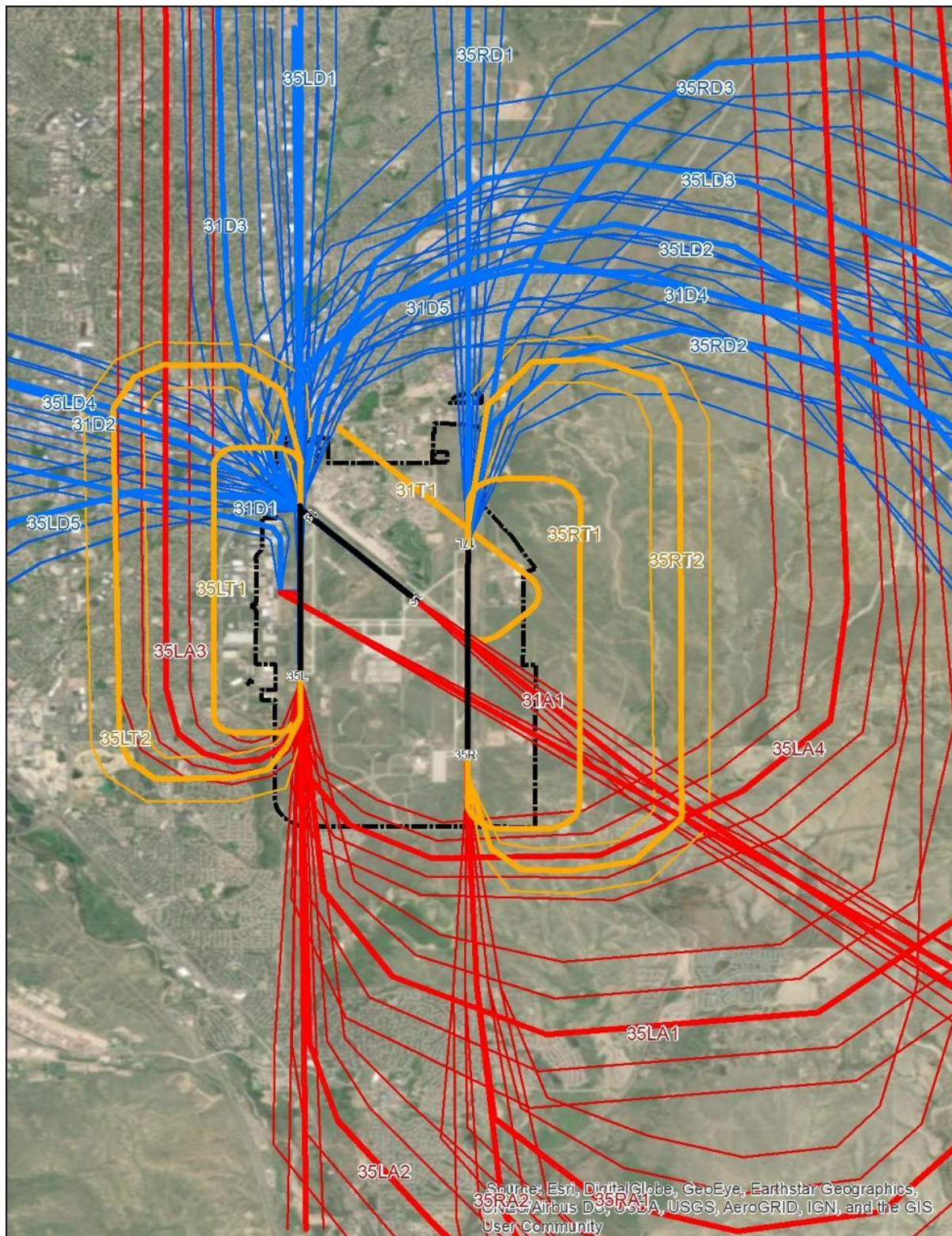
Source: FAA Data; KB Environmental Sciences, Inc

Table 4-13: Modeled Flight Track Use by Aircraft Category - Arrivals

Category	Modeled Flight Track Use Percentages					
	North Flow					
Runway 35L Track:	35LA1	35LA2	35LA3	35LA4		Total
Air Carrier	20%	80%				100%
Air Taxi/GA Jet	33%	67%				100%
General Aviation Prop	14%	43%	17%	26%		100%
Military	20%	80%				100%
Runway 35R Track:	35RA1	35RA2				Total
Air Carrier	37%	63%				100%
Air Taxi/GA Jet	98%	2%				100%
General Aviation Prop	49%	51%				100%
Military	29%	71%				100%
Runway 31 Track:	31A1					
Air Carrier	100%					100%
Air Taxi/GA Jet	100%					100%
General Aviation Prop	100%					100%
Military	100%					100%
	South Flow					
Runway 17R Track:	17RA1	17RA2	17RA3	17RA4	17RA5	Total
Air Carrier	34%	30%			36%	100%
Air Taxi/GA Jet	35%	35%			30%	100%
General Aviation Prop		29%	19%	33%	19%	100%
Military	57%	29%			14%	100%
Runway 17L Track:	17LA1	17LA2	17LA3	17LA4		Total
Air Carrier	10%	20%	35%	35%		100%
Air Taxi/GA Jet	14%	18%	55%	13%		100%
General Aviation Prop	46%	12%	23%	19%		100%
Military	12%	26%	19%	43%		100%
Runway 13 Track:	13A1					
Air Carrier	100%					100%
Air Taxi/GA Jet	100%					100%
General Aviation Prop	100%					100%
Military	100%					100%

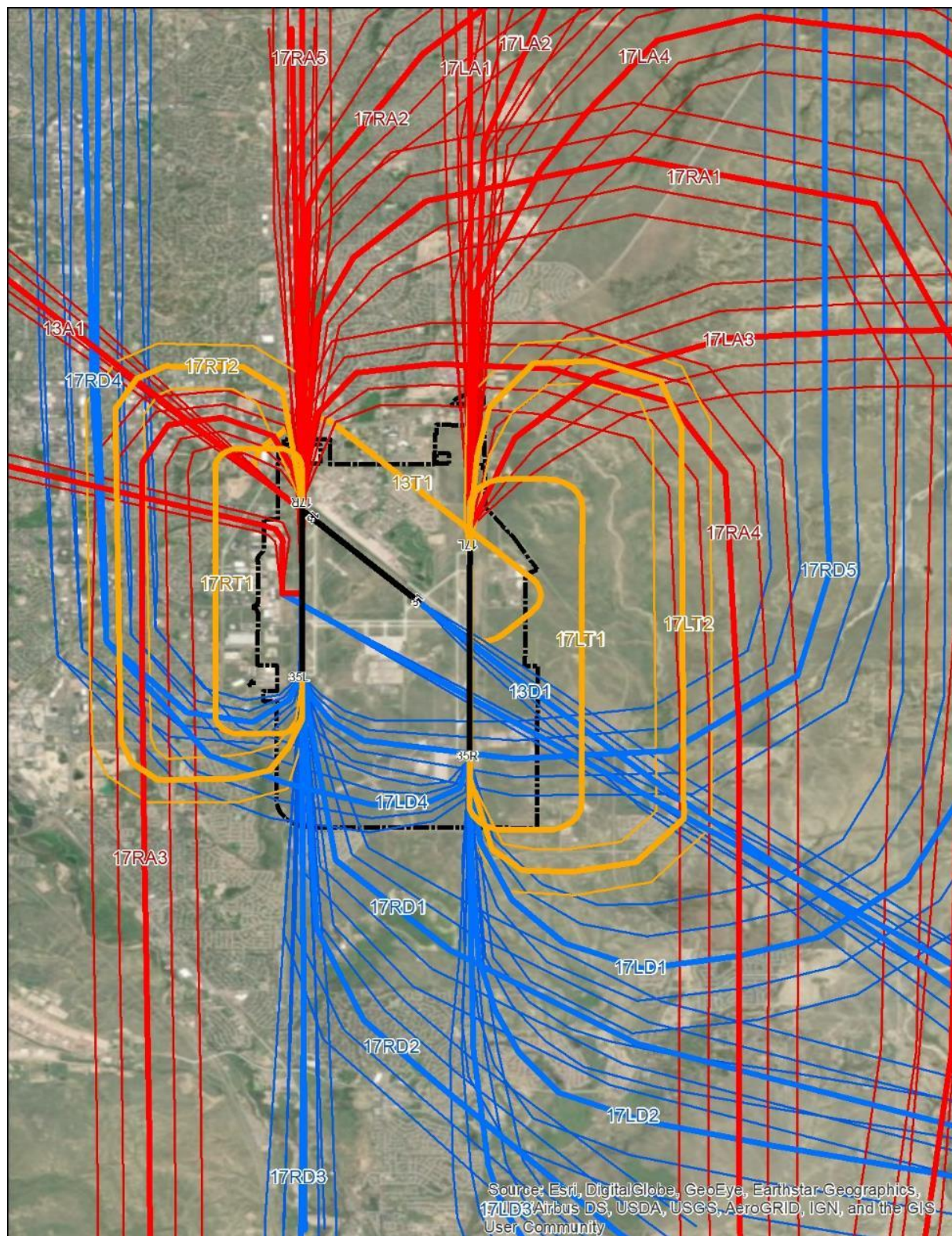
Source: FAA Data; KB Environmental Sciences, Inc

Figure 4-4: Modeled Flight Tracks – North Flow



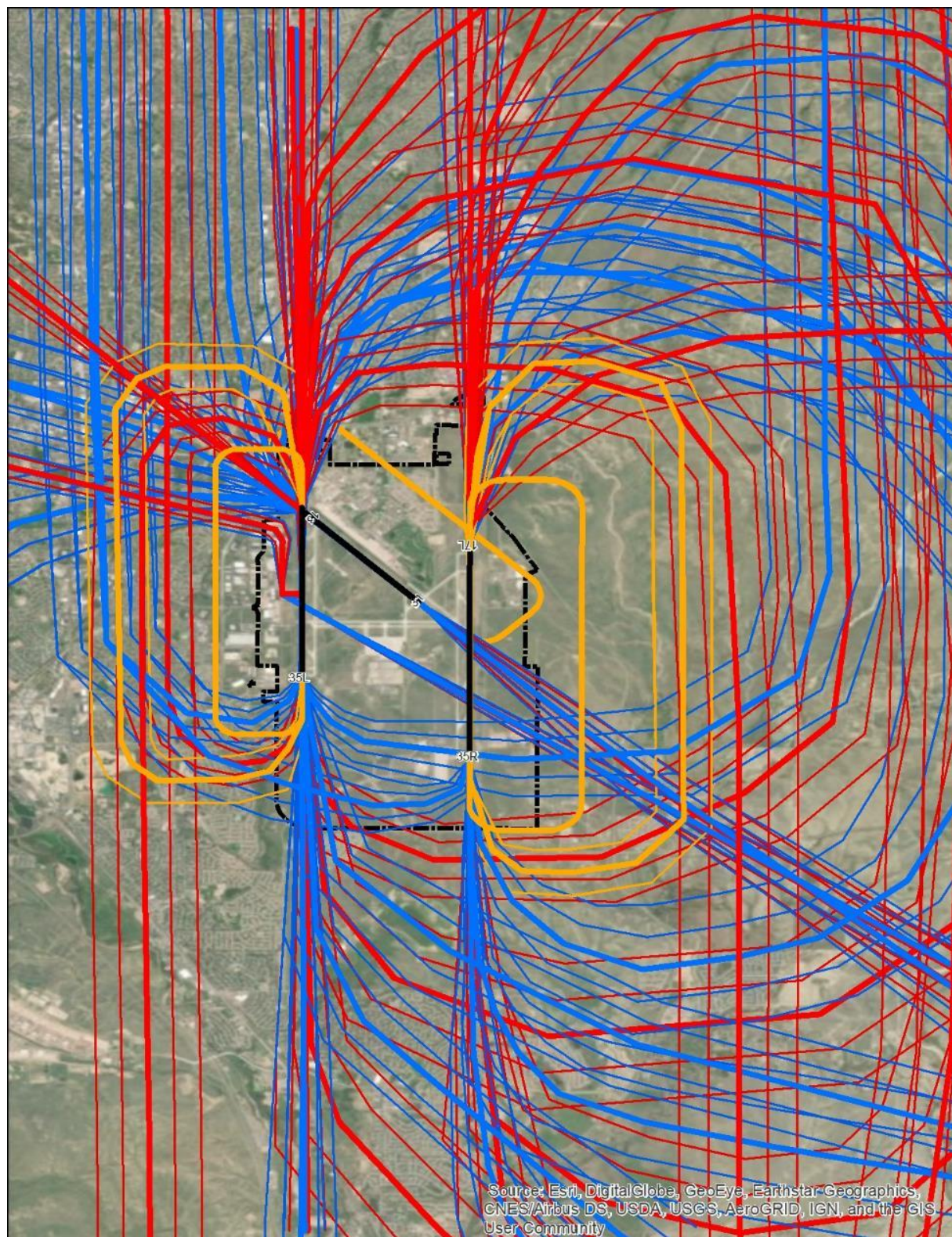
Note: Red tracks = arrivals, blue tracks = departures, and yellow tracks = airport pattern, touch & go.
Source: KB Environmental Sciences, Inc.

Figure 4-5: Modeled Flight Tracks – South Flow



Note: Red tracks = arrivals, blue tracks = departures, and yellow tracks = airport pattern, touch & go.
Source: KB Environmental Sciences, Inc.

Figure 4-6: Modeled Flight Tracks – ALL



Note: Red tracks = arrivals, blue tracks = departures, and yellow tracks = airport pattern, touch & go.
Source: KB Environmental Sciences, Inc.

4.2.7 2019 DNL Contours

The 2019 55-75 DNL contours are provided on **Figure 4-7**. **Table 4-14** identifies the areas within the DNL contour ranges. As shown in the table, the total area within the 55 and greater DNL contour is approximately 16 square miles. The DNL 65 dB contour primarily remains within the airport property boundary.

Table 4-14: 2019 DNL Contour Areas

DNL Range	Area (Sq. Miles)	
	Total	Off- Airport Property
55 to <60	9.21	4.88
60 to <65	3.75	0.62
65 to <70	1.50	0.03
70 to <75	0.74	0.00
75 and greater	0.95	0.00
Total	16.16	5.53

Source: KB Environmental Sciences, Inc.

4.2.8 2039 DNL Contours

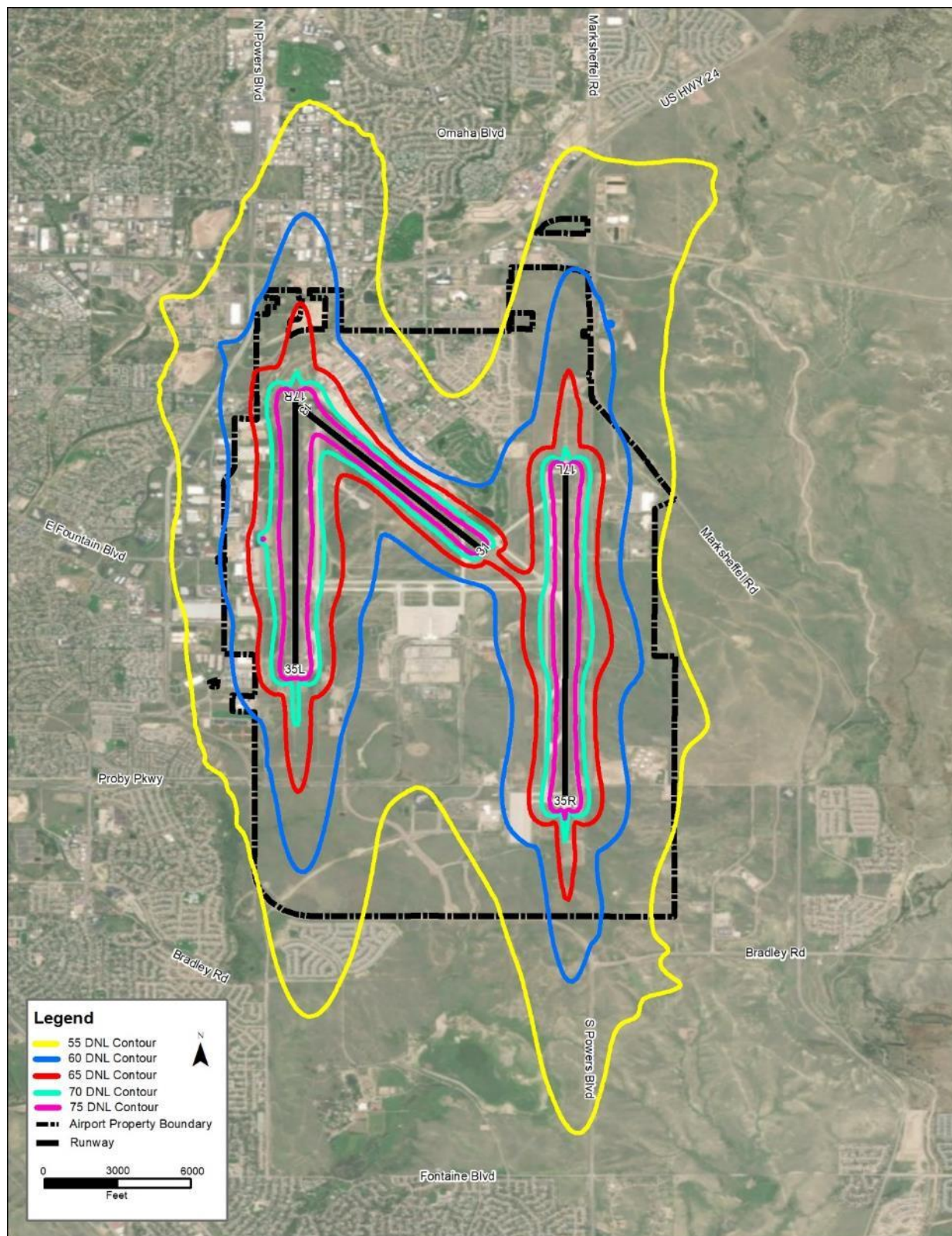
The 2039 DNL 55-75 dB contours are provided on **Figure 4-8**. **Table 4-15** identifies the areas within the DNL contour ranges. As shown in the table, the total area within the DNL 55 dB and greater DNL contour is approximately 22 square miles, an increase of 6 square miles over the 2019 condition. The DNL 65 dB contour primarily remains within the airport property boundary. Aircraft engines overall are getting quieter with the continued improvement in technology. The 2039 contours represent a long-term scenario for the purposes of compatible land use planning. These contours should be updated in the future to account for changes to the operations/aircraft fleet mix forecast to be operating at COS.

Table 4-15: 2039 DNL Contour Areas

DNL Range	Area (Sq. Miles)	
	Total	Off- Airport Property
55 to <60	12.90	9.27
60 to <65	5.07	1.48
65 to <70	2.15	0.10
70 to <75	0.92	0.00
75 and greater	1.20	0.00
Total	22.23	10.85

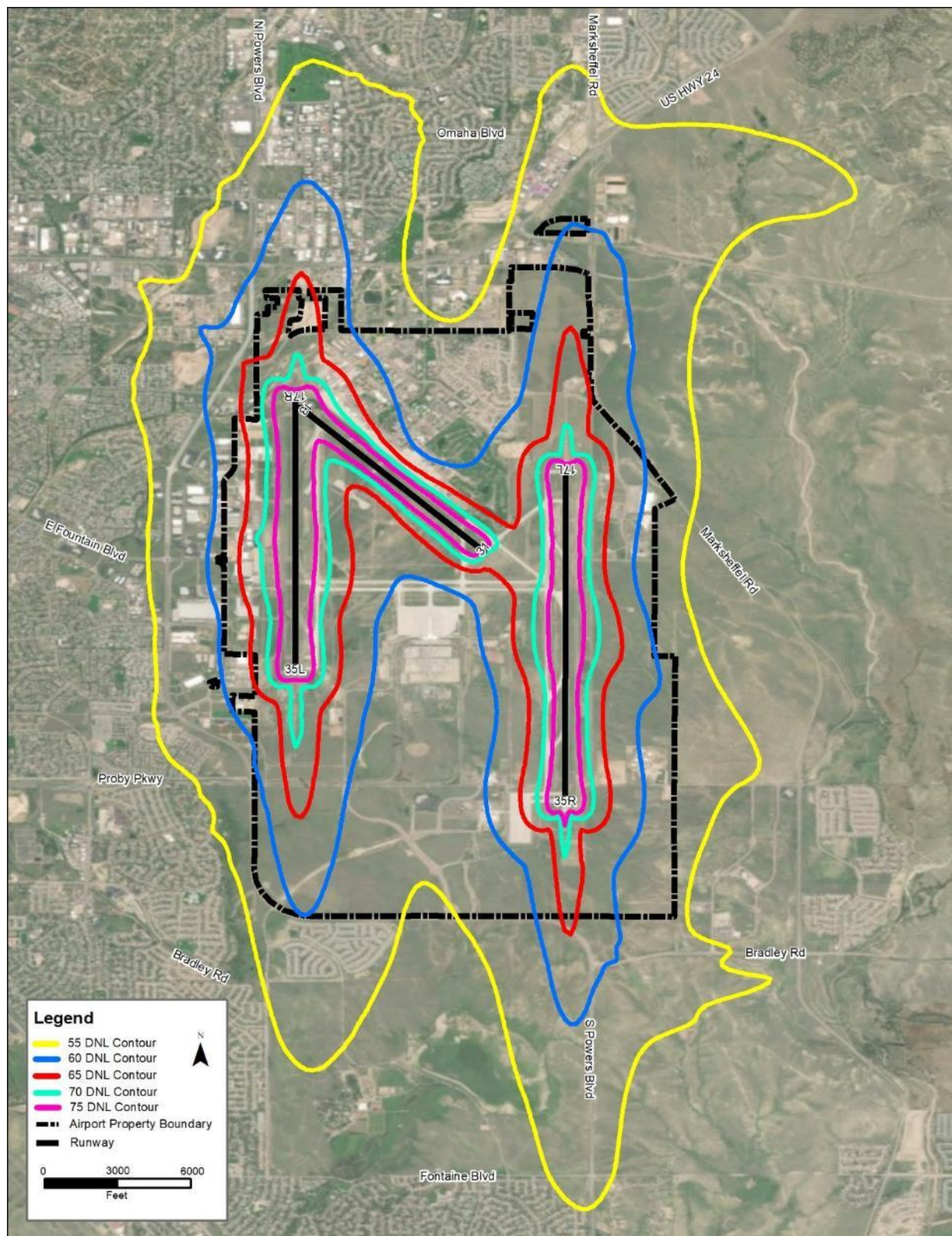
Source: KB Environmental Sciences, Inc.

Figure 4-7: 2019 DNL Contours



Source: KB Environmental Sciences, Inc.

Figure 4-8: 2039 DNL Contours



Source: KB Environmental Sciences, Inc.

4.3 Community Sound Level Measurements

For the purposes of developing an understanding of community and aircraft sound levels, measurements were made at eight locations around COS. The data collected was used to show relative levels from common community sound sources and sound levels from aircraft operating at COS.

The sound measurements were made during the three-day period of Monday, March 9, 2020 through Wednesday March 11, 2020.

There were a number of guidelines related to selection of the measurement sites that were key to successful measurement results. These guidelines indicated that a site should:

- Preferably be on public property
- Be located off the ends of each runway or sideline (pattern training)
- Be able to capture the various aircraft operating at COS
- Be away from tree canopies
- Be away from reflective surfaces
- Be away from construction sites, air conditioners and other local sound sources

Using the guidelines, eight measurement sites were selected and are shown on **Figure 4-9**. The approximate distance from the airport of each of the sites is listed below.

Site 1 - 1.5 miles north of the Runway 17R threshold

Site 2 - 1 mile west of Runway 17R-35L

Site 3 - 2 miles south of the Runway 35L threshold

Site 4 - 1.5 miles south of the Runway 35R threshold

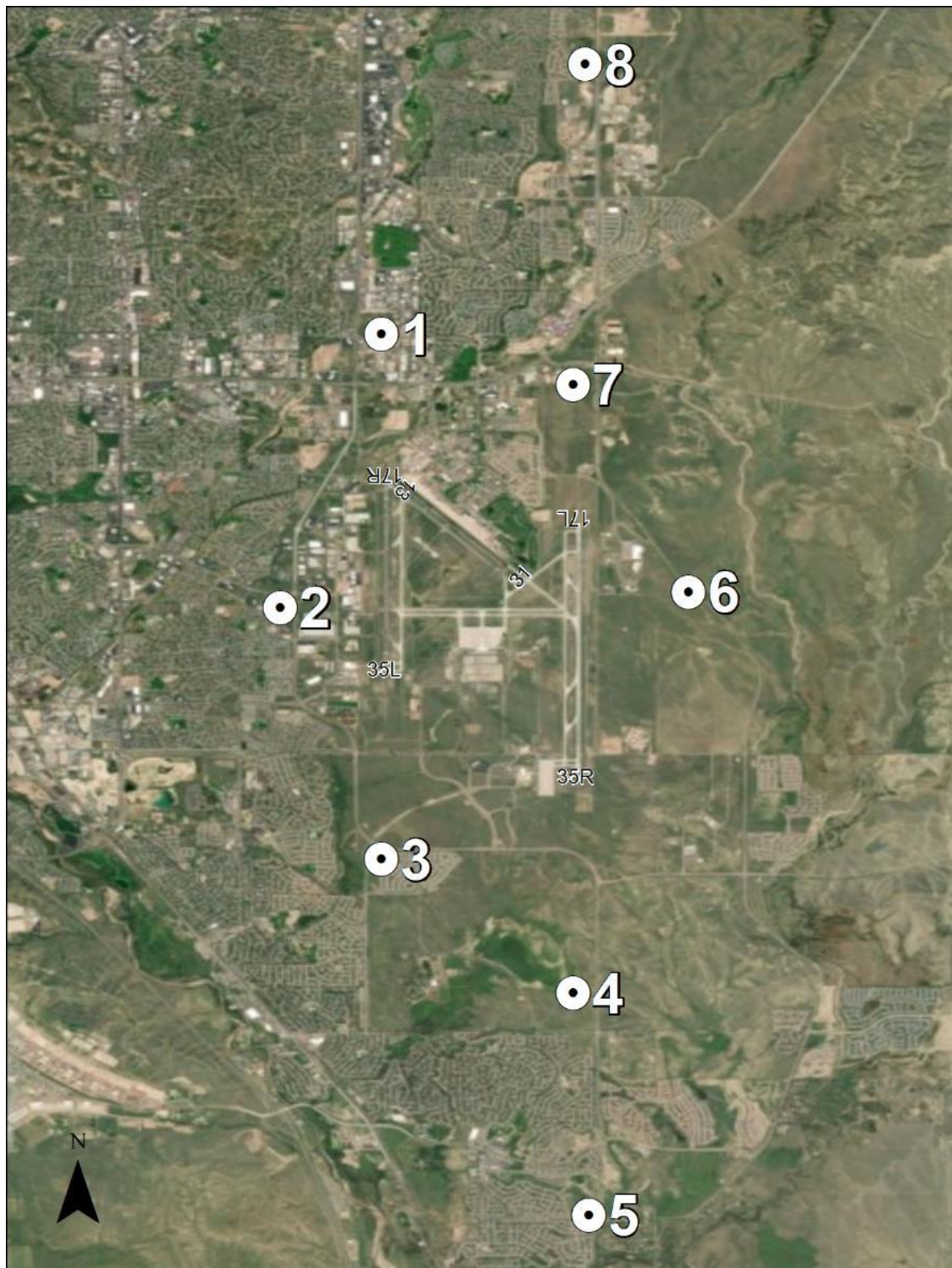
Site 5 - 5 miles south of the Runway 35R threshold

Site 6 – 1.3 miles east of Runway 17L-35R

Site 7 - 1.5 miles north of the Runway 17L threshold

Site 8 - 5 miles north of the Runway 17L threshold

Figure 4-9: Sound Level Measurement Sites



Source: KB Environmental Sciences, Inc

4.3.1 Measurement Process

A sound level measurement data sheet was prepared for each site. Prior to measurements at each site, the sound meter (Larson Davis 720 SLM) was calibrated (using a Larson Davis CAL 150B). The slow response setting and the A- weighted scale were used.

Staff were at each location during the measurement period to identify and note observations related to aircraft activities as well as other community sound sources. The aircraft and other sound sources were observed and maximum sound levels (Lmax) were noted in the data sheet for each event. The most common community sound source was passing vehicle traffic (cars, trucks and motorcycles). The general ambient and typical background levels were also noted.

Efforts were made to identify the specific aircraft type that generated each measured sound level. This included reviewing publicly available IFR and airport scheduled flight data. The specific aircraft type (or general description if the aircraft could not be specifically identified) are included in the results.

It should be noted that the sound levels identified are from a short period of time. Aircraft sound levels in any community are affected by the direction of flow at the airport, wind direction, humidity, aircraft types, and other general factors. Although the aircraft sound levels measured are representative of the magnitude of exposure, it is recognized that there will be variances in exposure from day to day. It is also important to note that the measured levels of aircraft sound may not be used to alter the sound data contained in the AEDT and subsequently cannot be used to develop or modify DNL contours.

The Lmax sound levels measured at each site for both aircraft and community sources are provided in the tables below.

4.3.2 Sound Level Measurement Results

Table 4-16: Site 1 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Beech 65 (general aviation)	Arrival	84.1	Overhead	Heavy Truck	70.0
Canadair Regional Jet	Arrival	52.9	Runway 17L	Heavy Truck	60.9
Canadair Regional Jet	Arrival	54.1	Runway 17L	Heavy Truck	62.9
Embraer 170 Regional Jet	Arrival	53.6	Runway 17L	Heavy Truck	70.8
Canadair Regional Jet	Arrival	54.4	Runway 17L	Mustang Car	78.3
Canadair Regional Jet	Arrival	55.1	Runway 17L	Pickup Truck	61.0
Embraer 145 Regional Jet	Arrival	60.1	Runway 17L	General Traffic	54-57
Embraer 145 Regional Jet	Arrival	58.0	Runway 17L	General Background	54-57
Airbus A320	Arrival	58.0	Runway 17L		
Boeing 737-800	Departure	66.3	Runway 35R		
Canadair Regional Jet	Departure	60.2	Runway 35R		
Canadair Regional Jet	Departure	57.2	Runway 35R		

Source: KB Environmental Sciences, Inc

Site 1 –Looking South



Table 4-17: Site 2 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Beech King Air (general aviation)	Departure	59.4	Runway 17R	Truck	62.3
Beech King Air (general aviation)	Overflight	70.2	Overhead	Truck	62.3
Piper PA 28 (general aviation)	Departure	54.6	Runway 17R	Car	52.0
Piper PA 28 (general aviation)	Overflight	70.1	Overhead	Nearby Construction	62-65
General Aviation Jet	Departure	86.1	Runway 17R	General Traffic	55-60
Piper PA 28 (general aviation)	Overflight	71.0	Overhead	Quiet Background	45-47
General Aviation Prop	Overflight	58.3	Overhead		
General Aviation Prop	Overflight	74.0	Overhead		
General Aviation Jet	Departure	74.8	Runway 17R		
General Aviation Prop	Overflight	70.3	Overhead		
Beech King Air (general aviation)	Departure	64.2	Runway 35L		
General Aviation Prop	Overflight	67.3	Overhead		
General Aviation Prop	Overflight	68.0	Overhead		
General Aviation Prop	Overflight	68.1	Overhead		

Source: KB Environmental Sciences, Inc

Site 2 – Looking East



Table 4-18: Site 3 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Boeing 757	Departure	71.9	Runway 17R	Garbage Truck	70.6
Airbus A320	Departure	64.1	Runway 17L	Motorcycle	72.1
Beech King Air (general aviation)	Departure	64.2	Runway 17R	Motorcycle	65.4
Boeing 757	Departure	79.2	Runway 17R	Motorcycle	64.4
Boeing 737-800	Departure	62.4	Runway 17L	Car	63.4
Embraer 145 Regional Jet	Departure	50.8	Runway 17L	Car	60.1
Helicopter	Overflight	69.2	Overhead	Car	60.5
Military C130	Departure	79.0	Runway 17L	Truck	61.3
Military C130	Departure	74.0	Runway 17L	Dog Barking	57.0
Military C130	Departure	67.8	Runway 17L	SUV	60.4
Cessna 172 (general aviation)	Overflight	69.6	Overhead	Pickup Truck	62.3
Cessna 172 (general aviation)	Overflight	72.1	Overhead	General Traffic	58-60
Beech King Air (general aviation)	Departure	67.0	Runway 17R	Quiet Background	41-45
Military C130	Overflight	82.4	Overhead		
Military Jet	Departure	84.9			
Two Military Jets	Overflight	90.5	Overhead		

Source: KB Environmental Sciences, Inc

Site 3 - Looking West



Table 4-19: Site 4 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Boeing 757	Departure	67.3	Runway 17R	Garbage Truck	58.2
Jet (general aviation)	Departure	63.7	Runway 17R	General Traffic	51-54
Helicopter (civil)	Departure	56.8		Quiet Background	44-47
Boeing 737-800	Departure	73.1	Runway 17L		
Boeing 757	Departure	60.1	Runway 17R		
Jet (general aviation)	Departure	58.8	Runway 17R		
Boeing 737-800	Departure	70.5	Runway 17L		
Canadair Regional Jet	Departure	65.5	Runway 17L		
Twin Piston (general aviation)	Departure	54.3	Runway 17R		
Military C130	Departure	81.0	Runway 17L		
Embraer 145 Regional Jet	Departure	71.6	Runway 17L		
Military C130	Departure	57.2	Runway 17R		
Canadair Regional Jet	Departure	66.2	Runway 17L		
Canadair Regional Jet	Departure	67.2	Runway 17L		
Military C130	Departure	57.2	Runway 17R		
Helicopter (civil)	Overflight	68.0			

Source: KB Environmental Sciences, Inc

Site 4 - Looking North



Table 4-20: Site 5 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Canadair Regional Jet	Departure T	53.5	Runway 17L*	Dirt Hauling Truck	64.6
Canadair Regional Jet	Departure	54.8	Runway 17L*	Garbage Tuck	58.1
Boeing 737-800	Departure	70.1	Runway 17L	Dirt Hauling Truck	59.2
Canadair Regional Jet	Departure	54.2	Runway 17L*	General Background	51-55
General Aviation Prop	Departure	51.9	Runway 17R		
Embraer 145 Regional Jet	Departure	52.3	Runway 17L*		
Airbus A320	Departure	51.5	Runway 17L*		
Airbus A320	Arrival	67.0	Runway 35R		
* Turned east prior to site					

Source: KB Environmental Sciences, Inc

Site 5 - Looking North



Table 4-21: Site 6 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Embraer 145 Regional Jet	Departure	53.1	Runway 17L	Heavy Truck	78.6
Airbus A320	Arrival	65.2	Runway 17L	Heavy Truck	72.7
General Aviation Prop	Departure	52.6	Runway 17L	Heavy Truck	78.3
General Aviation Prop	Overflight	61.1		Car	60.3
General Aviation Prop	Overflight	61.1		General Traffic	64-71
				Quiet Background	40-45

Source: KB Environmental Sciences, Inc

Site 6 - Looking South



Table 4-22: Site 7 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Canadair Regional Jet	Departure	79.6	Runway 35R	Heavy Truck	62.4
Canadair Regional Jet	Departure	76.4	Runway 35R	Heavy Truck	63.0
Canadair Regional Jet	Arrival	75.6	Runway 17L	Motorcycle	55.8
Canadair Regional Jet	Arrival	73.2	Runway 17L	General Background	53-59
Embraer 170 Regional Jet	Arrival	82.4	Runway 17L	Quiet Background	42-46
Embraer 145 Regional Jet	Arrival	78.8	Runway 17L		
Airbus A320	Arrival	78.6	Runway 17L		
Canadair Regional Jet	Arrival	75.1	Runway 17L		
Embraer 145 Regional Jet	Arrival	78.1	Runway 17L		
Canadair Regional Jet	Arrival	74.4	Runway 17L		
Canadair Regional Jet	Arrival	74.8	Runway 17L		
Embraer 170 Regional Jet	Arrival	80.0	Runway 17L		
Embraer 145 Regional Jet	Arrival	78.5	Runway 17L		
Piper PA 28 (general aviation)	Arrival	77.3	Runway 17L		
Military C130	Arrival	84.1	Runway 17L		
Embraer 145 Regional Jet	Arrival	76.5	Runway 17L		
Airbus A320	Arrival	79.4	Runway 17L		

Source: KB Environmental Sciences, Inc

Site 7 - Looking South/Southeast



Table 4-23: Site 8 Sound Level Measurements

Aircraft	Operation	Lmax (dBA)	Notes	Other Non-Aircraft Events	Lamax (dBA)
Canadair Regional Jet	Departure	60.1	Runway 35R*	Jeep	71.8
Canadair Regional Jet	Departure	68.4	Runway 35R	Car	62.5
Canadair Regional Jet	Departure	66.4	Runway 35R*	School Bus	67.5
Canadair Regional Jet	Departure	60.8	Runway 35R*	Cement Truck	76.4
Embraer 170 Regional Jet	Departure	63.1	Runway 35R*	Light Traffic	54-57
Embraer 170 Regional Jet	Arrival	75.3	Runway 17L	General Traffic	58-63
Cessna 172 (general aviation)	Arrival	56.1	Runway 17L	General Background	58-63
Embraer 145 Regional Jet	Arrival	53.6	Runway 17R		
General Aviation Prop	Arrival	57.2	Runway 17L		
General Aviation Prop	Arrival	62.1	Runway 17L		
Embraer 145 Regional Jet	Arrival	69.5	Runway 17L		
Airbus A320	Arrival	78.3	Runway 17L		
* Turned east prior to site					

Source: KB Environmental Sciences, Inc.

Site 8 - Looking South



4.4 COS Annual Service Volume DNL Contours

In the effort to promote long-term off-airport compatible land use planning and recognizing that COS will be in operation beyond the 20-year aviation activity forecast timeframe, DNL contours have been prepared for the airport's annual service volume (ASV). The FAA defines ASV as a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, weather conditions, that would be encountered over a year's time. The means to determine an airport's ASV is found in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*. Capacity is defined as the maximum number of aircraft operations which can be accommodated at the airport over a period of time. Based on information in the FAA AC, COS's ASV is 320,000 annual operations.

The aircraft operations for the ASV scenario by category was determined by multiplying the percentage of operations in each category that occurred in 2019 by the total ASV operations. These data are shown in **Table 4-24**.

Table 4-24: Modeled COS ASV Operations

Air Carrier	Air Taxi	GA	Military	Total
44,800	19,200	160,000	96,000	320,000

Source: Jviation, Inc. and KB Environmental Sciences, Inc.

The aircraft operations and fleet for itinerant and local operations was determined by multiplying the percentages by aircraft type that occurred in 2019 by the total ASV and are provided in **Table 4-25** and **Table 4-26**. The table also identifies the AEDT aircraft assignment for each.

Table 4-25: Modeled 2019 ASV Operations by Aircraft Type - Itinerant

Category	Aircraft Type(s)	Percent of Category	AEDT Noise ID	Operations
Air Carrier	Airbus A-320	23.3%	A320-232	10,437
	Bombardier CRJ-700/900	22.0%	CRJ9-ER	9,870
	Boeing 737-800	20.8%	737800	9,320
	Embraer ERJ 170/175	19.1%	EMB170	8,545
	Boeing 757-200	7.9%	757PW	3,530
	Boeing 737-700	2.6%	737700	1,161
	Airbus A-319	1.6%	A319-131	734
	Boeing 767-300/400	0.9%	767300	413
	Airbus A-321	0.9%	A321-232	386
	Boeing 747-400	0.6%	747400	277
	Boeing 777-200	0.3%	777200	126
	Air Carrier Total	100.0%		44,800
Air Taxi	Bombardier CRJ-200, Challenger 300/600	69.3%	CL600	13,298
	Embraer ERJ 135/140/145	9.4%	EMB145	1,802
	King Air/Super King Air, Swearingen Metroliner	5.5%	DHC6	1,048
	Cessna Citation Jet, Phenom 300	3.5%	CNA500	673
	Learjet 35/40/45/55/60/75	2.6%	LEAR35	500
	Cessna 560 Excel / Ultra	2.6%	CNA560U	491
	Cessna 680 Citation Sovereign	2.3%	CNA680	442
	Cessna 750 Citation X, Dassault Falcon 2000	1.9%	CNA750	365
	Gulfstream GIV, GV	1.5%	GV	282
	Cessna 550, Beechjet 400	0.6%	CNA55B	110
	IA 1125 Westwind, Gulfstream 150	0.3%	IA1125	64
	Pilatus PC-12, Cessna 208 Caravan	0.2%	CNA208	46
	Bombardier BD-700 Global Express	0.2%	BD-700-1A10	44
	Dassault Falcon 900	0.2%	FAL900EX	37
	Air Taxi Total	100.0%		19,200
General Aviation	Cessna 172 /177, Lancair 360	25.2%	CNA172	18,519
	Beechcraft Bonanza 33/35/36, Mooney M20C	23.9%	GASEPV	17,559
	Cirrus SR20/22	12.0%	COMSEP	8,802
	King Air/Super King Air	7.0%	DHC6	5,141
	Piper Twin Comanche	6.4%	PA30	4,717
	Cessna Citation Jet, Phenom 300	4.7%	CNA500	3,423
	Eclipse 500	3.5%	ECLIPSE500	2,544
	Pilatus PC-12, Cessna 208 Caravan	2.7%	CNA208	2,005
	Cessna 560 Excel / Ultra	2.2%	CNA560U	1,607
	Learjet 35/40/45/55/60/75	2.1%	LEAR35	1,563
	Cessna 441 / 425	1.4%	CNA441	1,012
	Cessna 550, Beechjet 400	1.2%	CNA55B	907
	IA 1125 Westwind, Gulfstream 150	1.2%	IA1125	863
	Cessna 750 Citation X, Dassault Falcon 2000	0.9%	CNA750	676
	Challenger 300/600	0.8%	CL600	623
	Dassault Falcon 900	0.8%	FAL900EX	557

Category	Aircraft Type(s)	Percent of Category	AEDT Noise ID	Operations
	Gulfstream GIV, GV	0.7%	GV	519
	Cessna 680 Citation Sovereign	0.5%	CNA680	354
	Bombardier BD-700 Global Express	0.1%	BD-700-1A10	92
	AgustaWestland A119	1.9%	A109	1,398
	Aerospatiale/Airbus AS350	1.0%	SA350D	717
	General Aviation Total	100.0%		73,598
Military	Lockheed C-130 Hercules	23.3%	C130E	9,223
	UV18 / De Havilland DHC-6	13.9%	DHC6	5,522
	F-16, F-22, F-35	11.1%	F16PW0	4,408
	Cirrus SR20/22	9.0%	COMSEP	3,562
	Pilatus PC-12	7.9%	CNA208	3,123
	C-17 Globemaster	6.3%	C17	2,513
	C-21 / LearJet 35	6.0%	LEAR35	2,367
	F-18	5.6%	F-18	2,204
	C37A / Gulfstream V	2.7%	GV	1,082
	Northrop T-38 Talon	2.6%	T-38A	1,017
	Boeing KC-135 Stratotanker	2.4%	KC135R	952
	Fairchild Republic A-10	2.3%	A10A	919
	Boeing 737-700	2.2%	737700	862
	Boeing 767-300	1.4%	767300	561
	Bombardier /De Havilland DHC-8	1.1%	DHC830	423
	Boeing 747-400	1.0%	747400	407
	Sikorsky S-70 / UH-60 Blackhawk	1.0%	S70	399
	CH-47 Chinook	0.2%	CH47D	98
	Military Total	100.0%		39,642
All Aircraft Itinerant				177,240

Source: Jviation Inc. and KB Environmental Sciences, Inc.

Table 4-26: Modeled 2019 ASV Operations by Aircraft Type - Local

Category	Aircraft Type(s)	Percent of Category	AEDT Noise ID	Operations
General Aviation	Cessna 172 /177, Lancair 360	39.0%	CNA172	33,696
	Beechcraft Bonanza 33/35/36, Mooney M20C	36.0%	GASEPV	31,104
	Cirrus SR20/22	18.0%	COMSEP	15,552
	Cessna 441 / 425	7.0%	CNA441	6,048
	General Aviation Total	100.0%		86,400
Military	Lockheed C-130 Hercules	100.0%	C130E	56,361
	Military Total	100.0%		56,361
All Aircraft Local				142,760

Source: Jviation Inc. and KB Environmental Sciences, Inc.

4.4.1 Time of Day

Aircraft operations modeled in AEDT are assigned as occurring during daytime (7:00 A.M. to 9:59 P.M.) or nighttime (10:00 P.M. to 6:59 A.M.). As previously stated, DNL values are calculated such that aircraft operations during the night are penalized by the addition of 10 dBA to each operation. The time-of-day percentages modeled for 2019 and 2039 were based on 2019 actual aircraft data. For conservative noise modeling purposes, the percentage of aircraft operations modeled at night for the ASV scenario was increased by 5% over what occurred in 2019. The time-of-day percentages of operations modeled by aircraft category for the ASV scenario are summarized in **Table 4-27**.

Table 4-27: 2019 ASV Percent Operations by Time of Day

	Departures	
	Daytime (7:00am-9:59pm)	Nighttime (10:00pm-6:59am)
Air Carrier	76%	24%
Air Taxi	87%	13%
General Aviation	89%	11%
Military	92%	8%
	Arrivals	
	Daytime (7:00am-9:59pm)	Nighttime (10:00pm-6:59am)
Air Carrier	82%	18%
Air Taxi	86%	14%
General Aviation	91%	9%
Military	91%	9%

Source: KB Environmental Sciences, Inc.

The runway use, flight tracks, flight track use percentages and aircraft departure stage lengths modeled for the ASV were the same as both the 2019 and 2039 conditions.

4.4.2 Airport ASV DNL Contours

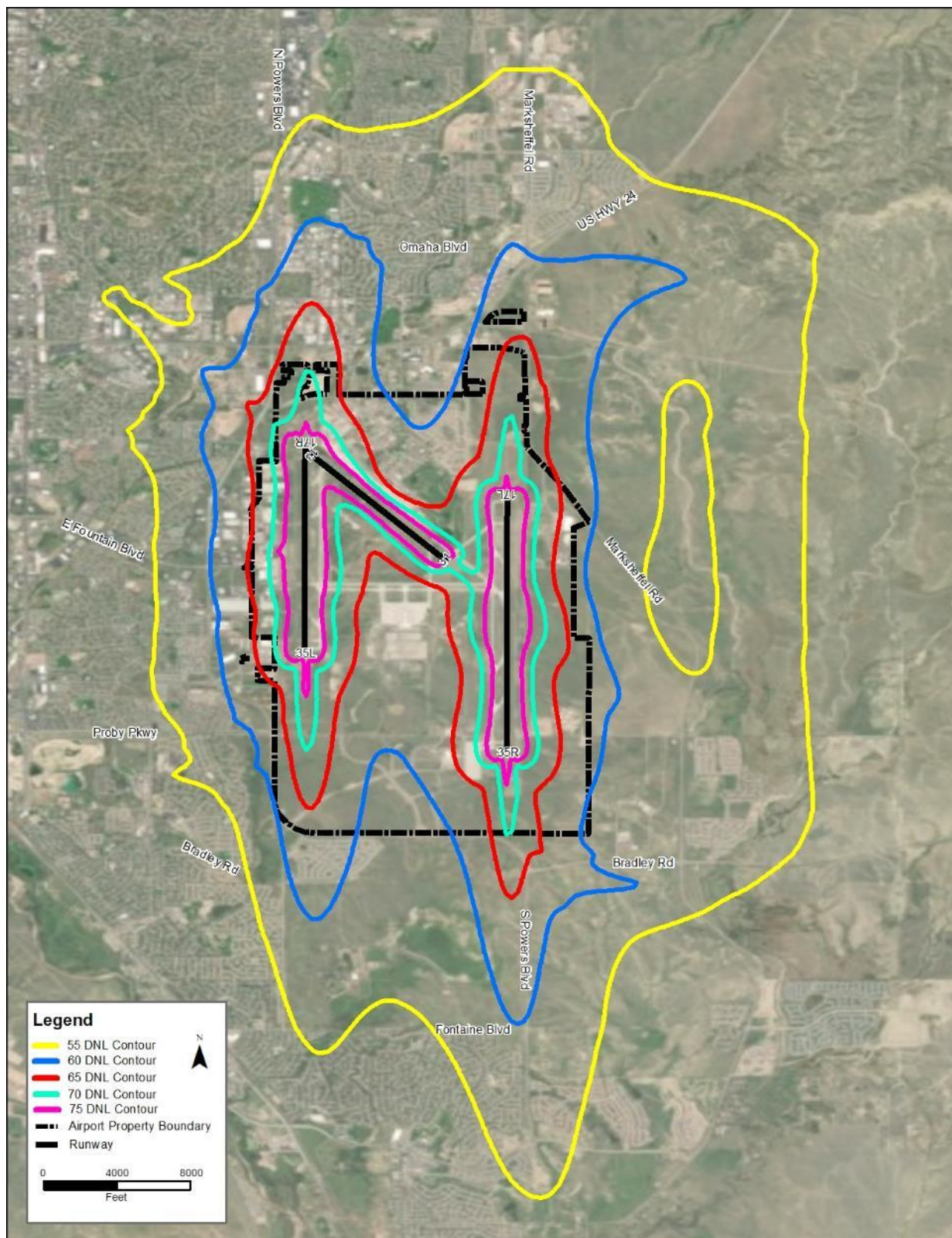
The COS ASV DNL 55-75 dB contours are provided on **Figure 4-10**. **Table 4-28** identifies the areas within the DNL contour ranges. As shown in the table, the total area within the 55 and greater DNL contour is approximately 43 square miles. The DNL 65 dB contour includes 0.85 square miles of land beyond the airport property boundary.

Table 4-28: 2019 ASV DNL Contour Areas

DNL Range	Area (Sq. Miles)	
	Total	Off- Airport Property
55 to <60	24.97	24.44
60 to <65	10.25	6.13
65 to <70	4.13	0.85
70 to <75	1.68	0.03
75 and greater	1.85	0.00
Total	42.88	31.45

Source: KB Environmental Sciences, Inc.

Figure 4-10: 2019 ASV DNL Contours



Source: KB Environmental Sciences, Inc.

5 Airport Land Use Compatibility Plan

5.1 Preface

The final chapter of the Colorado Springs Airport Land Use Compatibility Study is the culmination of the previous chapters and analyses, providing requirements for development within the vicinity of the Airport. This Chapter has taken into account industry standards and developed guidance and requirements to ensure compatible land use in the vicinity of COS as well as an appropriate review process. To provide clarity on the new requirements, the following preface provides a summary of changes found in this chapter and why the changes have been made.

5.1.1 Airport Overlay and Subzones

5.1.1.1 Airport Overlay

The previous Airport Overlay (AO) adopted by the City of Colorado Springs, El Paso County, and City of Fountain was based on the outer limits of the imaginary surfaces defined by the Federal Aviation Administration (FAA) in 14 C.F.R. Part 77 (Part 77). This regulation establishes standards and notification requirements for objects affecting navigable airspace and is controlled by the FAA.

In addition to the Part 77 surfaces, Part 77.9 of 14.C.F.R. also includes a FAA notification area. To provide a simple airport overlay that includes all areas that may trigger FAA and/or Airport review, the original AO has been expanded to include the FAA notification area. This area extends 20,000 feet from runway ends at a slope of 100:1.

In addition to revising the limits of the AO, the Aircraft Navigation Subzone (ANAV) is being discontinued. The boundaries of the ANAV corresponded with the limits of the previous AO; to eliminate redundancy and provide clearer overlays and subzones, the ANAV subzone was eliminated in this chapter. **Figure 5-1** depicts a comparison between the previous AO/ANAV and the new AO.

FAA Determination of Hazard

It is important to note that the FAA requirements found in Part 77.9 remain regardless of the limits of the AO. Development that triggers FAA notification must complete FAA Form 7460-1 (Notice of Proposed Construction or Alteration) and associated documentation. Once the FAA has completed an aeronautical study, a determination is issued regarding the impact to air navigation. One of three responses is typically issued:

- Determination of No Hazard - The subject construction did not exceed obstruction standards and marking/lighting is not required.
- Determination of No Hazard with Conditions - The proposed construction/alteration would be acceptable contingent upon implementing mitigating measures such as the marking and lighting of the structure.
- Determination of Hazard - The proposed construction/alteration is determined to be a hazard to air navigation.

This determination will be provided to the City or County as part of the development application process. It is the intent of this Plan to revise the existing AO to more directly and explicitly prohibit the construction of structures in the AO that the FAA has determined would constitute a hazard to air navigation.

5.1.1.2 DNL 65 dB Noise Contour (DNL65)

The previous City Code included the Airport Noise Subzone (ADNL). This subzone was based on the projected annual average noise exposure (DNL) and included the DNL 65 dB, DNL 70 dB, and DNL 75 dB to noise contours. As part of this study and as discussed in Chapter 4, the noise contours were updated in 2020. The limits of the DNL 65 dB and increasing noise levels have changed and are now based on airport service volume (ASV). A new subzone, the DNL65, has replaced the ADNL and provides a more distinct title as well as simplified limit based only on the DNL 65 dB. The increasing DNL's were found to be irrelevant as a subzone as they remained largely on airport property and within the boundary of the DNL65

A short technical paper discussing the background and significance of the DNL 65 dB is included in **Appendix A**.

Figure 5-1 depicts the comparison between previous ADNL and the new DNL65.

5.1.1.3 Airport Influence Area (AIA)

This chapter includes the addition of the Airport Influence Area (AIA), a subzone based on the DNL 60 dB noise contour using the revised ASV modeling. As briefly discussed in **Chapter 2** and frequently used throughout the country to ensure land use compatibility in relation to noise, noise disclosure and sound attenuation are required within this subzone. This subzone establishes a buffer based on the DNL 60 dB, rather than the standard FAA DNL 65 to allow for flexibility in permitted land uses while ensuring adequate sound protection and notification of those developing in proximity to the Airport.

The limits of the AIA are depicted in **Figure 5-1**.

5.1.2 Basis of Noise Contours

As mentioned previously, the noise contours prepared as part of this study are based on airport annual service volume (ASV) rather than airport operations which were the basis in previous noise contours. The FAA defines ASV as a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, weather conditions, that would be encountered over a year's time. It was determined that the use of ASV was the preferred noise model base for COS as the resulting contours would ultimately provide noise protection for the maximum capacity of the Airport rather than forecasted operations which fluctuate over time.

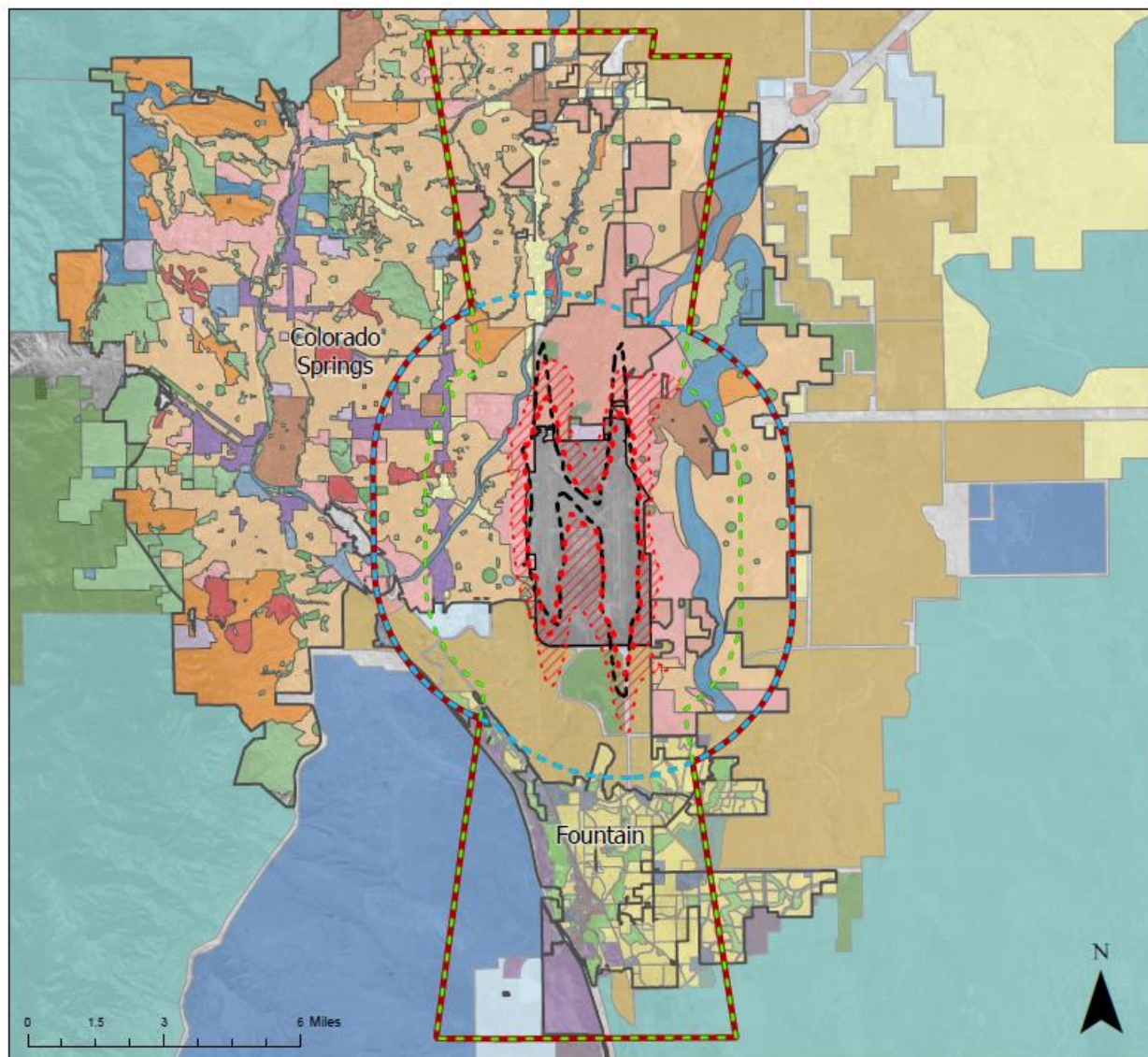
5.1.3 Land Use Compatibility Standards




































The main purpose of this study and most importantly this chapter is to provide a unified and single set of compatibility standards for all development that occurs within the AO regardless of local jurisdiction. It is recommended that the City of Colorado Springs, El Paso County, and the City of Fountain adopt the standards as a part of their permit process.

Secondly, as a publicly-owned airport that has and will continue to accept federal grant monies from the FAA, the Airport is required to follow FAA guidance and requirements. Uniquely, the airfield is also shared

by Peterson Air Force Base which is required to follow the Department of Defense (DOD) standards. The safety zones and associated compatible land uses required by the DOD standards are oftentimes more stringent. As such, it was determined that the safety zones and associated land uses used by the DOD would be followed in this Plan to account for the stricter requirements and maintain compatibility with DOD standards. Specifically, the land uses discussed in **Table 5-2** follow the typical land use (Standard Land Use Manual) codes used by the DOD. It should be noted that because the DOD standards are followed in the Plan, Clear Zones (CZ) were added as subzones under the new AO. The CZ is a surface on the ground beginning at the runway end and symmetrical about the runway centerline extended, measuring 3,000 feet long and 3,000 feet wide. The purpose of the CZ is to enhance safety in an area that possesses a significant potential for aircraft accidents.

Figure 5-1: Overlay and Subzone Comparison



LAND USE			LEGEND		
El Paso County			 New / Developing Corridor	 Regional Center	
Colorado Springs					
 Urban Residential	 Candidate Open Space	Fountain	 Commercial	 Historic Downtown	
 Large-Lot Residential	 Commercial Center				 Industrial
 Suburban Residential	 Community Activity Center				 Mixed Use
 Employment Center	 Employment Center				 Public
 Regional Open Space	 Existing Golf Course / Cemetery				 Residential
 Rural	 Existing Park Land / Open Space				 Agriculture
 Incorporated	 General Residential				
 Military	 Low Residential				
	 Major Institutional				
	 Mature Redevelopment Corridor				
			Existing	 Airport Influence Area (AIA)  DNL 60 Contour ASV  DNL 65 Contour ASV (65 DNL)  Airport Overlay (AO)	
			Previous	 DNL 65 Contour  Airport Overlay (AO)  Part 77 Notification Area  Airport Property Boundary	

Source: Jviation

5.2 Introduction

5.2.1 Title

The title of this document shall be “The Colorado Springs Airport Land Use Compatibility Plan” and may be cited as such. The Colorado Springs Airport Land Use Compatibility Plan shall also be referred to as the “Plan”.

5.2.2 Authority

The City of Colorado Springs, El Paso County, and City of Fountain each have land use and zoning jurisdiction over specific areas within the AO. Although the City of Colorado Springs and the City of Fountain are within the boundaries of El Paso County, they are three distinct jurisdictional entities and are referred to herein as the “Entities”. It should be noted that the City of Colorado Springs is the owner and operator of the Colorado Springs Airport (Airport or COS) and has sole responsibility for land use and development decisions that occur on Airport property. Regarding land use decisions off-Airport property; the City of Colorado Springs will be treated separately from the Airport. Each of the Entities have statutory codes or ordinances in place for development within their respective jurisdictions; the codes may reference this Plan as a unified set of standards.

The AAC was formed in 1965 by City of Colorado Springs Ordinance No. 3183 and is a board of seven appointed members with representation from the Airport, City of Colorado Springs and El Paso County. The AAC acts in an advisory capacity to the Mayor, the City Council and the City Planning Commission, and, if requested, other City departments, enterprises, and quasi-governmental entities with an interest on Airport controlled property and may act in an advisory capacity to the El Paso County Planning Commission and the Board of County Commissioners of El Paso County. The AAC advises on matters concerning land use and all other matters affecting the construction, planning or operation of COS. The AAC does not have authority to approve or deny development proposals.

This Plan provides specific standards to evaluate development within the AO and support the Airport and AAC recommendations to the appropriate jurisdiction with authority over the proposed development. It is assumed that the Entities will adopt this Plan as part of their zoning law and therefore has been written as such.

5.2.3 Purpose

A land use compatibility plan encourages compatible land uses in the vicinity of an airport and provides for orderly growth of the airport as well as the surrounding area. It also meant to help safeguard the well-being of the people and property within the vicinity of an airport.

The purpose of the Colorado Springs Airport Land Use Compatibility Plan is to ensure that land use in areas surrounding the Colorado Springs Airport are compatible with present and projected future Airport operations. This Plan is intended to meet the following objectives:

1. To prohibit manmade structures, objects of natural growth, and land uses that constitute hazards to air navigation, in furtherance of the Entity’s obligations under Colorado Revised Statutes Section 43-10-113.

2. To restrict land uses and concentrations of people within areas of high accident potential surrounding the Airport as designated by the Federal Aviation Administration (FAA) and the U.S. Department of Defense (DOD).
3. To restrict residential and other noise-sensitive land uses in areas surrounding the Airport that are or may in the future be exposed to high levels of aircraft noise.
4. To restrict land uses in areas surrounding the Airport that may constitute wildlife attractants and thus present risk to aircraft operating to, from and at the Airport.
5. To ensure the free passage of aircraft in areas surrounding the Airport, as recognized in Colorado Revised Statutes Section 41-1-107, in a manner that does not constitute an impairment of property rights in violation of Colorado Revised Statutes Section 29-20-201.
6. To balance the vested rights and interests of private property owners with the Airport's objective to protect the viability of the Airport in support of the regional economy, the region's air transportation needs, and the flying missions of the Peterson Air Force Base.

5.2.4 Legal Status

This Plan shall serve three essential purposes:

1. To provide specific standards and procedural requirements for adoption by the Entities within their respective zoning laws to promote compatible development.
2. To provide specific standards and procedural requirements for adoption by the Airport and AAC to guide their review of land use and development proposals submitted to the Entities and referred to the Airport and AAC.
3. To inform property owners and developers on the airport land use compatibility factors and considerations that should guide responsible development in the areas surrounding the Airport.

Applicability and Exemptions

The following applicability and exemptions apply to this Plan:

1. The requirements of this Plan shall apply in all cases where all or a portion of the property subject to application for development approval is located within the AO.
2. The requirements of this Plan shall not apply to a lawfully constructed building or structure in existence at the time of adoption of the code or ordinance from which this zone derives, provided no changes in use or material changes in the structure are made. All property owners within the AO shall have continuing obligations to, for example and without limitation, avoid interference with the Airport as proscribed herein; maintain marking and lighting of airport hazards; and reduce the height of objects of natural growth as may be required by aviation easement. Where the provisions of this Plan conflict with those of the underlying zoning, the requirements of this Plan shall control.

3. Peterson Air Force Base (PAFB) is working with the community to develop and implement a Joint Land Use Study (JLUS) that sets the stage for both the community and base to move forward in addressing land use compatibility. If the installation and the local governments are unable to work collaboratively, the installation is more vulnerable to the possibility of being closed and its troops and operations reassigned to other posts, commonly known as the Base Realignment and Closure process or “BRAC”. Based on the mission and unique requirements of PAFB, exceptions to local land use and zoning requirements may exist within the Department of Defense. This Plan is intended to support the success and protection of the current and future missions at PAFB.
4. Nothing herein is intended to interfere with the federal government’s exclusive jurisdiction over the management of the navigable airspace in accordance with 49 U.S.C. Section 40103, or responsibility for the operation of aircraft shared between the federal government and the pilot-in-command of an aircraft.
5. Nothing herein is intended to waive any right of the Entities to assert that aircraft enjoy the right of free passage in areas surrounding the Airport by operation of state law or a prescriptive easement, to remove airport hazards as provided in Colorado Revised Statutes Section 41-4-108, or to assert that the Entities are immune from liability for Airport and aircraft effects on private property.

Administration

This Plan will be administered by the Airport. No development may occur within the AO without review by the Airport and approval by the respective Entity.

5.2.5 Responsibility

The ultimate responsibility for land use decision-making within the AO lies with the respective Entity with jurisdiction.

5.3 Definitions

The following definitions shall apply to all portions of the Colorado Springs Airport Land Use Compatibility Plan. More detailed or specific definitions may be found within various sections; in such cases, the most specific definition takes precedence. Further a comprehensive list of terms contained within this chapter are found in **Appendix B**.

5.3.1 Rules of Construction¹

Technical Terms:

Words and phrases shall be construed according to the common and approved usage of the language, but technical words and phrases that may have acquired a peculiar and appropriate meaning in law shall be construed and understood according to such meaning. More specifically:

- a. The words "owner," "person," or "developer" include a firm, association, partnership, trust, company, or a corporation as well as an individual.
- b. The words "used" or "occupied" include the words "intended, arranged, maintained, or designed to be used or occupied".
- c. The word "lot" includes the words "plot" or "parcel."
- d. The words "existing," "existed," "exists," and "occupied" shall imply the modifier "lawfully."
- e. The terms "zone," "subzone," and "overlay" shall all refer to the overlays and subzones defined by this Plan.

Lists and Examples

Unless otherwise specifically indicated, lists of items or examples that use terms such as "for example," "including," and "such as," or similar language are intended to provide examples, not to be exhaustive lists of all possibilities.

Computation of Time

The time in which an act is to be done shall be computed by excluding the first day and including the last day. If a deadline or required date of action falls on a Saturday, Sunday, or holiday observed by the Entities, the deadline or required date of action shall be the next day that is not a Saturday, Sunday, or a holiday observed by the Entities.

Public Bodies, Documents, and Authority

- a. All public officials, bodies, and agencies to which references are made are those of the City of Colorado Springs, City of Fountain, and El Paso County, unless otherwise expressly stated.
- b. Whenever reference is made to a resolution, ordinance, statute, regulation, or document, it shall be to the most recent edition of such regulation, resolution, ordinance, statute, regulation, or document, unless otherwise specifically stated.
- c. Whenever a provision of this Plan requires the head of a department or another officer or employee of the Entities to perform an act or duty, that provision shall be construed as

¹ City of Colorado Springs, ReTool: Unified Development Code (UDC) Project, Module 1, Public Draft April 2020

authorizing the department head or officer to delegate that responsibility to others over whom they have authority. The person to whom authority under this Plan has been delegated is sometimes referred to as a “designee”.

- d. Whenever a provision of this Plan identifies an individual or entity associated with an application or with property, that provision shall be construed as including any legally authorized agents or assigns of that individual, but the Entities may require proof of such legal authorization before authorizing any agent or assign to take actions related to any application or property for which they are not the property owner.

Mandatory and Discretionary Terms

The words "shall," "will," and "must" are always mandatory. The words "may" and "should" are discretionary terms.

Conjunctions

Unless the context clearly suggests the contrary, conjunctions shall be interpreted as follows:

- a. "And" indicates that all connected items, conditions, provisions or events apply; and
- b. "Or" indicates that one or more of the connected items, conditions, provisions, or events apply.

Tenses, Plural, and Gender

- a. Words used in one tense (past, present, or future) include all other tenses, unless the context clearly indicates the contrary.
- b. The singular includes the plural and the plural the singular, unless the context clearly indicates the contrary.
- c. Words used in the masculine gender include the feminine gender and vice versa.

Heading, Illustrations, and Text

In case of any difference of meaning or implication between the text of this Plan and any heading, drawing, table, figure, or illustration, the text shall control.

5.4 Compatibility Zone Factors

As discussed in **Chapter 2**, the City of Colorado Springs and El Paso County have adopted an AO within their land development codes that promote compatible development surrounding COS. The AO is based on a combination of FAA and DOD standards and guidelines. It is the intent of this Plan to update and clarify the previously accepted development standards within the AO. This Plan will also provide a set of unified standards which the Airport and AAC can use when evaluating proposed land uses within the AO and subzones.

The four primary factors considered in this Plan are noise, overflight, safety, and airspace protection; together creating a plan that ensures compatible land use. Each factor considers the following:

- Noise - Evaluates land use within each noise level
- Overflight – Considers overflight notification within residential development and wildlife hazards
- Safety - Evaluates land use against safety zones – examples RPZ, APZs, Inner approach/departure zone, inner turning zone, outer approach/departure zone, traffic pattern zone
- Airspace Protection – protects for imaginary surfaces (Part 77 surfaces)

5.4.1 Noise

Noise resulting from aircraft is often considered the primary concern when addressing compatible land uses in proximity to an airport. Aircraft can create noise at levels that produce annoyance and can impact the quality of life for those living and working near an airport. Noise impacts can vary significantly, factors that can influence aircraft noise impacts may include:

- Number and type of aircraft operations
- Time of day of operations
- Layout of airfield and configuration of land uses in relation to layout
- Percent of time each runway is used
- Location and frequency of use of the flight tracks
- Surrounding land uses, level of noise produced, and ambient noise levels
- Noise sensitivity and previous noise experience of local community
- Perception of need of noise

The effects of noise are real and as with factors that influence noise, the effects of noise vary in severity. They most often include:

- Community annoyance
- House vibration
- Difficulty learning
- Health effects
- Sleep disturbance

The fundamental approach to enhancing noise compatibility is to reduce, as much as possible, the extent to which noise disrupts the activity of the community and their annoyance. The best method is to reduce the number of people that occupy a high noise-sensitive area; however, this approach is not always possible. In which case, alternatives may include:

- Protecting the community from noise
- Educating the community on noise issues and increase awareness
- Promoting land uses with a relatively high ambient noise and not sensitive to aircraft noise

5.4.2 Overflight

The consideration of overflight is largely associated with aircraft operating over residential areas, noise sensitive areas and areas that may create wildlife hazards. Oftentimes, areas in close proximity to an airport and within areas of high noise levels (above DNL 65 dB) have known noise impacts and the associated impacts are accepted. Land use restrictions are also often in place for these areas. There is significantly more variability in areas with lower noise levels (DNL 60 dB and less). Oftentimes, these areas are further from an airport and the communities within the overflight area may not be aware of overflight possibilities and the associated impacts. As such, guidelines related to overflight are chiefly focused on increasing awareness, educating the public, and less focused on restricting land uses. Educational measures may include buyer awareness measures such as recorded deed notices, and real estate disclosure statements.

5.4.3 Safety

The consideration of the safety of those living and working in and near airports and those operating aircraft is the most important factor when considering land use compatibility. Ideally, to minimize the risk that aircraft accidents pose to people and property near airports, development near airports would be restricted; however, that is largely not practical and, in most cases, too late. Consequently, the issue becomes determining which land uses are acceptable in high risk areas.

The designation of safety zones, and allowed uses within each, is a crucial element in land use compatibility. The dimensions of safety zones are largely defined by the FAA and DOD; however, allowable land uses are left to the local jurisdiction to determine. Factors to consider when determining allowable land uses in relation to safety should generally include land use characteristics that may add to or limit the severity of aircraft accidents when they occur. These can include the following:

- High concentrations of people
 - The population density in critical safety zones
 - The potential for aircraft accident in specific areas when considering aircraft operations and land use characteristics
 - The appropriateness of residential, as well as industrial and commercial development that may have a high number of employees, in relation to safety zones
 - Urban versus rural areas – due to land values, the cost of avoiding risk may differ
 - Runway proximity; often the areas of highest risk are closest to runway ends
 - Protection of existing land uses and prohibit new development in critical areas

- High risk-sensitive uses
 - Limited mobility of occupants, i.e. schools, hospitals, nursing homes, etc.
 - Critical communication facilities such as power plants, electrical substations, public communication facilities, and other facilities that if damaged could cause significant adverse effects to public health and welfare well beyond the immediate vicinity of the facility
 - Above ground storage of highly flammable or hazardous materials
- Preservation of open land
 - Fewer occupants reduce the severity of an accident
 - Provides a safe alternative to the runways for an emergency landing

5.4.4 Airspace Protection

The protection of airspace is a vital component of land use compatibility planning and is crucial to the viability of airport operations and can, if not regulated, limit the ability of an airport to operate as intended. Factors to consider when determining allowable land uses in relation to air space protection should include land use characteristics that could create hazards to flight and contribute to causing an aircraft accident. The following factors should be considered to ensure appropriate airspace protection:

- Limit and discourage the construction of tall structures within the airport approach and departure paths
- Require developers complete and submit a Notice of Proposed Construction or Alteration (FAA Form 7460-1) to the Airport and FAA
- Maintain an unobstructed view for pilots by controlling dust, glare, light emissions, smoke, steam, and smog
- Reduce wildlife and bird attractants by monitoring wildlife activity and eliminating potential habitats
- Clearly define areas where potential land uses that could attract wildlife are prohibited. These land uses may include pools, ponds, sewage lagoons, and fountains.

5.5 Overlay Zones

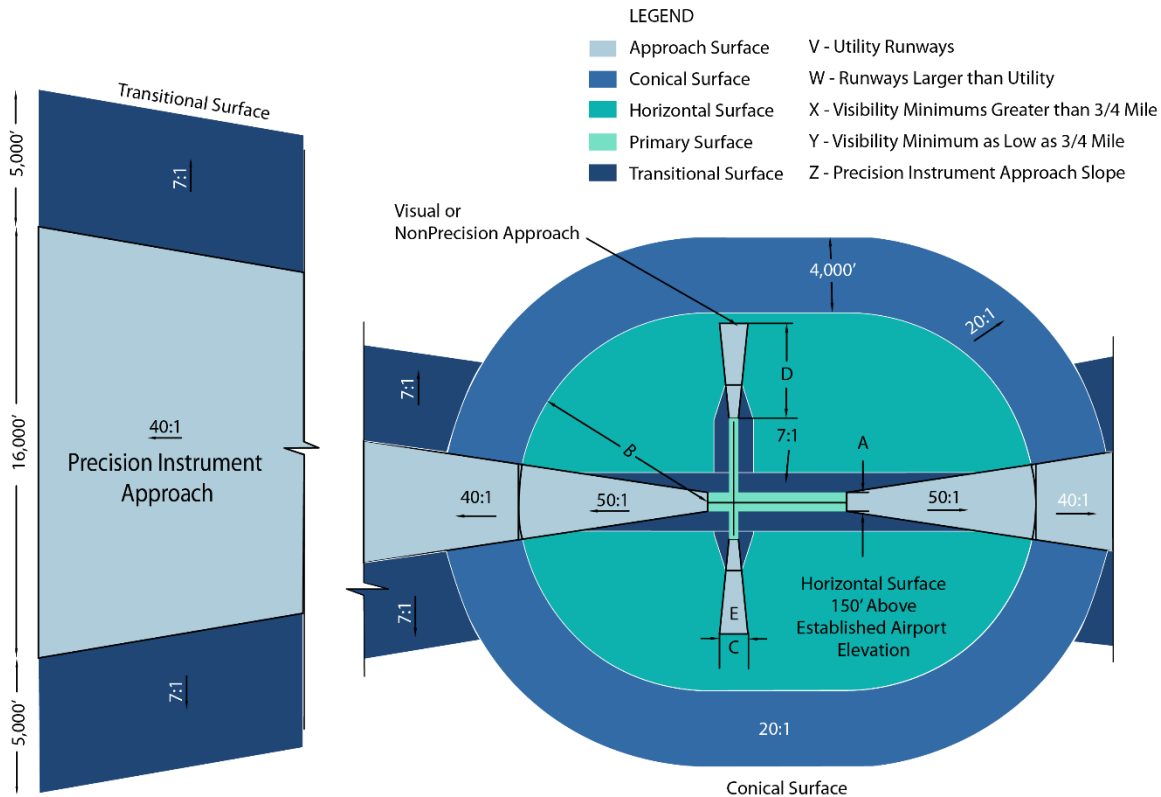
With the consideration of the compatibility zone factors discussed in **Section 5.4**, the following overlay and subzones have been implemented. The Entities should adopt the following zones in their specific land use codes or ordinances to ensure noise, overflight, safety, and airspace are protected.

5.5.1 Airport Overlay (AO)

As discussed in Section 5.1, the AO is an overlay zone, including subzones, that creates, establishes, and protects against hazards to air navigation. The revised AO includes both the FAA Part 77 surfaces as well as the FAA's notification area. The Part 77 imaginary surfaces include the following surfaces (also depicted in **Figure 5-2**):

- **Primary surface:** The width of a primary surface ranges from 250 to 1,000 feet depending on the existing or planned approach and runway type (visual, nonprecision, or precision).
- **Approach surface:** The approach surface is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface. The approach slope has a ratio of 20:1, 34:1, or 50:1, depending on the approach type. The length of the approach surface varies from 5,000 to 50,000 feet and also depends upon the approach type. The inner edge of the approach surface is the same width as the primary surface and expands uniformly to a width ranging from 1,250 to 16,000 feet, depending on the type of runway and approach.
- **Transitional surface:** The transitional surface extends outward and upward at right angles to the runway centerline and extends at a slope of 7:1 from the sides of the primary and approach surfaces. The transitional surfaces extend to the point at which they intercept the horizontal surface at a height of 150 feet above the airport elevation.
- **Horizontal surface:** The horizontal surface is a horizontal plane located 150 feet above the airport elevation and includes an area from the transitional surface to the conical surface. The perimeter is formed by creating arcs from the center of each primary surface and connecting the adjacent arcs. The radius for utility and visual runway ends is 5,000 feet and 10,000 feet for precision and nonprecision runway ends.
- **Conical surface:** The conical surface extends upward and outward from the edge of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- **Outer horizontal surface (military airports only):** The outer horizontal plane is a horizontal plane located 500 feet above the airport elevation and extends outward from the outer edge of the conical surface for a horizontal distance of 30,000 feet.

Figure 5-2: Part 77 Surfaces



Source: FAA

As discussed previously, in addition to the Part 77 surfaces, the AO has been expanded to include a FAA notification area. Per 14.C.F.R., Part 77.9, these regulations state: "Any person/organization who intends to sponsor any of the following construction or alterations must notify the Administrator of the FAA:

- Any construction or alteration exceeding 200 ft above ground level
- Any construction or alteration:
 - within 20,000 ft of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with at least one runway more than 3,200 ft.
 - within 10,000 ft of a public use or military airport which exceeds a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200 ft.
 - within 5,000 ft of a public use heliport which exceeds a 25:1 surface
- Any highway, railroad or other traverse way whose prescribed adjusted height would exceed that above noted standards
- When requested by the FAA
- Any construction or alteration located on a public use airport or heliport regardless of height or location

Persons failing to comply with the provisions of FAR Part 77 are subject to Civil Penalty under Section 902 of the Federal Aviation Act of 1958, as amended and pursuant to 49 U.S.C. Section 46301(a). “

Development within this notification area and that which penetrates the Part 77 surfaces require notification to the FAA. All development with the AO is reviewed by the Airport and AAC.

Requirements for Property within the Airport Overlay

- **Avigation Easement Required.** Entity approvals for new development, rezoning, subdivision, and building permits for property within the AO should be conditioned upon the grant of an avigation easement by all owner(s) of the applicant’s property. The avigation easement shall:
 1. Be in a form approved by the Entity (See **Appendix C**);
 2. Permit unobstructed passage of aircraft above the property;
 3. Waive any right or cause of action against the Entity arising from noise, vibrations, fumes, dust, fuel particles, and other effects caused by aircraft and airport operations;
 4. Require the grantor to reduce the height of structures or objects of natural growth or change the use of land as necessary to eliminate a hazardous obstruction to air navigation as specified or determined by the FAA;
 5. Run with the land for a perpetual term;
 6. Be subject to release by the jurisdictional entity only upon the permanent cessation of operations of the Airport or the exclusion of the property from the AO;
 7. Include language stating, when required by this section, that noise mitigation construction requirements are required to mitigate the noise to which the property is exposed; and
 8. Be recorded in the Entity’s Clerk and Recorder.
- **Interference with Airport Operations Prohibited.** It is required that no use may be made of land within the AO that may create electrical interference with radio communications between an Air Traffic Control facility and an aircraft; make it difficult for pilots to distinguish between airport lights and other lights; cause glare in the eyes of pilots using the airport; impair visibility in the vicinity of COS; or otherwise endanger the landing, taking off, or maneuvering of aircraft at COS or in the vicinity of COS. The Airport and AAC review for compliance with this standard shall be performed in accordance with the review requirements of this section.
- **Wildlife and Bird Attractants Prohibited.** It is required that no use may be made of land within the AO that may attract or sustain wildlife that may threaten aviation safety. Property owners shall comply with the separation standards prescribed by the FAA in Advisory Circular 150/5200-33 (*Hazardous Wildlife Attractants on or near Airports*), as the same may be amended from time to time. Particular attention shall be paid, for example and without limitation, to municipal landfills, water management facilities, wetlands, dredge spoil containment areas, agricultural activities (including crop and livestock production), golf courses, parks and wildlife management areas. The Airport and AAC review for compliance with this standard shall be performed in accordance with the review requirements of this section.
- **Hazards to Air Navigation Prohibited.**
 - a. It is required that all development within the AO shall comply with the notice requirements of Part 77, as the same may be amended from time to time. Notice shall be provided for

development within the AO or as otherwise required by Part 77. The applicant for new development, rezoning, subdivision or building permit required to provide notice pursuant to this section and Part 77 shall provide the Airport and AAC with a copy of the completed FAA Form 7460-1 (Notice of Proposed Construction or Alteration) (see **Appendix D**) and a copy of any obstruction evaluation, aeronautical study, or hazard determination issued by the FAA.

- b. It is required that an Entity shall not approve any temporary or permanent structure or use of land that the FAA has advised would constitute a hazard to air navigation. This prohibition may be overcome only upon a showing by the applicant that the FAA has changed its determination through discretionary review or review based on new facts, the determination has been vacated by a court of competent jurisdiction, or the applicant has altered the development and the FAA has determined that the alteration would eliminate the hazard.
- c. It is required that all development within the AO shall comply with the standards for marking and lighting specified by the FAA in Part 77 and Advisory Circular 70/7460-1 (*Obstruction Marking and Lighting*), as each of the same may be amended from time to time. Modifications and deviations from these standards shall be permissible only if approved by the FAA.

5.5.2 Subzones

The AO is divided into six subzones for the purpose of prescribing what land uses are permitted, conditional, or prohibited in areas surrounding Airport based on considerations of noise, overflight, safety, and airspace protection. The subzones include:

1. Runway Protection Zone (RPZ)
2. Clear Zone (CZ)
3. Accident Potential Zone 1 (APZ-1)
4. Accident Potential Zone 2 (APZ-2)
5. DNL 65 dB Noise Contour (DNL65)
6. Airport Influence Area (AIA)

Table 5-1 summarizes the basic dimensions and intent of land use requirements for each zone. **Figure 5-3** depicts the boundaries of each subzone; however, more detailed exhibits for each jurisdictional entity can be found in **Appendix E**.

This map displays the Lake Michigan shoreline with various land use zones. A central area is highlighted with a red outline and labeled with numbers 17R, 13, 17L, 31, 35L, and 35R. A scale bar at the bottom left indicates 0, 1.5, 3, and 6 miles. A north arrow is at the bottom right.

LAND USE		LEGEND	
El Paso County	Colorado Springs	New / Developing Corridor	DNL 60 Contour ASV
Urban Residential	Candidate Open Space	Regional Center	DNL 65 Contour ASV (65 DNL)
Large-Lot Residential	Commercial Center	Fountain	Airport Influence Area (AIA)
Suburban Residential	Community Activity Center	Commercial	Airport Overlay (AO)
Employment Center	Employment Center	Historic Downtown	Accident Potential Zone 1 (APZ1)
Regional Open Space	Existing Golf Course / Cemetery	Industrial	Accident Potential Zone 2 (APZ2)
Rural	Existing Park Land / Open Space	Mixed Use	Clear Zone (CZ)
Incorporated	General Residential	Public	Runway Protection Zone (RPZ)
Military	Low Residential	Residential	Runway
	Major Institutional	Agriculture	Airport Property Boundary
	Mature Redevelopment Corridor		City Boundaries

Source: Jvation

Table 5-1: Dimensions and Intent of Land Use Requirements

Overlay or Subzone	Code	Dimensions	Intent
Runway Protection Zone ¹	RPZ	A trapezoidal shaped zone centered about the extended runway centerline	To enhance safety and protection of people and property on the ground
Clear Zone ^{2, 3}	CZ	A surface on the ground beginning at the runway end and symmetrical about the runway centerline extended, measuring 3,000' long and 3,000' wide	To enhance safety in an area that possesses a significant potential for aircraft accidents
Accident Potential Zone 1 ²	APZ-1	Starts at the end of the Clear Zone, measures 5,000' long and 3,000' wide, centered about the runway centerline	To enhance safety in an area that possesses a significant potential for aircraft accidents
Accident Potential Zone 2 ²	APZ-2	Begins at the end of APZ-1, is 7,000' long and 3,000' wide	To enhance safety in an area that possesses a measurable potential for aircraft accidents
DNL 65 dB Noise Contour ³	DNL65	Based on airport capacity noise modeling	To prohibit noise-sensitive and other non-compatible uses
Airport Influence Area ⁴	AIA	Based on airport capacity noise modeling and the DNL 60 dB noise contour	To establish a buffer around the Airport based on noise in which noise disclosure and sound attenuation are required
Airport Overlay	AO	Includes FAA Part 77 imaginary surfaces and FAA notification area.	To create, establish, and maintain hazards to air navigation.

Notes:

1. Standards defined in FAA AC 150/5300
2. Standards defined in AIR FORCE HANDBOOK 32-7084. These subzones are not recognized by the FAA.
3. See **Appendix A** for further information on the significance of DNL 65 dB
4. The AIA replaces the previous ADNL subzone.

Source: Jviation

Development Requirements Within AO and Subzones

The following are required for development within the subzones:

- a. An Entity shall approve new development, rezoning, subdivision, and building permits for property within the AO only if the proposed land use is consistent with the Land Use Compatibility Table as shown in **Table 5-2**.
- b. Conditional uses shall be permitted only if the applicant demonstrates compliance with the standards prescribed within this Plan and as reviewed and confirmed pursuant to the review process of this section.
- c. Development within the AIA should comply with the noise disclosure and sound attenuation standards of this Plan and the Building Code adopted by the Entities.
 - **Noise Disclosure.** It is required that for all residential dwelling units to be constructed within the AIA (DNL 60 dB), the applicant shall provide to all prospective purchasers, a recorded statement notifying the purchaser that they are located within an area that will be impacted by aircraft operations. The statement shall include language affirming that, where applicable, acoustical treatment measures have been required to achieve a prescribed interior noise level. The statement shall be provided by COS. See **Appendix F** for recorded noise statement. *Note: City of Colorado Springs to provide recommendation for the inclusion of this noise disclosure requirement.*
 - **Sound Attenuation.** It is required that, within the AIA, new structures and the material alteration or repair of existing structures that result in more than fifty percent of the

recorded square footage of the structure shall include acoustical treatment measures which achieve an interior noise level not to exceed DNL 40 dB per DOD guidance. This standard shall be met through the use of building materials and construction techniques which have a laboratory sound transmission class. All new structures required to be constructed in accordance with this interior noise level standard shall include central air conditioning and ventilation systems, sufficient to enable occupancy of the building without the need for ventilation from open windows or doors.

- **Outdoor Noise Disclosure.** It is required that for all developments to be constructed within the AIA, the applicant shall provide to all prospective purchasers, a recorded statement notifying the purchaser that they are located in an area that will be impacted by aircraft operations. Those participating in outdoor activities may be exposed to sound levels at and above DNL 60 dB as a result of aircraft operating in the area. The statement shall be provided by COS.
- **Airfield Lighting Disclosure.** It is required that for all developments to be constructed within the AIA, the applicant shall provide to all prospective purchasers, a recorded statement notifying the purchaser that they are located in an area that may be impacted by airfield lighting. The statement shall be provided by COS.

5.6 Permitted Uses and Development Requirements

5.6.1 Purpose

The following uses and development requirements within the vicinity of the Colorado Springs Airport have been established to avoid threats to the health, safety, and wellbeing of persons and property.

5.6.2 Allowed, Conditional, and Prohibited Uses

Land uses that are Permitted, Conditional, or Non-Compatible (prohibited) in the AO as well as the subzones are shown in **Table 5-2**. The Standard Land Use (SLU) codes referenced in this Plan are derived from the commonly used Standard Land Use Coding Manual (SLUCM) which was originally developed and published in 1965 by the Department of Commerce, Bureau of Public Roads. It was reprinted by the Department of Transportation, Highways Division in 1977. The SLUCM codes are used within this plan to be consistent with the land use codes used by the DOD.

Table 5-2 depicts uses that may be permitted in each respective zone. The uses in **Table 5-2** supplement and supersede, but do not replace, the uses for each underlying zone or district as defined by each Entity's individual code. To determine whether a use is available in the overlay districts, first refer to the appropriate Entity's land use code to see whether a listed use is available in the underlying zone or district where the property is located, and if so, then refer to **Table 5-2** to determine whether the overlay zone modifies the terms on which that use is available. In case of a conflict between the Entity code and **Table 5-2**, the provisions of **Table 5-2** shall apply.

If a land use is permitted by-right or permitted as a conditional use in the underlying zone or district, the use is not permitted until the applicant obtains conditional use approval by the Airport. However, if a land use is non-compatible or prohibited in the AO or subzones, as depicted in **Table 5-2**, it is prohibited regardless if it is a permitted or conditional use in the underlying zone or district. **All land uses noted as a permitted or conditional must allow for the long term safe and efficient operation of the Airport.**

Table 5-2: Permitted (P), Conditional (C), and Non-Compatible (left blank) Land Uses

SLUCM Code	Land Use	Overlay or Subzone Compatibility ¹						
		RPZ	CZ	APZ-1	APZ-2	DNL65	AIA	AO
	Residential							
11	Household, single family units							
11.11	Single units: detached						C ²	P
11.12	Single units: semi-detached						C ²	P
11.13	Single units: attached row						C ²	P
11.21	Two units: side-by-side						C ²	P
11.22	Two units: one above the other						C ²	P
11.3	Apartments						C ²	P
12	Household, 2-4 units						C ²	P
13	Household, multiunits (5 or more)						C ²	P
14	Residential condominiums						C ²	P
15	Mobile home parks or courts						C ²	P
16	Hotels/motels						C ²	P

SLUCM Code	Land Use	Overlay or Subzone Compatibility ¹						
		RPZ	CZ	APZ-1	APZ-2	DNL65	AIA	AO
	Manufacturing³							
21	Food and kindred products				P	P	P	P
22	Textile mill products				P	P	P	P
23	Apparel and other finished products made from fabrics, leather, and similar materials					P	P	P
24	Lumber and wood products (except furniture)			P	P	P	P	P
25	Furniture and fixtures			P	P	P	P	P
26	Paper and allied products			P	P	P	P	P
27	Printing and publishing			P	P	P	P	P
28	Chemicals					P	P	P
29	Petroleum refining and related industries					P	P	P
30	Rubber and miscellaneous plastic products					P	P	P
32	Stone, clay and glass products				P	P	P	P
33	Primary metal industries				P	P	P	P
34	Fabricated metal products				P	P	P	P
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks-manufacturing					P	P	P
39	Miscellaneous manufacturing			P	P	P	P	P
	Transportation, Communication, and Utilities³							
41	Railroad/transit transportation			C ⁵	P	P	P	P
42	Motor vehicle transportation			C ⁵	P	P	P	P
43	Aircraft transportation			C ⁵	P	P	P	P
45	Highway and street right of way		C ⁴	C ⁵	P	P	P	P
46	Automobile parking			C ⁵	P	P	P	P
47	Communication			C ⁵	P	P	P	P
48	Utilities ⁶			C ⁵	C ⁵	P	P	P
48.5	Solid waste disposal (landfills, incinerators, etc)					P	P	P
49	Other transportation, communication, and utilities not classified elsewhere			C ⁵	P	P	P	P
	Trade							
50	Condominiums - Other than residential condominiums			P	P	P	P	P
51	Wholesale trade			P	P	P	P	P
52	Retail trade - Building materials, hardware, and farm equipment			P	P	P	P	P
53	Retail trade - Shopping centers-Neighborhood, Community, Regional, Super-regional ⁸				C ⁷	P	P	P
54	Retail trade - Food				P	P	P	P
55	Retail trade - Automotive, marine craft, aircraft, and accessories			P	P	P	P	P

SLUCM Code	Land Use	Overlay or Subzone Compatibility ¹						
		RPZ	CZ	APZ-1	APZ-2	DNL65	AIA	AO
56	Retail trade - Apparel and accessories				P	P	P	P
57	Retail trade - Furniture, home furnishings and equipment				P	P	P	P
58	Retail trade - Eating and drinking				C ⁷	P	P	P
59	Other retail trade				P	P	P	P
	Services⁹							
61	Finance, insurance, and real estate services				P	P	P	P
62	Personal services				P	P	P	P
62.4	Cemeteries			C ¹⁰	C ¹⁰	P	P	P
63	Business services				P	P	P	P
63.7	Warehousing and storage services ¹¹			P	P	P	P	P
64	Repair services			P	P	P	P	P
65	Professional services				P	P	P	P
65.1	Hospitals other medical facilities					C ^{2, 12}	C ^{2, 12}	P
65.16	Nursing Homes						C ²	P
66	Contract construction services			P	P	P	P	P
67	Governmental services				P	C ¹²	P	P
68	Educational services					C ¹²	P	P
68.1	Child care services, child development centers, and nurseries					C ¹²	C ¹²	P
69	Miscellaneous services				P	P	P	P
69.1	Religious activities (including places of worship)					P	P	P
	Cultural, Entertainment and Recreational							
71	Cultural activities and nature exhibitions					C ^{12, 13}	C ^{12, 13}	P
71.2	Nature Exhibits			C ^{12, 13}	C ^{12, 13}	C ^{12, 13}	C ^{12, 13}	P
72	Public assembly					P	P	P
72.1	Auditoriums, concert halls					C ¹²	P	P
72.11	Outdoor music shells, amphitheaters						P	P
72.2	Outdoor sports arenas, spectator sports					C ¹⁴	P	P
73	Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.				C ¹⁵	P	P	P
74	Recreational activities (including golf courses, riding stables, water recreation)			C ¹³	C ¹³	P	P	P
75	Resorts and group camps					P	P	P
76	Parks			C ¹³	C ¹³	P	P	P
79	Other cultural, entertainment, and recreational			C ^{10, 13}	C ^{10, 13}	P	P	P
	Resource Production and Extraction							
81	Agriculture (except live- stock)	C ^{4, 16}	C ^{4, 16}	C ^{4, 16}	C ^{4, 16}	C ^{2, 16}	P	P

SLUCM Code	Land Use	Overlay or Subzone Compatibility ¹						
		RPZ	CZ	APZ-1	APZ-2	DNL65	AIA	AO
81.5-81.7	Agriculture-Livestock farming, including grazing and feedlots			C ¹⁶	C ¹⁶	C ^{2, 16}	P	P
82	Agriculture related activities			C ¹⁷	C ¹⁷	C ^{2, 16}	P	P
83	Forestry activities			P	P	C ^{2, 16}	P	P
84	Fishing activities and related services	C ¹⁸	C ¹⁸	P	P	P	P	P
85	Mining activities and related services			C ¹⁹	C ¹⁹	P	P	P
86	Marijuana growing operations					P	P	P
89	Other resource production			P	P	P	P	P
Undeveloped Land and Water Areas								
91	Undeveloped land	P	P	P	P	P	P	P
93	Water areas			C ²⁰	C ²⁰	C ²⁰	P	P
94	Open space land	P	P	P	P	P	P	P
99	Other undeveloped land	P	P	P	P	P	P	P

Notes:

1. A "P" or "C" designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed to determine whether the use is clearly compatible, normally compatible, or not compatible due to various circumstances.
2. Residential buildings require a 40dB interior noise level.
3. Other factors to be considered may include labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.
4. No structures (except airfield lighting and navigational aids necessary for the safe operation of the airfield when there are no other siting options), buildings, or above-ground utility and communications lines should normally be located in the CZ on or off the Airport. Roads within the graded portion of the CZ are prohibited. All roads within the CZ are discouraged, but if required, they should not be wider than two lanes and the rights-of-way should be fenced (frangible) and not include sidewalks or bicycle trails. Nothing associated with these roads should violate obstacle clearance criteria.
5. No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.
6. Development of renewable energy resources, including solar and geothermal facilities and wind turbines, may impact aircraft operations through hazards to flight or electromagnetic interference. Each new development should be analyzed for compatibility issues on a case-by-case basis that considers both the proposal and potentially affected mission.
7. Land Use is normally prohibited by the DOD in APZ-2; the Airport and AAC will review individual applications against compatibility factors of the proposed development.
8. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, or managed as a unit. Shopping center types include strip, neighborhood, community, regional, and super-regional facilities anchored by small businesses, a supermarket or drug store, discount retailer, department store, or several department stores, respectively.
9. Ancillary uses such as meeting places, auditoriums, etc. are not recommended.
10. No chapels or houses of worship are allowed within APZ 1 or APZ 2.
11. Big box (supercenter, superstore, or megastore) stores are not included as part of this category.
12. Where the community determines that these uses must be allowed, measures to achieve an interior noise level not to exceed DNL 40 dB per DOD guidance should be incorporated into building codes and be considered in individual approvals. Measures to achieve an overall noise reduction do not necessarily solve noise difficulties outside the structure and additional evaluation is warranted.
13. Building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces. Facilities such as playgrounds, clubhouses, meeting places, auditoriums, large classes, etc., are not recommended.
14. Land use is compatible provided special sound reinforcement systems are installed.

15. Applications that include amusement centers, family entertainment centers or amusement parks designed or operated that could attract or result in concentrations of people, including employees and visitors, will be reviewed by the Airport and AAC against compatibility factors.
16. Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.
17. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.
18. Controlled hunting and fishing may be permitted for the purpose of wildlife management.
19. Surface mining operations that could create retention ponds that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or operations that produce dust or light emissions that could affect pilot vision are not compatible.
20. Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are pre-existing, nonconforming land uses. Naturally occurring water features that attract waterfowl present a potential BASH. Actions to expand naturally occurring water features or construction of new water features should not be encouraged. If construction of new features is necessary for storm water retention, such features should be designed so that they do not attract waterfowl.

5.6.3 Nonconforming Uses

A use of land or a structure that was lawfully established and has been lawfully continued, but that no longer complies with the requirements of the Plan due to the actions of an Entity, and not due to the actions of the property owner are considered an allowable nonconforming use. If the use of land or a structure changes, the future use must comply with the Plan.

Property owners may have continuing obligations under preexisting requirements imposed by the Entities, including an avigation easement. Moreover, this Plan is intended to prohibit uses of land that may create hazards or otherwise interfere with the safe use of the Airport. These prohibitions are intended to apply to the maximum extent permissible under law.

5.7 Procedural Guidance for Applicants

These procedures are set forth to provide information to those seeking to develop land within the AO or construct a structure of more than 200 feet within El Paso County. Applicants must direct all submittals to the appropriate Entities as they have the ultimate decision in the approval or denial of an application. The Airport and AAC act in an advisory capacity to the Entities.

5.7.1 Pre-Application Meeting

The Applicant shall schedule a pre-application meeting with the appropriate Entity, if required by the Entity. At this point, the Entity shall notify the Applicant of their development in relation to the AO and subzones. If development would occur within the AO, the Entity shall notify the Applicant of the requirements of **Section 5.5.1**.

If development within the AO is Conditionally allowed per **Table 5-2** of this Plan, it is recommended the Entity/Applicant invite the Airport in the pre-application meeting. Applicants shall have a Pre-Application meeting for any Non-Compatible developments within AO and all developments within the AIA with the Airport.

5.7.2 Application Submittal

Applicant shall submit land use application to the appropriate Entity and follow the Entity application process. If the development is to occur within the AO, in addition to the requirements of the Entity, the application shall include:

- Proposed use
- Number of structures, gross and net density
- Type of structures, approximate size of units, and approximate maximum height of building in feet
- Amount and function of proposed open space, specifying whether it is public or private
- Vicinity map with scale, north arrow and date of preparation
- Location and legal description of lot
- Proposed timetable for development plan
- Acknowledgement of potential FAA requirement for FAA Form 7460-1

The Airport/AAC shall receive ample time (no less than 30 days) from receiving the development application to review and provide recommendation for approval or denial of the application. Comments given by the Airport and AAC shall be addressed by the Applicant and the application shall be re-submitted if needed. If a recommendation of denial is given by the Airport and AAC, the Applicant may request, if applicable, the reason for the recommended denial, and re-submit the application.

No response from the Airport and AAC to the Entity shall not imply a recommendation of approval. The Airport and ACC will respond to all land use items/applications with “no comments”, if necessary.

5.8 Procedural Guidance for the Airport and AAC

Entities shall refer all applications for new development, rezoning, subdivision, building permit, etc., within the AO to the Airport and AAC. The Airport and AAC shall review each application against the four primary compatibility zone factors stated in **Section 5.4**; noise, overflight, safety, and airspace protection. The Airport shall consider the following questions when assessing land use compatibility:

- What is the land use in relation to each noise level?
- Is overflight notification required within residential development and/or could wildlife hazards be created by the development?
- Is the development within a safety zone (RPZ and APZ's)?
- Does the development penetrate a Part 77 surface?

5.8.1 Airport and AAC Review

The Airport and AAC shall **review** each application with respect to the following matters:

1. Whether Form 7460-1 was required to be and, if so, was filed with the FAA.
2. Whether the general requirements of this section for all development within the AO and subzones have been satisfied.
3. Whether the intended use of land is consistent with the land use compatibility standards and requirements of this Plan. Factors to be considered include labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.

5.8.2 Airport and AAC Recommendations

The Airport and AAC shall **make a recommendation** to the Entities on the following matters:

1. Whether a conditional use should be approved.
2. Whether a variance should be granted.
3. Whether development might interfere with Airport and aircraft operations or attract wildlife as prohibited by this Plan.

5.9 Land Use Plan Implementation and Administration

Input and buy in from local agencies are essential to the success of a Land Use Compatibility Plan. The adoption and, ultimately, implementation of a plan, that supports all stakeholders requires continued cooperation between Entities beyond the development of the plan. The following sections provide a summary of actions that the Airport and AAC review prior to approval by the City of Colorado Springs, El Paso County, and the City of Fountain. As discussed, the Airport and AAC do not have approval authority; however, it is in the best interest of the Airport, Entities, and local community for development that may impact the Airport be reviewed by the Airport and AAC prior to approval.

5.9.1 Actions Subject to Review

Required Review

All applications within the AO require a review by the Airport and AAC.

Voluntary Review

The Airport and the AAC may voluntarily review proposed uses that are otherwise compatible; however, may have unique features or elements that applicants or stakeholders **voluntarily submit** to the Airport and AAC for review. These applications may or may not be within the AO. These reviews are encouraged at the earliest stages of the development process to provide input and comments that would help to ensure airport compatibility. Voluntary review and associated input and comments are advisory only to the applicant and would not constitute a determination.

Discretionary Review

The Airport and AAC may **request to review**, at their discretion, proposed uses that are otherwise compatible; however, may have unique features or elements that could result in incompatible land uses. These applications may or may not be located within the AO. These reviews are encouraged at the earliest stages of the development process to provide input and comments that would help to ensure airport compatibility. Discretionary review and associated input and comments are advisory only to the local agency and would not constitute a determination.

5.9.2 Adoption and Implementation

In an effort to provide a consistent and uniform review of development within the AO and associated subzones, it is recommended that Entities with jurisdiction within the AO adopt this Plan as their primary guiding document for development within the AO. The allowed land uses discussed in this Plan supplement and supersede, but do not replace, the use indications for each underlying zone and district as defined by each Entity's individual code.

Appendix A: Background on DNL 65 dB

Introduction

As explained elsewhere in this Land Use Compatibility Study, the FAA has identified DNL 65 dB as the threshold of significant noise exposure and considers residential land uses to be compatible with cumulative noise exposure levels below this threshold. As also explained, the FAA recognizes the right and responsibility of local governments to prescribe permissible land uses in relation to aircraft noise exposure.

There is a long and complex history to the FAA's adoption of DNL 65 dB and the consideration by FAA and others of different metrics and thresholds. The resources and hyperlinks below are provided for those interested in deepening their understanding of the origins of the DNL 65 dB threshold, the scientific underpinnings of this threshold, and past and present efforts to consider whether a lower threshold might be appropriate.

Bibliography

To review the Congressional mandate that led to the FAA's adoption of DNL 65 dB as the threshold of significant noise exposure, see the [Aviation Safety and Noise Abatement Act of 1979](#).

To review the FAA's regulation on aviation noise and compatibility planning, see [14 C.F.R. Part 150](#). See specifically Appendix A for the FAA's guidelines on the compatibility of specific land uses with aircraft noise at various levels.

To review the FAA's high-level summary on the adoption of the DNL 65 dB threshold, see [FAA History of Noise](#).

To review the FAA's most recent comprehensive policy statement on aircraft noise, see [Aviation Noise Abatement Policy 2000](#).

To review the FAA's announcement of its intent to conduct an extensive social survey of community reaction to noise, see [Press Release – FAA to Re-Evaluate Method for Measuring Effects of Aircraft Noise](#) (May 7, 2015). Although the FAA conducted the social surveys, the agency has not, to date, released any results.

To review the latest Congressional mandates on aviation noise, see [FAA Reauthorization Act of 2018, Subtitle D – Airport Noise and Environmental Streamlining](#). See specifically Sections 173, 179, 187, 188 and 189 for various mandates to the FAA to examine the impacts of aircraft noise on communities surrounding airports.

To review the FAA’s recent analysis of alternative noise metrics, see [Report to Congress, FAA Reauthorization Act of 2018 \(Pub. L. 115-254\) Section 188 and Sec 173](#) (April 14, 2020).

To review federal government research findings on aircraft noise, see the findings and reports of the [Federal Interagency Committee on Aviation Noise](#). FICAN’s most recent comprehensive review is found in [Research Review of Selected Aviation Noise Issues](#) (2018).

For scientific research on aviation noise, see reports and papers of the Massachusetts Institute of Technology’s [Partnership for Air Transportation Noise and Emissions Reduction](#) (disbanded in 2015).

For a review of efforts by airport owners and local governments to address noise exposure below DNL 65 dB, see Transportation Research Board, ACRP Synthesis 16, [Compilation of Noise Programs in Areas Outside DNL 65](#) (2009).

For an examination of the various effects of aircraft noise, see Transportation Research Board, ACRP Synthesis 9, [Effects of Aircraft Noise: Research Update on Select Topics](#) (2008).

For an examination of aviation noise by the U.S. Government Accountability Office, see GAO-08-216T, [Impact of Aviation Noise on Communities Presents Challenges for Airport Operations and Future Growth of the National Airspace System](#) (2007).

For a historical perspective on noise analysis conducted by the U.S. Environmental Protection Agency, see [Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety](#) (1974).

Appendix B

Airport-Related Definitions:

Accident Potential Zone-1 (APZ-1): An APZ is an area where an aircraft mishap is most likely to occur if one occurs. It does not reflect the probability of an accident. An accident is more likely to occur in APZ 1 than APZ 2. APZ 1 starts at the end of Clear Zone and Runway Protection Zone (RPZ) is 5,000 feet long and 3,000 feet wide. This zone applies limitations to ground level development. APZ's apply to military airports and the standards are determined by the Department of Defense.

Accident Potential Zone 2 (APZ-2): APZ 2 begins at the end of APZ 1, is 7,000 feet long and 3,000 feet wide. This zone applies limitations (albeit less stringent than APZ 1) to ground level development. APZ's apply to military airports and the standards are determined by the Department of Defense.

Aircraft: Any unassembled, partially assembled, or fully assembled collection of parts, operational or nonoperational, that make a contrivance now known or later invented, used or designed for navigation of or flight in the air or space regardless of the form of propulsion that powers the aircraft in flight.

Aircraft Navigation Subzone (ANAV): A subzone recognized within the City of Colorado Springs Code. It is located at and above the ground as depicted on the previous Airport Overlay Map as adopted and amended by the City of Colorado Springs. The ANAV encompasses all land within the overlay. *This subzone is no longer referenced as a subzone within this Plan.*

Airport: A facility relating to the landing or taking off of aircraft such as a landing field, aircraft parking, and service facilities, including related facilities for operation, service, fueling, repair, storage, charter, sales, and rental of aircraft, and activities directly associated with the operation and maintenance of airport facilities and the provision of safety and security. For purposes of this Plan, Airport refers only to the facility now known as City of Colorado Springs Municipal Airport, or any future name or common reference for that facility that may be promulgated, adopted or referred to.

Airport Influence Area (AIA): An area at and above the ground used to establish a buffer around the airport based on the potential for aircraft noise impacts where noise disclosure and sound attenuation are required. This area encompasses the modeled DNL 60 dB noise contour surrounding the Airport and based on overall capacity or annual service volume (ASV) of the Airport in 2019 and 2039.

Airport Noise Subzone (ADNL): A noise exposure subzone recognized within the City of Colorado Springs Code. The subzone is indicated by collective lines of increasing projected annual average noise exposure (DNL) from 60 DNL to 65 DNL, 65 DNL to 70 DNL, 70 DNL to 75 DNL, and 75 DNL to 80 DNL. (See also the definition of DNL.) *This subzone is no longer referenced as a subzone and has been replaced with the AIA in the recommended land use plan.*

Airport Overlay (AO): An overlay zone, conforms to 14 C.F.R. Part 77 , and extends for a horizontal distance of 20,000 feet from each runway end extending outward and upward at a slope of 100 to1 and includes any development over 200 feet above ground level (AGL) anywhere within El Paso County. The zone establishes an imaginary surface and development types that require notification to the FAA through the submission of a FAA Form 7460-1 pursuant to 14 C.F.R. Part 77. See **Appendix Error! Reference source not found.** for FAA Form 7460-1.

Annual Service Volume (ASV): As defined by the FAA, the ASV is a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, and weather conditions, that would be encountered over a year's time.

Clear Zone: A term used at military airports that roughly corresponds to the FAA's limits of an RPZ. The clear zone is an area 3,000 feet long measured along the extended runway centerline beginning at the end of all main military runways and 3,000 feet wide centered on and measured at right angles to the extended runway centerline. The limits of the clear zones are determined by the Department of Defense.

DNL 65 dB Noise Contour (DNL65): An area at and above the ground used to establish a buffer around the airport based on noise in which noise-sensitive and other non-compatible land uses are prohibited. This area encompasses the DNL 65 dB noise contour surrounding the Airport and is based on overall capacity or annual service volume (ASV) of the Airport.

Part 77: (14 CFR Part 77, Sec. 77.31) - Objects Affecting Navigable Airspace, establishes standards for determining obstructions in navigable airspace; defines the requirements for notice to the FAA Administrator of certain proposed construction or alteration; provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace; provides for public hearings on the hazardous effect of proposed construction or alteration on air navigation; and provides for establishing antenna farm areas.

Runway: A defined area on an airport prepared for landing and takeoff of aircraft along its length.

Runway Protection Zone (RPZ): A subzone located at the end of each runway designated on the AO map that enhances safety and protection of people and property on the ground. RPZ's apply to civilian airports and the standards are determined by the Federal Aviation Administration; however, they compare to the clear zones defined at military airports by the Department of Defense.

Land Use Definitions

Residential

SLUCUM housing definitions historically include a separation between owner-occupied and typically rented structures. This ownership issue is not an airport land use concept that has any distinction of note. Our recommendation is to limit the residential definition to just single-family residential and multi-family residential to distinguish the number of occupied units on a given lot.

Single Family Residential: For the purposes of Table 5-2 in this Plan, Single-family Residential includes the following land uses: household, single family units; single units: detached; single units: semi-detached; single units: attached row. These definitions are distinct from multi-family residential land uses defined below. See base zone for residential land use distinctions.

Household, single family units: For the purposes of Table 5-2 in this Plan, see Single Family Residential.

Single units: detached: For the purposes of Table 5-2 in this Plan, see Single Family Residential.

Single units: semi-detached: For the purposes of Table 5-2 in this Plan, see Single Family Residential.

Single units: attached row: For the purposes of Table 5-2 in this Plan, see Single Family Residential.

Multi-family Residential: For the purposes of Table 5-2 in this Plan, Multi-family Residential includes the following land uses: Two units: side-by-side; Two units: one above the other; Apartments; Household, 2-4 units; Household, multiunits; and Residential condominiums. These definitions are distinct from single-family residential land uses defined above. See base zone for residential land use distinctions.

Two units: side-by-side: For the purposes of Table 5-2 in this Plan, see Multi-family Residential.

Two units: one above the other: For the purposes of Table 5-2 in this Plan, see Multi-family Residential.

Apartments: For the purposes of Table 5-2 in this Plan, see Multi-family Residential.

Household, 2-4 units: For the purposes of Table 5-2 in this Plan, see Multi-family Residential.

Household, multiunits (5 or more): For the purposes of Table 5-2 in this Plan, see Multi-family Residential.

Residential condominiums: For the purposes of Table 5-2 in this Plan, see Multi-family Residential.

Mobile home parks or courts: Any parcel of land or portion thereof which is used or offered for use as a location for one or more mobile homes

Hotels/motels: Establishments, known to the public as hotels, motor hotels, motels, or tourist courts, primarily engaged in providing lodging, or lodging and meals, for the general public. Hotels which are operated by membership organizations and open to the general public are included in this industry.

Manufacturing

Food and kindred products: Establishments manufacturing or processing foods and beverages for human consumption, and certain related products, such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls.

Textile mill products: Establishments engaged in performing any of the following operations: (1) preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine, and cordage; (2) manufacturing broadwoven fabrics, narrow woven fabrics, knit fabrics, and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabrics, and knit apparel; (4) coating, waterproofing, or otherwise treating fabrics; (5) the integrated manufacture of knit apparel and other finished articles from yarn; and (6) the manufacture of felt goods, lace goods, non-woven fabrics, and miscellaneous textiles.

Apparel and other finished products made from fabrics, leather, and similar materials: Establishments producing clothing and fabricating products by cutting and sewing purchased woven or knit textile fabrics and related materials, such as leather, rubberized fabrics, plastics, and furs. Also included are

establishments that manufacture clothing by cutting and joining (for example, by adhesives) materials such as paper and non-woven textiles.

Lumber and wood products (except furniture): Establishments engaged in cutting timber and pulpwood; merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or related materials.

Furniture and fixtures: Establishments engaged in manufacturing household, office, public building, and restaurant furniture; and office and store fixtures.

Paper and allied products: Establishments primarily engaged in the manufacture of pulps from wood and other cellulose fibers, and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes. Also included are establishments primarily engaged in manufacturing bags of plastics film and sheet.

Printing and publishing: Establishments engaged in printing by one or more common processes, such as letterpress; lithography (including offset), gravure, or screen; and those establishments which perform services for the printing trade, such as bookbinding and platemaking. This major group also includes establishments engaged in publishing newspapers, books, and periodicals, regardless of whether or not they do their own printing.

Chemicals: Establishments producing basic chemicals, and establishments manufacturing products by predominantly chemical processes. Establishments classified in this major group manufacture three general classes of products: (1) basic chemicals, such as acids, alkalies, salts, and organic chemicals; (2) chemical products to be used in further manufacture, such as synthetic fibers, plastics materials, dry colors, and pigments; and (3) finished chemical products to be used for ultimate consumption, such as drugs, cosmetics, and soaps; or to be used as materials or supplies in other industries, such as paints, fertilizers, and explosives.

Petroleum refining and related industries: Establishments primarily engaged in petroleum refining, manufacturing paving and roofing materials, and compounding lubricating oils and greases from purchased materials.

Rubber and miscellaneous plastic products: Establishments manufacturing products, not elsewhere classified, from plastics resins and from natural, synthetic, or reclaimed rubber, gutta percha, balata, or gutta siak.

Stone, clay and glass products: Establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, and other products from materials taken principally from the earth in the form of stone, clay, and sand.

Primary metal industries: Establishments engaged in smelting and refining ferrous and nonferrous metals from ore, pig, or scrap; in rolling, drawing, and alloying metals; in manufacturing castings and other basic metal products; and in manufacturing nails, spikes, and insulated wire and cable.

Fabricated metal products: Establishments engaged in fabricating ferrous and nonferrous metal products, such as metal cans, tinware, handtools, cutlery, general hardware, nonelectric heating apparatus, fabricated structural metal products, metal forgings, metal stampings, ordnance (except vehicles and guided missiles), and a variety of metal and wire products, not elsewhere classified.

Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks-manufacturing: Establishments that engage in the manufacturing of instruments (including professional and scientific) for measuring, testing, analyzing, and controlling, and their associated sensors and accessories; optical instruments and lenses; surveying and drafting instruments; hydrological, hydrographic, meteorological, and geophysical equipment; search, detection, navigation, and guidance systems and equipment; surgical, medical, and dental instruments, equipment, and supplies; ophthalmic goods; photographic equipment and supplies; and watches and clocks.

Miscellaneous manufacturing: Establishments primarily engaged in manufacturing products not classified in any other manufacturing major group. Industries in this group fall into the following categories: jewelry, silverware, and plated ware; musical instruments; dolls, toys, games, and sporting and athletic goods; pens, pencils, and artists' materials; buttons, costume novelties, miscellaneous notions; brooms and brushes; caskets; and other miscellaneous manufacturing industries.

Transportation, Communication, and Utilities

Railroad/transit transportation: Establishments furnishing transportation by line-haul railroad, and switching and terminal establishments. Railways serving a single municipality, contiguous municipalities, or a municipality and its suburban areas are also included.

Motor vehicle transportation: All public highways, roads, and bridges. This includes such related infrastructure as guardrails, streetlamps, rest stops, embankments, and sound barriers.

Aircraft transportation: Establishments engaged in furnishing domestic and foreign transportation by air and also those operating airports and flying fields and furnishing terminal services. Establishments primarily engaged in performing services which may incidentally use airplanes (e.g., crop dusting and aerial photography) are classified according to the service performed.

Highway and street right of way: Highway and street right-of-ways are part of the designated public land.

Automobile parking: Establishments primarily engaged in providing parking space for motor vehicles, usually on an hourly, daily, or monthly basis and/or valet parking services.

Communication: Establishments furnishing point-to-point communications services, whether intended to be received aurally or visually; and radio and television broadcasting.

Utilities: Establishments engaged in the generation, transmission, and/or distribution of electricity or gas or steam. Such establishments may be combinations of any of the above three services and also include other types of services, such as transportation, communications, and refrigeration. Water and irrigation systems, and sanitary systems engaged in the collection and disposal of garbage, sewage, and other wastes by means of destroying or processing materials, are also included.

Solid waste disposal (landfills, incinerators, etc.): Establishments primarily engaged in the collection and disposal of refuse by processing or destruction or in the operation of incinerators, waste treatment plants, landfills, or other sites for disposal of such materials.

Other transportation, communication, and utilities not classified elsewhere: Other transportation, communication, and utilities not classified elsewhere

Trade

Condominiums - Other than residential condominiums: A single dwelling unit in a multi-unit dwelling or structure, which is separately owned and which may be combined with an undivided interest in the common areas and facilities of the property. Residential uses are not included.

Wholesale trade: Establishments primarily engaged in the wholesale distribution of non-durable goods

Retail trade - Building materials, hardware, and farm equipment: Retail establishments primarily engaged in selling lumber and other building materials; paint, glass, and wallpaper; hardware; nursery stock; lawn and garden supplies; and mobile homes.

Retail trade - Shopping centers-Neighborhood, Community, Regional, Super-regional: Retail stores which sell a number of lines of merchandise, such as dry goods, apparel and accessories, furniture and home furnishings, small wares, hardware, and food. The stores included in this group are known by such names as department stores, variety stores, general merchandise stores, and general stores.

Retail trade – Food: Retail stores primarily engaged in selling food for home preparation and consumption.

Retail trade - Automotive, marine craft, aircraft, and accessories: Retail dealers selling new and used automobiles, boats, recreational vehicles, utility trailers, and motorcycles including mopeds; those selling new automobile parts and accessories; and gasoline service stations. Automobile repair shops maintained by establishments engaged in the sale of new automobiles are also included.

Retail trade - Apparel and accessories: Retail stores primarily engaged in selling new clothing, shoes, hats, underwear, and related articles for personal wear and adornment. Furriers and custom tailors carrying stocks of materials are included.

Retail trade - Furniture, home furnishings and equipment: Retail stores selling goods used for furnishing the home, such as furniture, floor coverings, draperies, glass and chinaware, domestic stoves, refrigerators, and other household electrical and gas appliances. Establishments selling electrical and gas appliances are included in this group only if the major part of their sales consists of articles for home use.

Retail trade - Eating and drinking: Retail establishments selling prepared foods and drinks for consumption on the premises; and also lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption. Restaurants, lunch counters, and drinking places operated as a subordinate service facility by other establishments are not included in this industry, unless they are operated as leased departments by outside operators.

Other retail trade: Retail establishments, not elsewhere classified. These establishments fall into the following categories: drug stores, liquor stores, used merchandise stores, miscellaneous shopping goods stores, non-store retailers, fuel dealers, and miscellaneous retail stores, not elsewhere classified.

Services

Finance, insurance, and real estate services: Establishments operating primarily in the fields of finance, insurance, and real estate. Finance includes depository institutions, non-depository credit institutions, holding (but not predominantly operating) companies, other investment companies, brokers and dealers in securities and commodity contracts, and security and commodity exchanges. Insurance covers carriers of all types of insurance, and insurance agents and brokers. Real estate includes owners, lessors, lessees, buyers, sellers, agents, and developers of real estate.

Personal services: Establishments primarily engaged in providing services generally to individuals, such as laundries, dry-cleaning plants, portrait photographic studios, and beauty and barber shops. Also included are establishments operating as industrial launderers and those primarily engaged in providing linen supply services to commercial and business establishments.

Cemeteries: Establishments primarily engaged in operating sites or structures reserved for the interment of human or animal remains and/or cremating the dead.

Business services: Establishments primarily engaged in rendering services, not elsewhere classified, to business establishments on a contract or fee basis, such as advertising, credit reporting, collection of claims, mailing, reproduction, stenographic, news syndicates, computer programming, photocopying, duplicating, data processing, services to buildings, and help supply services.

Warehousing and storage services: An enclosed building used primarily for the storage and dispatching of goods and materials. Typical uses include wholesaling, wholesale distributors, distribution and fulfillment centers, storage warehouses, and moving and storage companies. Also includes buildings designed primarily for the storage of household items and inventory of small commercial businesses where storage units are individually leased or rented, where access to storage units is infrequent and where no utilities are provided except for the service of a manager's apartment and for lighting of individual storage units.

Repair services: Establishments primarily engaged in the provision of repair services to individuals and households, rather than businesses, but excluding automotive and equipment repair use types. Typical uses include appliance repair shops, shoe repair, watch or jewelry repair shops, or repair of musical instruments.

Professional services: Work done for others, predominately on the premises of the office, by someone trained and engaged in such work for a career; e.g., doctors, lawyers, accountants.

Hospitals, nursing homes, other medical facilities: Establishments primarily engaged in furnishing medical, surgical, and other health services to persons.

Nursing Homes: Establishments primarily engaged in providing inpatient nursing and rehabilitative services to patients who require continuous health care, but not hospital services. Also included are

establishments primarily engaged in providing inpatient nursing and rehabilitative services, but not on a continuous basis.

Contract construction services: Establishments primarily engaged in activities commonly referred to as construction and shall include with-out limiting thereby, plumbing, heating, roofing, interior remodeling, excavating.

Governmental services: Establishments primarily engaged in providing general support for government, which include personnel, auditing, procurement services, and building management services, and other general government establishments which cannot be classified in other industries.

Educational services: Establishments providing academic or technical instruction. Also included are establishments providing educational services such as libraries, student exchange programs, and curriculum development.

Child care services, child development centers, and nurseries: Establishments primarily engaged in the care of infants or children, or in providing prekindergarten education, where medical care or delinquency correction is not a major element. These establishments may or may not have substantial educational programs. These establishments generally care for prekindergarten or preschool children, but may care for older children when they are not in school.

Miscellaneous services: Miscellaneous services not elsewhere classified.

Religious activities (including places of worship): An establishment for the conduct of religious activities, including but not limited to a church, temple, seminary, monastery, mosque, synagogue, and similar facilities. Accessory uses include but are not limited to housing and columbaria as accessory.

Cultural, Entertainment and Recreational

Cultural activities and nature exhibitions: Establishments that operate facilities or provide services to meet varied cultural, entertainment, and recreational interests of their patrons. This sector comprises (1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.

Nature Exhibits: Establishments primarily engaged in the preservation and exhibition of natural areas or settings.

Public assembly: Establishments for the mass assembly of people for either spectator sports, entertainment, or other social and institutional reasons.

Auditoriums, concert halls: See Public Assembly

Outdoor music shells, amphitheaters: See Public Assembly

Outdoor sports arenas, spectator sports: See Public Assembly

Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.: Establishments primarily engaged in operating amusement parks and amusement arcades and parlors.

Recreational activities (including golf courses, riding stables, water recreation): Establishments primarily engaged in the operation of sports, amusement, and recreation services, not elsewhere classified, such as bathing beaches, swimming pools, riding academies and schools, carnival operation, exposition operation, horse shows, picnic grounds operation, rental of rowboats and canoes, and shooting galleries.

Resorts and group camps: Establishments primarily engaged in operating overnight recreational camps, such as children's camps, family vacation camps, hunting and fishing camps, and outdoor adventure retreats, that offer trail riding, white water rafting, hiking, and similar activities. These establishments provide accommodation facilities, such as cabins and fixed campsites, and other amenities, such as food services, recreational facilities and equipment, and organized recreational activities.

Parks: Land set aside as public recreation and public space. Parks may include playground equipment, athletic fields, sport courts, swimming pools, and other facilities and programmed activities normally associated with public parks. Parks may also be reserved for natural or environmental reasons, such as preservation of wildlife, vegetation, or significant natural, cultural or historic resources.

Other cultural, entertainment, and recreational: Establishments (except amusement parks and arcades; gambling industries; golf courses and country clubs; skiing facilities; marinas; fitness and recreational sports centers; and bowling centers) primarily engaged in providing recreational and amusement services.

Resource Production and Extraction

Agriculture (except live- stock): Establishments (e.g., farms, orchards, greenhouses, nurseries) primarily engaged in the production of crops, plants, vines, and trees (excluding forestry operations). This major group also includes establishments primarily engaged in the operation of sod farms, and cranberry bogs; in the production of mushrooms, bulbs, flower seeds, and vegetable seeds; and in the growing of hydroponic crops. Seeds of field crops are classified in the same industry as crops grown for other purposes.

Agriculture-Livestock farming, including grazing and feedlots: Establishments primarily engaged in the raising of animals or production of animal products, such as eggs or dairy products, and the raising and harvesting of tree crops, row crops, or field crops on an agricultural or commercial basis. Typical uses include grazing, ranching, dairy farming, and poultry farming, and may include accessory retail sales under certain conditions.

Agriculture related activities: Establishments engaged in sale from the premises of feed, grain, fertilizers, pesticides, and similar goods or in the provision of agriculturally related services with incidental storage on lots other than where the service is rendered. Typical uses include nurseries, hay, feed and grain stores, and tree service firms.

Forestry activities: Establishments primarily engaged in the operation of timber tracts, tree farms, forest nurseries, and related activities such as reforestation services and the gathering of gums, barks, balsam needles, maple sap, Spanish moss, and other forest products.

Fishing activities and related services: Establishments primarily engaged in commercial fishing (including crabbing, lobstering, clamming, oystering, and the gathering of sponges and seaweed), and the operation of fish hatcheries and fish and game preserves, in commercial hunting and trapping, and in game propagation.

Mining activities and related services: Establishments primarily engaged in activities conducted on the surface or underground (or both) for the exploration for, development of, or extraction of natural products including, but not limited to, sand, gravel, topsoil, limestone and coal from their natural occurrences and the cleaning, concentrating, refining or other processing or preparation and loading for transit of crude natural products at or near the mine site.

Marijuana grow operations: An establishment licensed by the City and state for the growth, cultivation, acquisition, manufacture, storage, dispensing, or sale of medical marijuana or medical marijuana infused products, including the Medical Marijuana Center, Medical Marijuana Infused Products Manufacturer, Medical Marijuana Infused Products Manufacturer – Nonhazardous, and Medical Marijuana Infused Products Manufacturer – Hazardous uses.

Other resource production: Other resource production not classified elsewhere.

Undeveloped Land and Water Areas

Undeveloped land: Land in its natural state.

Water areas: The area between the banks of a lake, pond, river, perennial, or fish-bearing intermittent stream, excluding man-made farm ponds.

Open space land: Land and water areas retained for use as active or passive recreation areas or for resource protection in an essentially un-developed state.

Other undeveloped land: Other undeveloped land not classified elsewhere.

General Definitions

Adjacent: Bordering or touching. Lots that are separated by a trail, street, right-of-way, or platted alley are also considered adjacent.

Base Zone: A zone as determined by the entity with jurisdiction over the land.

Base Realignment and Closure (BRAC): a congressionally authorized process by the United States federal Department of Defense (DOD) for the review and approval of basing changes submitted by the Secretary of Defense.

Department of Defense (DOD): The federal department responsible for safeguarding national security of the United States.

Determination of No Hazard: When used in the context of airport and airspace studies and regulations, a final written aeronautical and/or airspace study reply received from the FAA in direct response to filing notice under 14 C.F.R. Part 77.

DNL: A Day-Night (sound) Level (DNL) that recognizes the added impact of nighttime noise. It is a 24-hour average noise level based on A-weighting with ten dBA added between 10:00 P.M. and 7:00 P.M. DNL is expressed visually via contour lines in five DNL increments.

Entities: For the purpose of this Plan, the Entities include the City of Colorado Springs, El Paso County, and the City of Fountain.

Federal Aviation Administration (FAA): The United States Department of Transportation, Federal Aviation Administration, or any successor agency.

Hazard to Air Navigation: Any improvement or use of land that obstructs or otherwise has a significant adverse impact on the airspace required for the flight of aircraft, as determined by the FAA under 14 C.F.R. Part 77 and related FAA orders and regulations as may be changed or amended.

Improvement: When used in the context of regulation of airspace in connection with the AO, any building, structure or other improvement, development or object, including trees, shrubbery or other vegetation.

Joint Land Use Study (JLUS): A cooperative planning effort conducted as a joint venture between an active military installation, surrounding jurisdictions, state and federal agencies, and other affected stakeholders to address compatibility around military installations.

Landing Area: The area of an airport used for landing, taking off, or taxiing of aircraft.

Nonconforming Use:

1. In general, a use of land or a structure that was lawfully established and has been lawfully continued, but that no longer complies with the requirements of this Plan due to the actions of an Entity, and not due to the actions of the property owner.
2. At the time of adoption of this Plan, any structure, tree, natural growth, or use of land existing, that is inconsistent with the provisions of the AO.

Peterson Air Force Base (PAFB): The U.S. Air Force Base located on the north side of the Colorado Springs Airport that shares the airfield with the Airport.

Person: When this Plan refers to actions or ownership by a person, that reference includes an individual, firm, partnership, corporation, company, association, joint stock association, or governmental entity, and includes a trustee, receiver, assignee, administrator, executor, guardian or a similar representative of any of those types of organization.

Safety Zone: An area that is protected from development to reduce the risk of damage to airplanes and persons and property on the ground in the event and aircraft undershoots, overshoots, or excursions from the runway.

Standard Land Use Coding Manual (SLUCM): A standard system for identifying and coding land use activities.

Underlying Zone: A zone as determined by the entity with jurisdiction over the land.

Appendix C: Avigation Easement Example



Instructions for Required Avigation Easements

Applicant will submit the following to Real Estate Services:

- ☐ Property Address(es) and/or Tax Schedule Number(s),
- ☐ Land Use Review's:
 - 1. Project Name and,
 - 2. Project Number.
- ☐ Legal descriptions prepared by a Colorado Licensed Surveyor:
 - Exhibit A** - a written description of the new easement area; and
 - Exhibit B** - a depiction of the easement area.
- ☐ Statement of Authority for the ownership entity, if the property is held in a LLC, corporation, etc,
- ☐ Applicant's contact information (mailing address, phone/cell number, email address).

Once all items received, above, Real Estate Services will:

- Obtain the latest Vesting Deed showing ownership of the property(s),
- Obtain approval of the exhibits submitted,
- Prepare the Easement document using the information provided by the Applicant and the information contained in the latest Vesting Deed,
- Send the Easement document to applicant to be signed and notarized by property owner,
- Request the Recording Fee from the applicant.

Next, Applicant will submit the following items to Real Estate Services:

- ☐ Fully executed and notarized Easement document;
- ☐ Check or money order payable to **The City of Colorado Springs** for payment of the recording fee. The fee is based on the following:

\$11.00 for the first page, \$5.00 for each additional page and a \$2.00 fee per document.

Real Estate Services will:

- Obtain the remaining signatures,
- Record the document electronically, and,
- Provide a copy of the recorded Easement to the Applicant.

Contact information for Real Estate Services:

Barbara Reinardy, Administrative Technician
City of Colorado Springs
Real Estate Services Division
Mailing address: P.O. Box 1575, MC 525, Colorado Springs, CO 80901-1575
Physical address: 30 South Nevada Avenue, Suite #502, Colorado Springs, CO 80903
Tel: (719) 385-5601; Fax: (719) 385-5610
E-mail: breinardy@springsgov.com

Appendix D: FAA Form 7460

NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

§ 77.7 Form and time of notice.

(a) If you are required to file notice under §77.9, you must submit to the FAA a completed FAA Form 7460-1, Notice of Proposed Construction or Alteration. FAA Form 7460-1 is available at FAA regional offices and on the Internet.

(b) You must submit this form at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest.

(c) If you propose construction or alteration that is also subject to the licensing requirements of the Federal Communications Commission (FCC), you must submit notice to the FAA on or before the date that the application is filed with the FCC.

(d) If you propose construction or alteration to an existing structure that exceeds 2,000 ft. in height above ground level (AGL), the FAA presumes it to be a hazard to air navigation that results in an inefficient use of airspace. You must include details explaining both why the proposal would not constitute a hazard to air navigation and why it would not cause an inefficient use of airspace.

(e) The 45-day advance notice requirement is waived if immediate construction or alteration is required because of an emergency involving essential public services, public health, or public safety. You may provide notice to the FAA by any available, expeditious means. You must file a completed FAA Form 7460-1 within 5 days of the initial notice to the FAA. Outside normal business hours, the nearest flight service station will accept emergency notices.

§ 77.9 Construction or alteration requiring notice.

If requested by the FAA, or if you propose any of the following types of construction or alteration, you must file notice with the FAA of:

(a) Any construction or alteration that is more than 200 ft. AGL at its site.

(b) Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:

(1) 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 ft. in actual length, excluding heliports.

(2) 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 ft. in actual length, excluding heliports.

(3) 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport described in paragraph (d) of this section.

(c) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) or (b) of this section.

(d) Any construction or alteration on any of the following airports and heliports:

(1) A public use airport listed in the Airport/Facility Directory, Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications;

(2) A military airport under construction, or an airport under construction that will be available for public use;

(3) An airport operated by a Federal agency or the DOD.

(4) An airport or heliport with at least one FAA-approved instrument approach procedure.

(e) You do not need to file notice for construction or alteration of:

(1) Any object that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation;

(2) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device meeting FAA-approved siting criteria or an appropriate military service siting criteria on military airports, the location and height of which are fixed by its functional purpose;

(3) Any construction or alteration for which notice is required by any other FAA regulation.

(4) Any antenna structure of 20 feet or less in height, except one that would increase the height of another antenna structure.

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177
Fax: (817) 222-5920

Website: <https://oeaaa.faa.gov>

INSTRUCTIONS FOR COMPLETING FAA FORM 7460-1

PLEASE TYPE or PRINT

ITEM #1. Please include the name, address and phone number of a personal contact point as well as the company name.

ITEM #2. Please include the name, address and phone number of a personal contact point as well as the company name.

ITEM #3. New Construction would be a structure that has not yet been built.

Alteration is a change to an existing structure such as the addition of a side mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alteration shall be included in ITEM #21 "Complete Description of Proposal".

Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has never been studied by the FAA. The reason for the notice shall be included in ITEM #21 "Complete Description of Proposal".

ITEM #4. If Permanent, so indicate. If Temporary, such as a crane or drilling derrick, enters the estimated length of time the temporary structure will be up.

ITEM #5. Enter the date that construction is expected to start and the date that construction should be completed.

ITEM #6. Please indicate the type of structure. DO NOT LEAVE BLANK.

ITEM #7. In the event that obstruction marking and lighting is required, please indicate type desired. If no preference, check "other" and indicate "no preference" DO NOT LEAVE BLANK. NOTE: High Intensity lighting shall be used only for structures over 500' AGL. In the absence of high intensity lighting for structures over 500' AGL, marking is also required.

ITEM #8. If this is an existing tower that has been registered with the FCC, enter the FCC Antenna Structure Registration number here.

ITEM #9 and #10. Latitude and longitude must be geographic coordinates, accurate to within the nearest second or to the nearest hundredth of a second if known. Latitude and longitude derived solely from a hand-held GPS instrument is NOT acceptable. A hand-held GPS is only accurate to within 100 meters (328 feet) 95 percent of the time. This data, when plotted, should match the site depiction submitted under ITEM #20.

ITEM #11. NAD 83 is preferred; however, latitude and longitude may be submitted in NAD 27. Also, in some geographic areas where NAD 27 and NAD 83 are not available other datum may be used. It is important to know which datum is used. DO NOT LEAVE BLANK.

ITEM #12. Enter the name of the nearest city and state to the site. If the structure is or will be in a city, enter the name of that city and state.

ITEM #13. Enter the full name of the nearest public-use (not private-use) airport or heliport or military airport or heliport to the site.

ITEM #14. Enter the distance from the airport or heliport listed in #13 to the structure.

ITEM #15. Enter the direction from the airport or heliport listed in #13 to the structure.

ITEM #16. Enter the site elevation above mean sea level and expressed in whole feet rounded to the nearest foot (e.g. 17'3" rounds to 17', 17'6" rounds to 18"). This data should match the ground contour elevations for site depiction submitted under ITEM #20.

ITEM #17. Enter the total structure height above ground level in whole feet rounded to the next highest foot (e.g. 17'3" rounds to 18"). The total structure height shall include anything mounted on top of the structure, such as antennas, obstruction lights, lightning rods, etc.

ITEM #18. Enter the overall height above mean sea level and expressed in whole feet. This will be the total of ITEM #16 + ITEM #17.

ITEM #19. If an FAA aeronautical study was previously conducted, enter the previous study number.

ITEM #20. Enter the relationship of the structure to roads, airports, prominent terrain, existing structures, etc. Attach an 8-1/2" x 11" non-reduced copy of the appropriate 7.5 minute U.S. Geological Survey (USGS) Quadrangle Map MARKED WITH A PRECISE INDICATION OF THE SITE LOCATION. To obtain maps, contact USGS at 1-888-275-8747 or via internet at "<http://store.usgs.gov>". If available, attach a copy of a documented site survey with the surveyor's certification stating the amount of vertical and horizontal accuracy in feet.

ITEM #21.

- For transmitting stations, include maximum effective radiated power (ERP) and all frequencies.
- For antennas, include the type of antenna and center of radiation (Attach the antenna pattern, if available).
- For microwave, include azimuth relative to true north.
- For overhead wires or transmission lines, include size and configuration of wires and their supporting structures (Attach depiction).
- For each pole/support, include coordinates, site elevation, and structure height above ground level or water.
- For buildings, include site orientation, coordinates of each corner, dimensions, and construction materials.
- For alterations, explain the alteration thoroughly.
- For existing structures, thoroughly explain the reason for notifying the FAA (e.g. corrections, no record or previous study, etc.).

Filing this information with the FAA does not relieve the sponsor of this construction or alteration from complying with any other federal, state or local rules or regulations. If you are not sure what other rules or regulations apply to your proposal, contact local/state aviation's and zoning authorities.

Paperwork Reduction Work Act Statement: A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection displays a currently valid OMB Control Number. The OMB control number for this information collection is 2120-0001. Public reporting for this collection of information is estimated to be approximately 19 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information. All responses to this collection of information are mandatory for anyone proposing construction or alteration that meets the criteria contained in 14 CFR 77. This information is collected to evaluate the effect of proposed construction or alteration on air navigation and is not confidential. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, Federal Aviation Administration, 10101 Hillwood Parkway, Fort Worth, TX 76177-1524.

Please Type or Print on This Form



U.S. Department of Transportation
Federal Aviation Administration

Failure To Provide All Requested Information May Delay Processing of Your Notice

Notice of Proposed Construction or Alteration

FOR FAA USE ONLY

Aeronautical Study Number

1. Sponsor (person, company, etc. proposing this action):

Attn. of

Name:

Address:

City: State: Zip:

Telephone: Fax:

2. Sponsor's Representative (if other than #1):

Attn. of

Name:

Address:

City: State: Zip:

Telephone: Fax:

3. Notice of: ☐ New Construction ☐ Alteration ☐ Existing

4. Duration: ☐ Permanent ☐ Temporary (months, days)

5. Work Schedule: Beginning End

6. Type: ☐ Antenna Tower ☐ Crane ☐ Building ☐ Power Line
☐ Landfill ☐ Water Tank ☐ Other

7. Marking/Painting and/or Lighting Preferred:

☐ Red Lights and Paint ☐ Dual - Red and Medium Intensity
☐ White-Medium Intensity ☐ Dual - Red and high Intensity
☐ White -High Intensity ☐ Other

8. FCC Antenna Structure Registration Number (if applicable):

9. Latitude: ° ' "

10. Longitude: ° ' "

11. Datum: ☐ NAD 83 ☐ NAD 27 ☐ Other

12. Nearest: City: State:

13. Nearest Public-use (not private-use) or Military Airport or Heliport:

14. Distance from #13. to Structure:

15. Direction from #13. to Structure:

16. Site Elevation (AMSL): ft.

17. Total Structure Height (AGL): ft.

18. Overall Height (#16 + #17) (AMSL): ft.

19. Previous FAA Aeronautical Study Number (if applicable):

-OE

20. Description of Location: (Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and any certified survey)

21. Complete Description of Proposal:

Frequency/Power (kW)

Notice is required by 14 Code of Federal Regulations, part 77 pursuant to 49 U.S.C., Section 44718. Persons who knowingly and willingly violate the notice requirements of part 77 are subject to a civil penalty of \$1,000 per day until the notice is received, pursuant to 49 U.S.C., Section 46301(a)

I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to mark and/or light the structure in accordance with established marking & lighting standards as necessary.

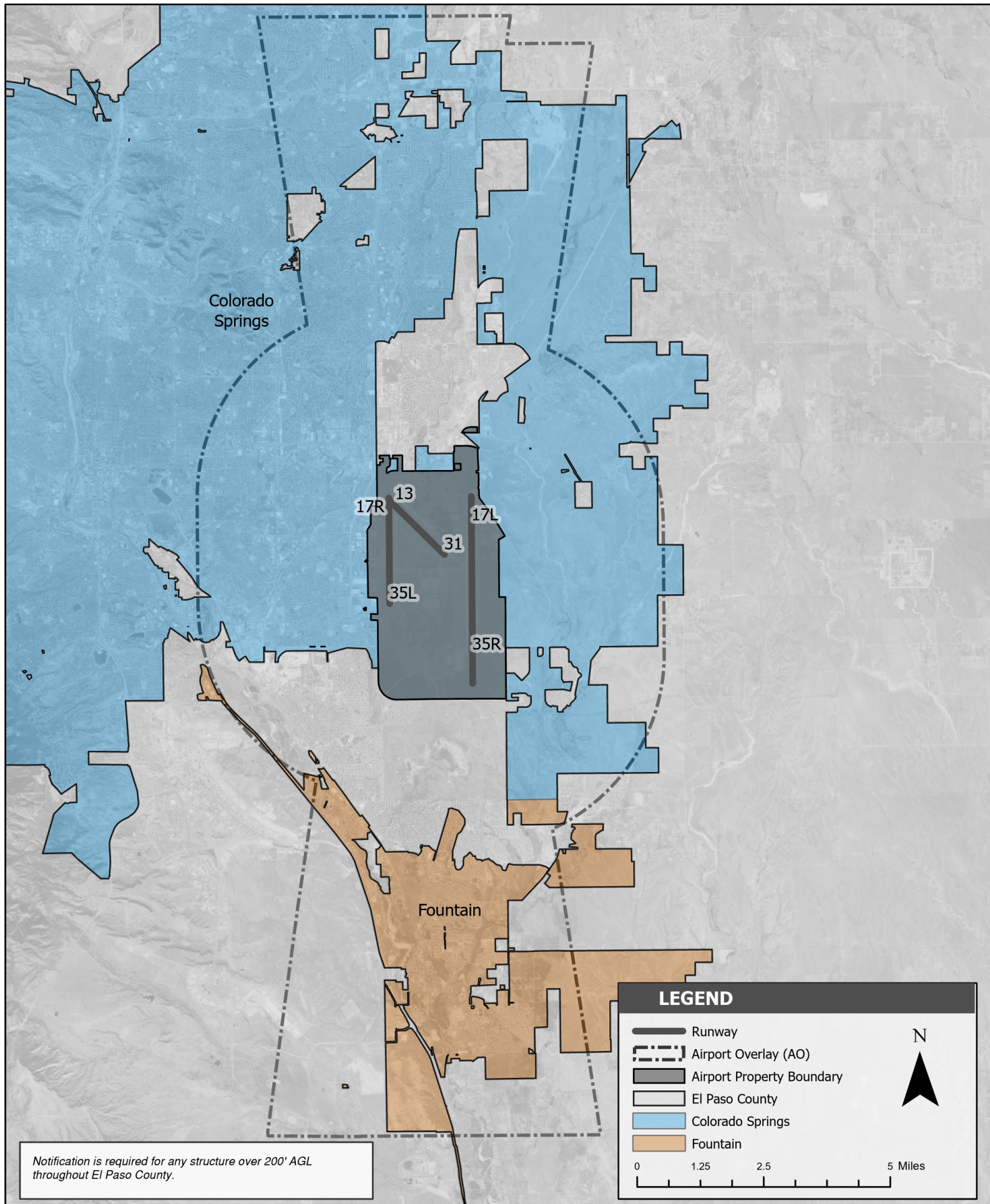
Date

Typed or Printed Name and Title of Person Filing Notice

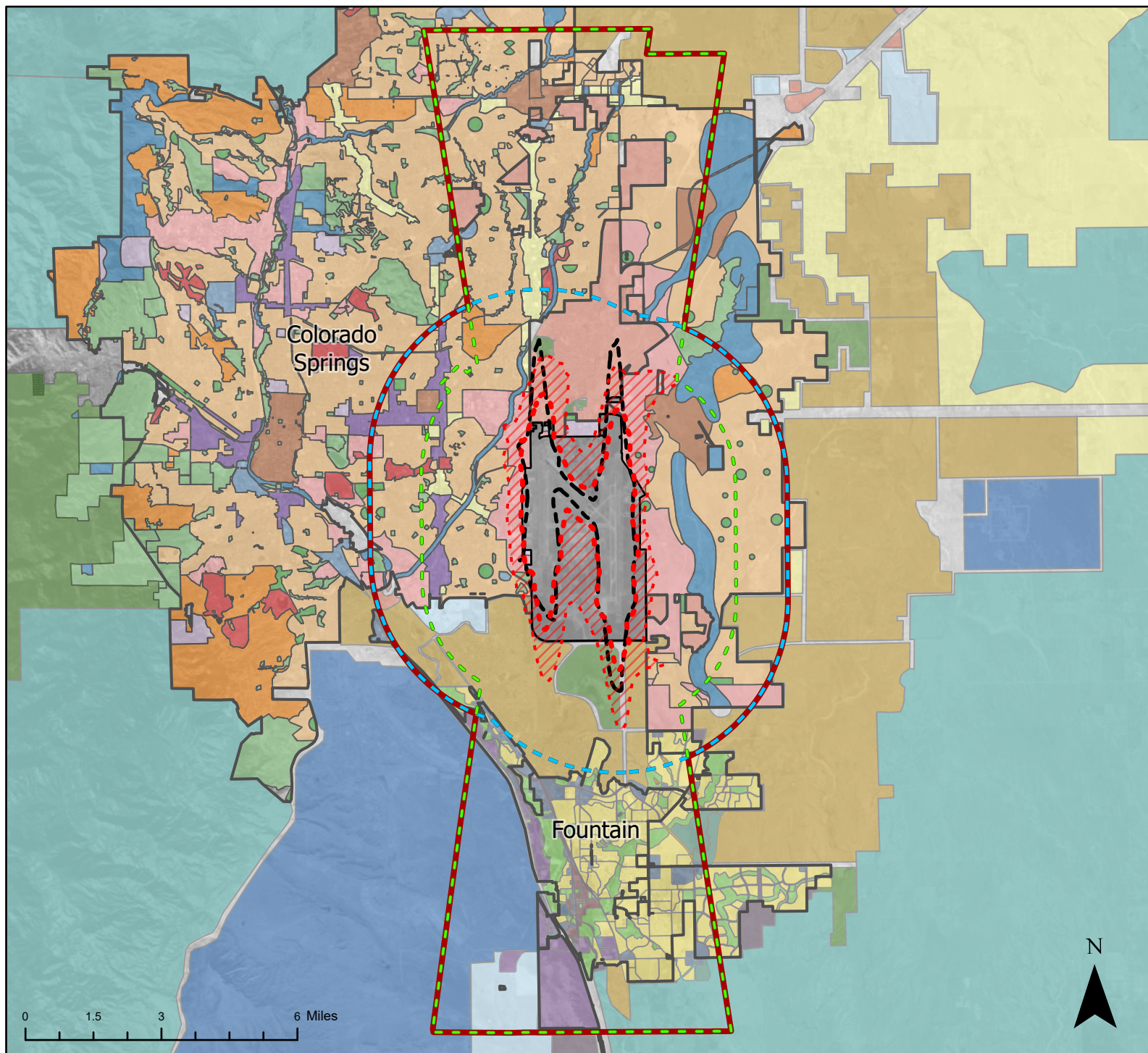
Signature

Appendix E: Zone Maps

Colorado Springs Airport - Area Wide Overlay



COS: AO and Noise Comparison



LAND USE

El Paso County

- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

Colorado Springs

- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor

- New / Developing Corridor
- Regional Center

Fountain

- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

LEGEND

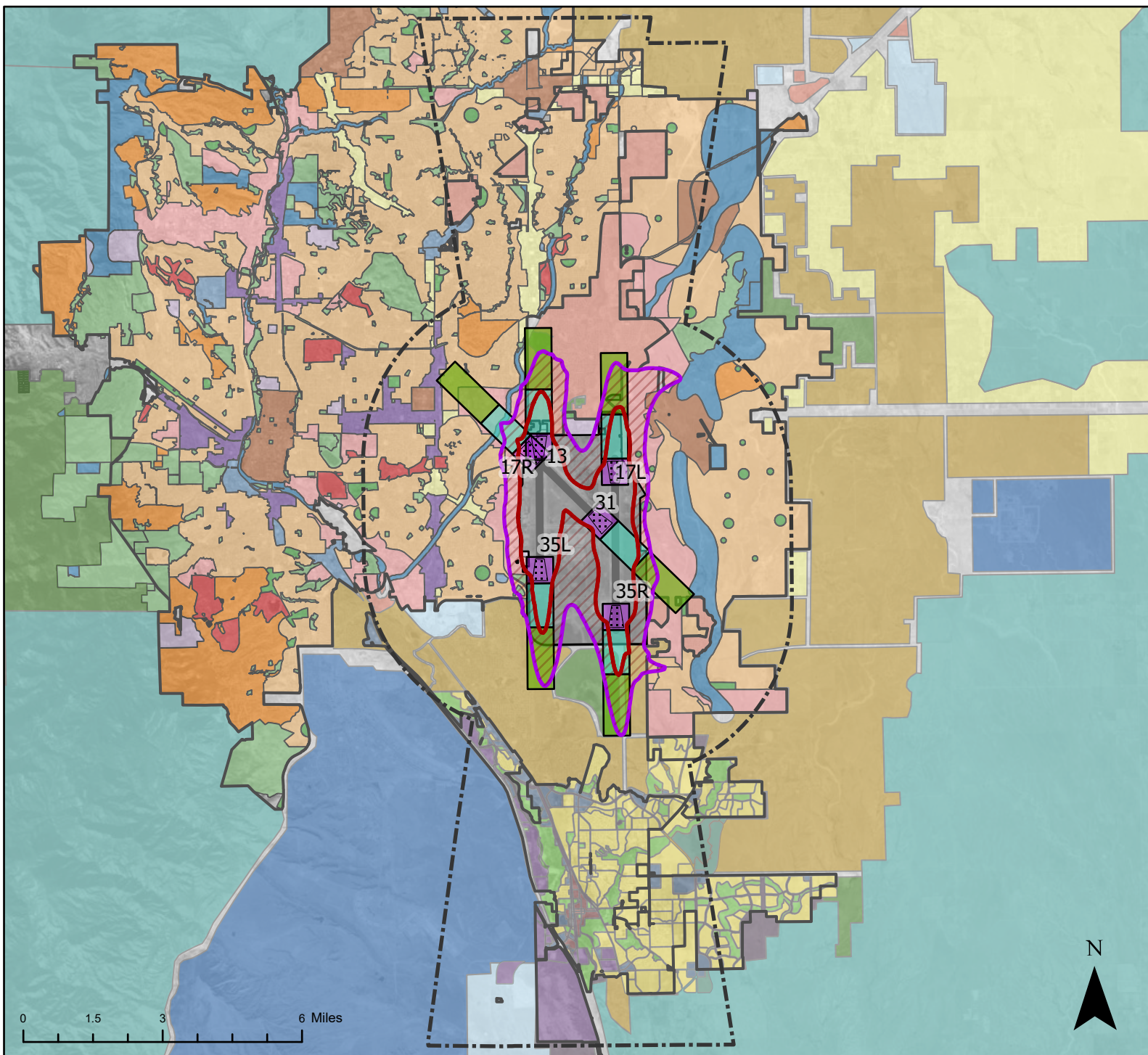
Existing

- Airport Influence Area (AIA)
- DNL 60 Contour ASV
- DNL 65 Contour ASV (65 DNL)
- Airport Overlay (AO)

Previous

- DNL 65 Contour
- Airport Overlay (AO)
- Part 77 Notification Area
- Airport Property Boundary

COS: Overlay and Subzones



LAND USE

El Paso County

- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

Colorado Springs

- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor

- New / Developing Corridor
- Regional Center

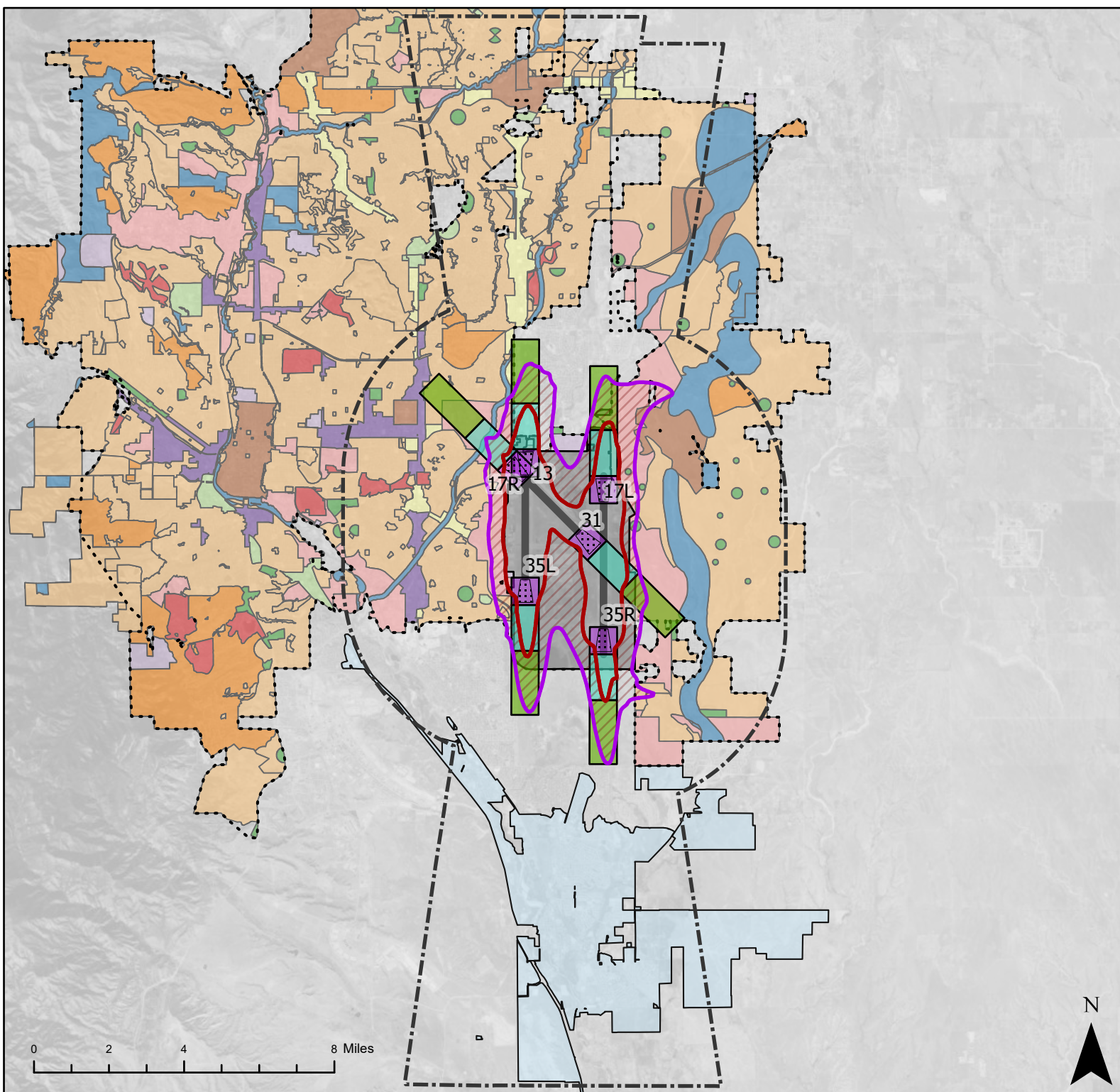
Fountain

- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV (65 DNL)
- Airport Influence Area (AIA)
- Airport Overlay (AO)
- Accident Potential Zone 1 (APZ1)
- Accident Potential Zone 2 (APZ2)
- Clear Zone (CZ)
- Runway Protection Zone (RPZ)
- Runway
- Airport Property Boundary
- City Boundaries

Land Uses: City of Colorado Springs



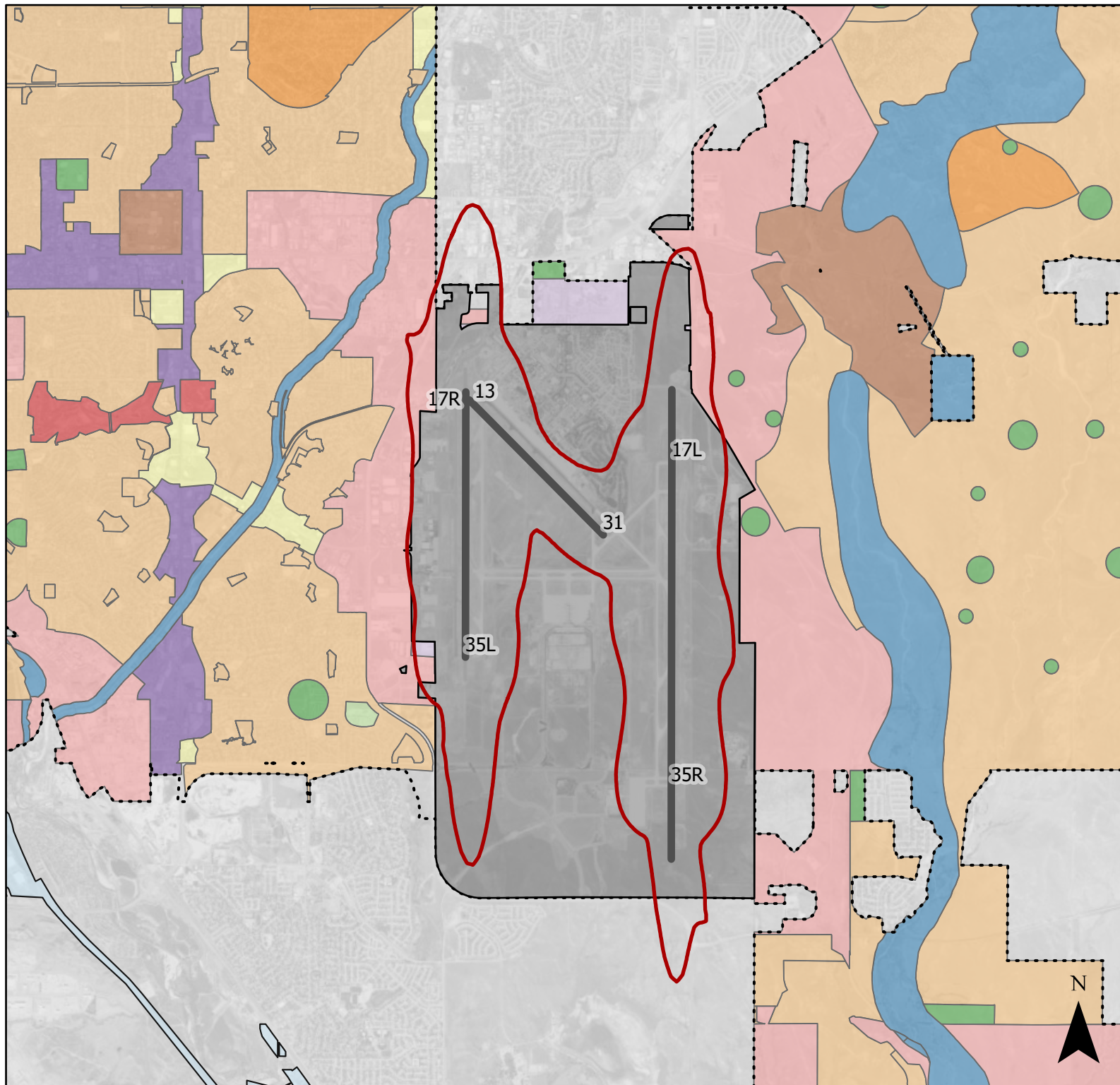
LAND USE

Candidate Open Space	General Residential
Commercial Center	Low Residential
Community Activity Center	Major Institutional
Employment Center	Mature Redevelopment Corridor
Existing Golf Course / Cemetery	New / Developing Corridor
Existing Park Land / Open Space	Regional Center













LEGEND

DNL 60 Contour ASV	Airport Overlay (AO)
DNL 65 Contour ASV (65 DNL)	Runway
Airport Influence Area (AIA)	Airport Property Boundary
Accident Potential Zone 1 (APZ1)	Colorado Springs
Accident Potential Zone 2 (APZ2)	Fountain
Runway Protection Zone (RPZ)	El Paso County
Clear Zone (CZ)	







Land Uses: City of Colorado Springs - 65 DNL Noise Contour ASV

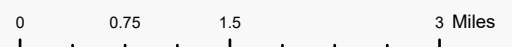


LAND USE

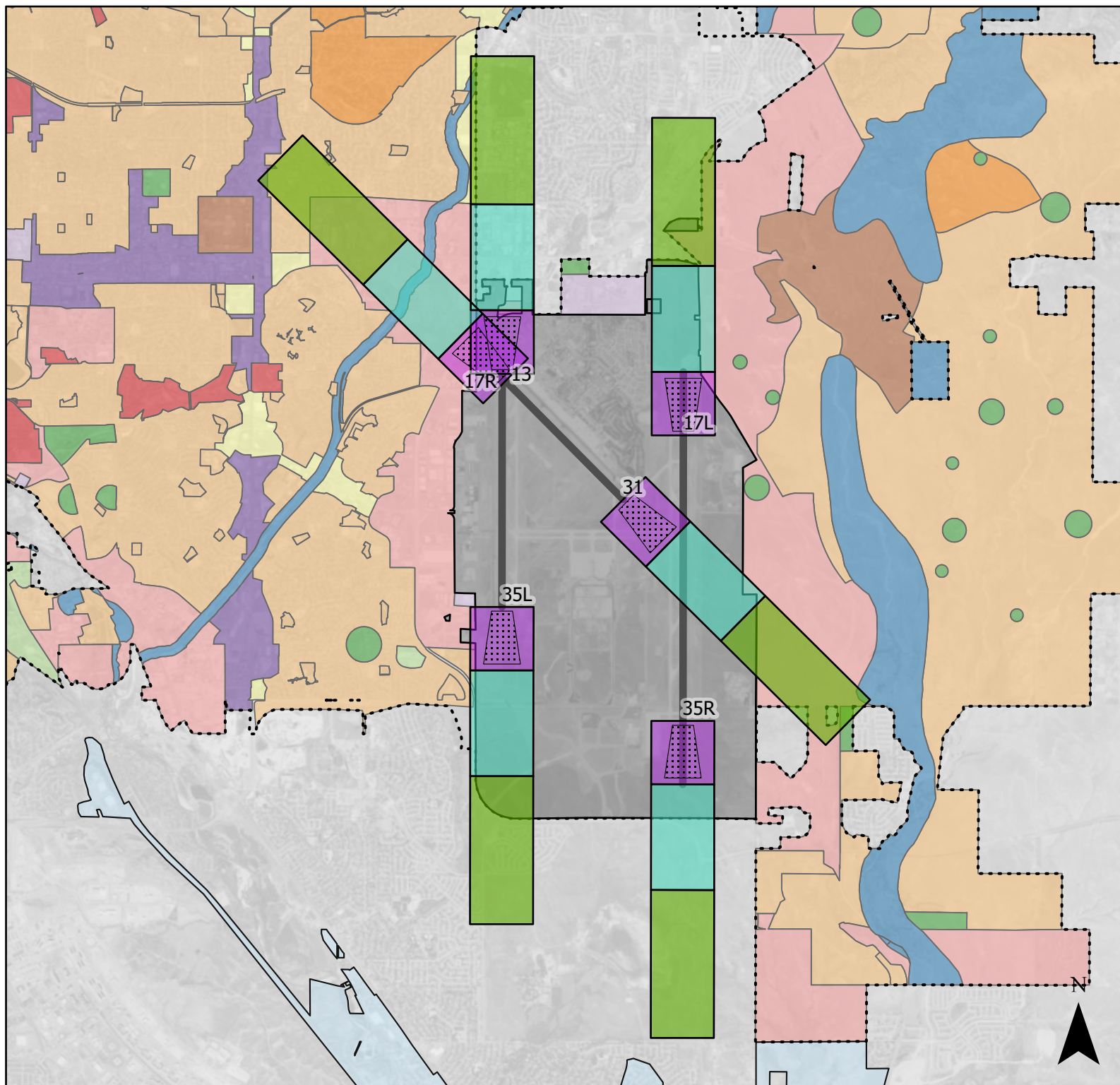
 Candidate Open Space	 General Residential
 Commercial Center	 Low Residential
 Community Activity Center	 Major Institutional
 Employment Center	 Mature Redevelopment Corridor
 Existing Golf Course / Cemetery	 New / Developing Corridor
 Existing Park Land / Open Space	 Regional Center

LEGEND

 DNL 65 Contour ASV	 Fountain
 Airport Property Boundary	 El Paso County
 Colorado Springs	 Airport Overlay (AO)



Land Uses: City of Colorado Springs - Airport and Runway Protection Zones

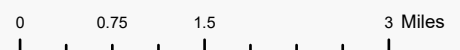


LAND USE

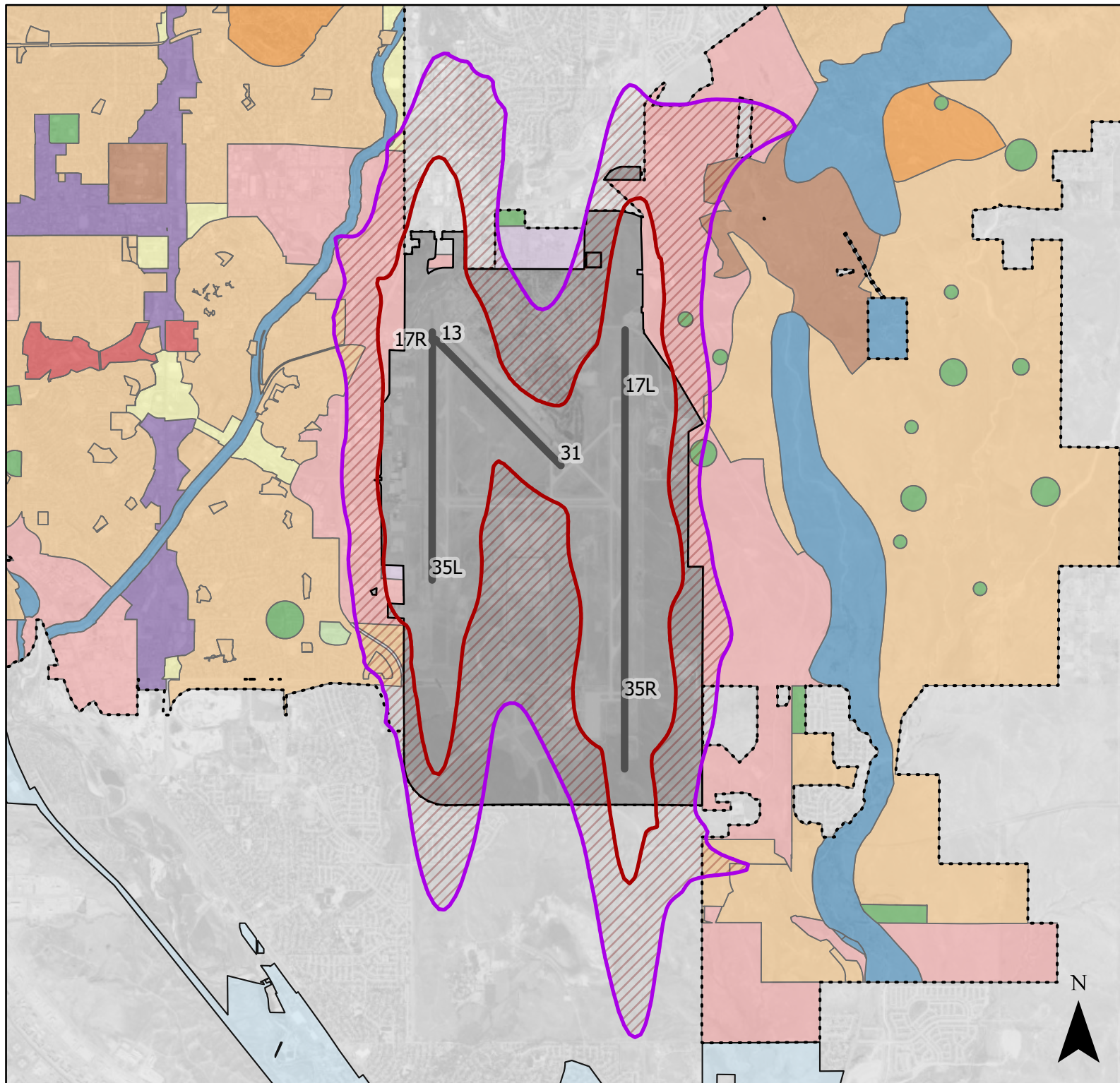
	Candidate Open Space		General Residential
	Commercial Center		Low Residential
	Community Activity Center		Major Institutional
	Employment Center		Mature Redevelopment Corridor
	Existing Golf Course / Cemetery		New / Developing Corridor
	Existing Park Land / Open Space		Regional Center

LEGEND

	Runway Protection Zone		Colorado Springs
	Accident Potential Zone 1		Fountain
	Accident Potential Zone 2		El Paso County
	Clear Zone		Airport Overlay (AO)
	Airport Property Boundary		



Land Uses: City of Colorado Springs - Airport Influence Area



LAND USE

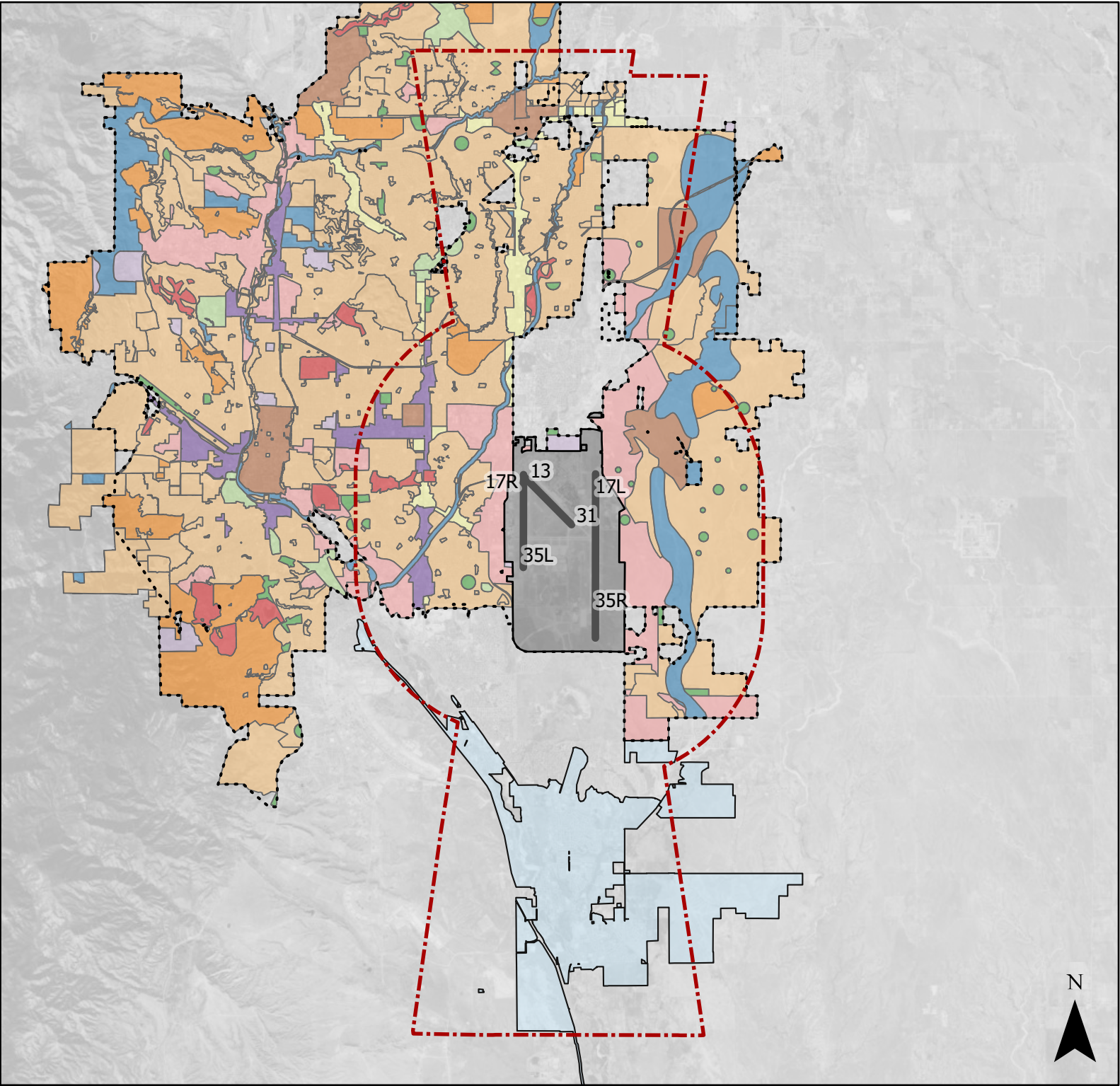
Candidate Open Space	General Residential
Commercial Center	Low Residential
Community Activity Center	Major Institutional
Employment Center	Mature Redevelopment Corridor
Existing Golf Course / Cemetery	New / Developing Corridor
Existing Park Land / Open Space	Regional Center

LEGEND

DNL 60 Contour ASV	Colorado Springs
DNL 65 Contour ASV	Fountain
Airport Influence Area	El Paso County
Airport Property Boundary	Airport Overlay (AO)

0 0.75 1.5 3 Miles

Land Uses: City of Colorado Springs - Airport Overlay



LAND USE

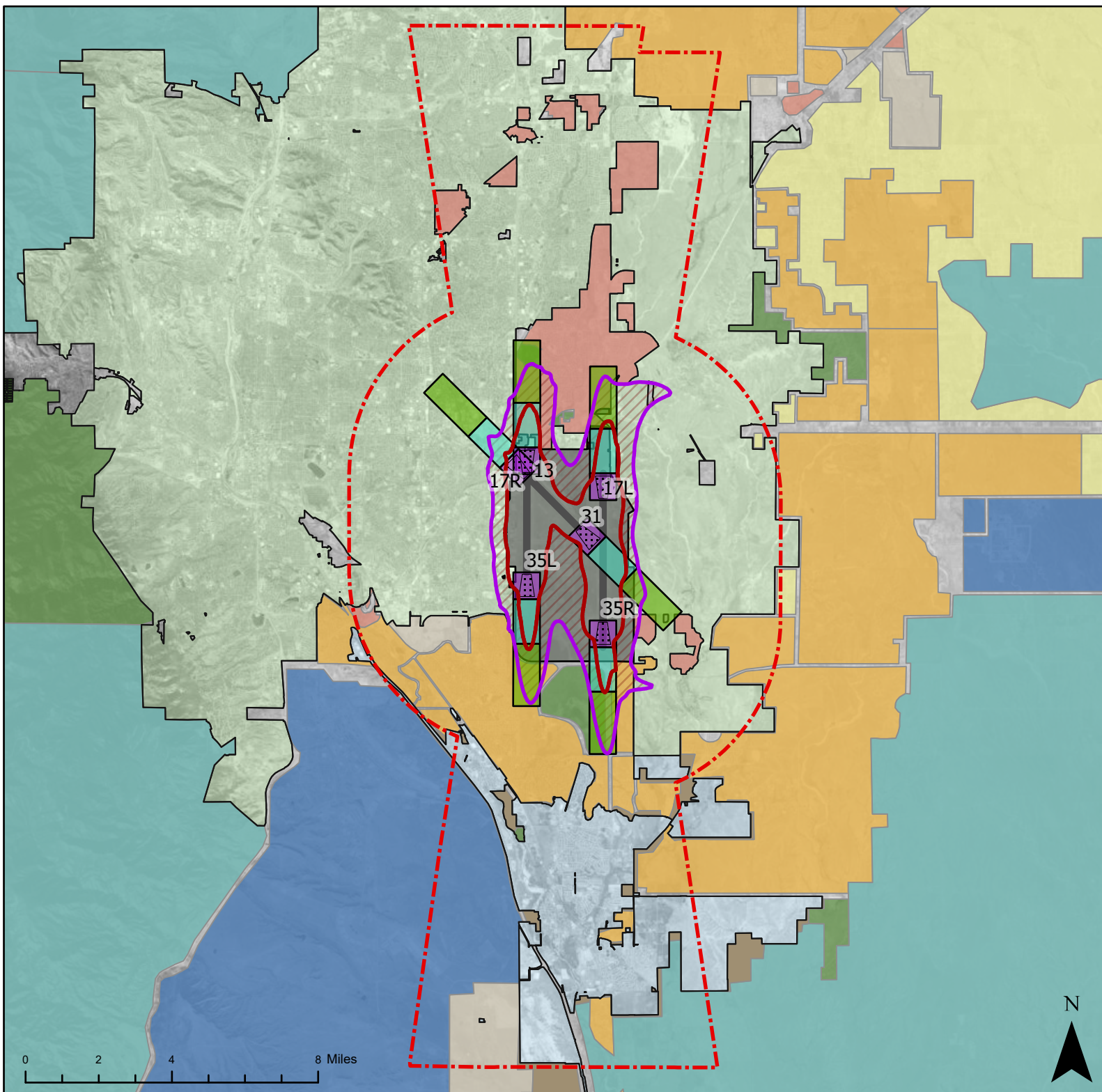
Candidate Open Space	General Residential
Commercial Center	Low Residential
Community Activity Center	Major Institutional
Employment Center	Mature Redevelopment Corridor
Existing Golf Course / Cemetery	New / Developing Corridor
Existing Park Land / Open Space	Regional Center

LEGEND

Airport Property Boundary	El Paso County
Colorado Springs	Airport Overlay (AO)
Fountain	



Land Uses: El Paso County



EL PASO COUNTY LAND USE

Urban Residential	Employment Center	Incorporated
Large-Lot Residential	Regional Open Space	Military
Suburban Residential	Rural	

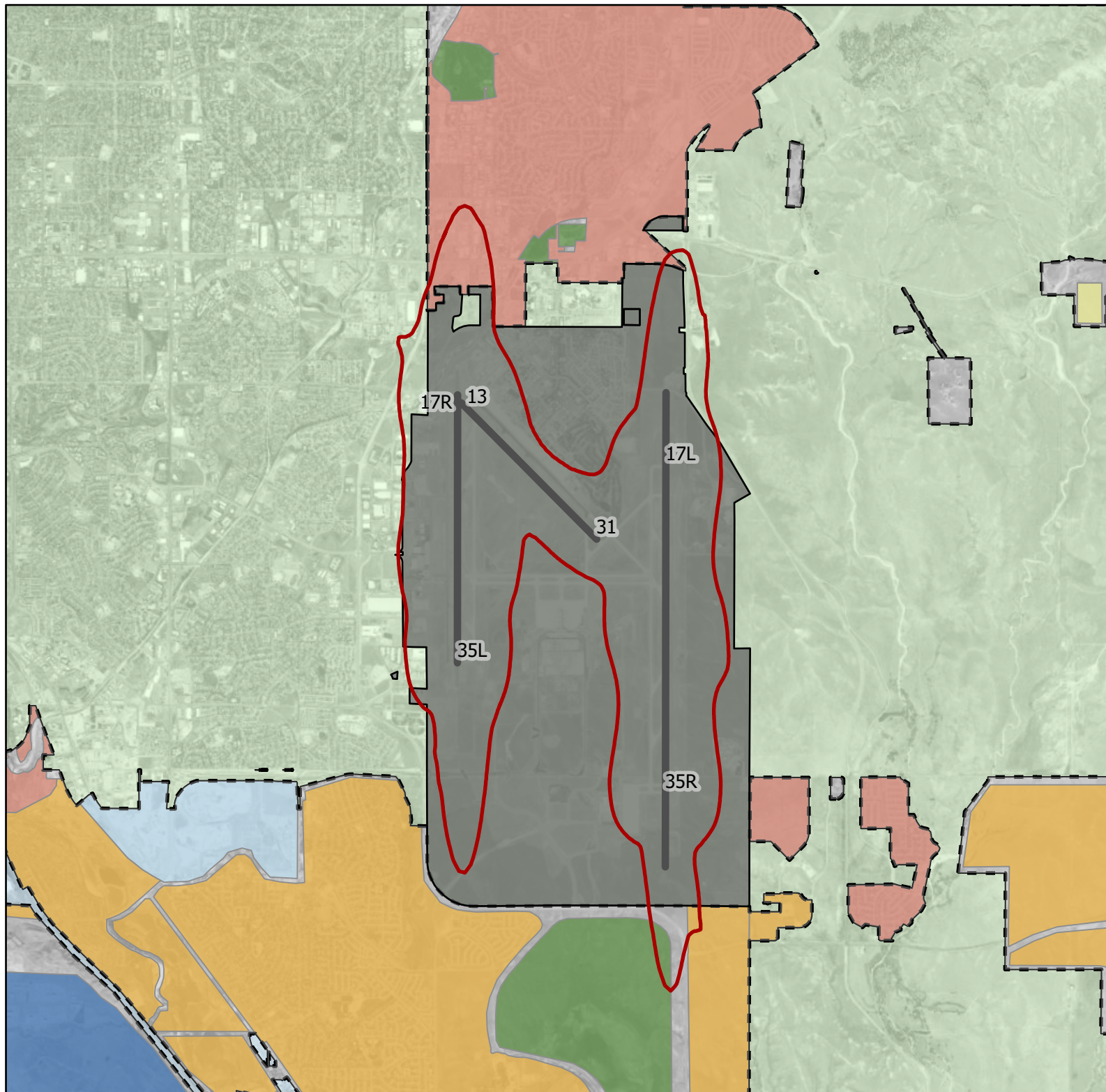
El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.

LEGEND

DNL 60 Contour ASV	Runway Protection Zone (RPZ)
DNL 65 Contour ASV (65 DNL)	Airport Overlay (AO)
Airport Influence Area (AIA)	Runway
Clear Zone (CZ)	El Paso County
Accident Potential Zone 1 (APZ1)	Colorado Springs
Accident Potential Zone 2 (APZ2)	Fountain

Land Uses: El Paso County - 65 DNL Noise Contour ASV



EL PASO COUNTY LAND USE

Urban Residential	Employment Center	Military
Large-Lot Residential	Regional Open Space	
Suburban Residential	Incorporated	

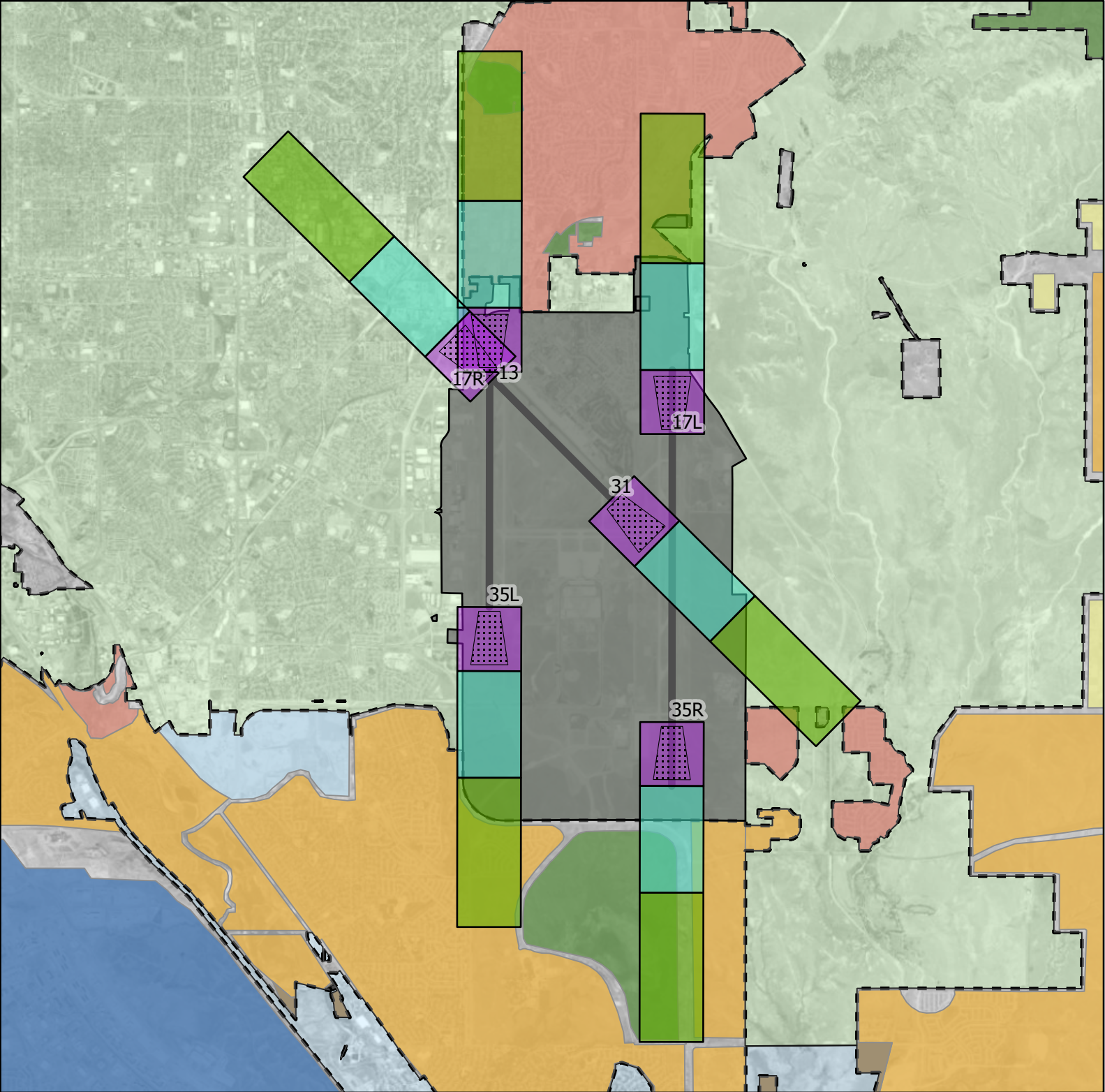
El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.

LEGEND

DNL 65 Contour ASV	N
Runway	
Airport Property Boundary	
El Paso County	
Colorado Springs	
Fountain	
0 0.75 1.5 3 Miles	

Land Uses: El Paso County - Airport and Runway Protection Zones



EL PASO COUNTY LAND USE

Urban Residential	Employment Center	Military
Large-Lot Residential	Regional Open Space	
Suburban Residential	Incorporated	

El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.

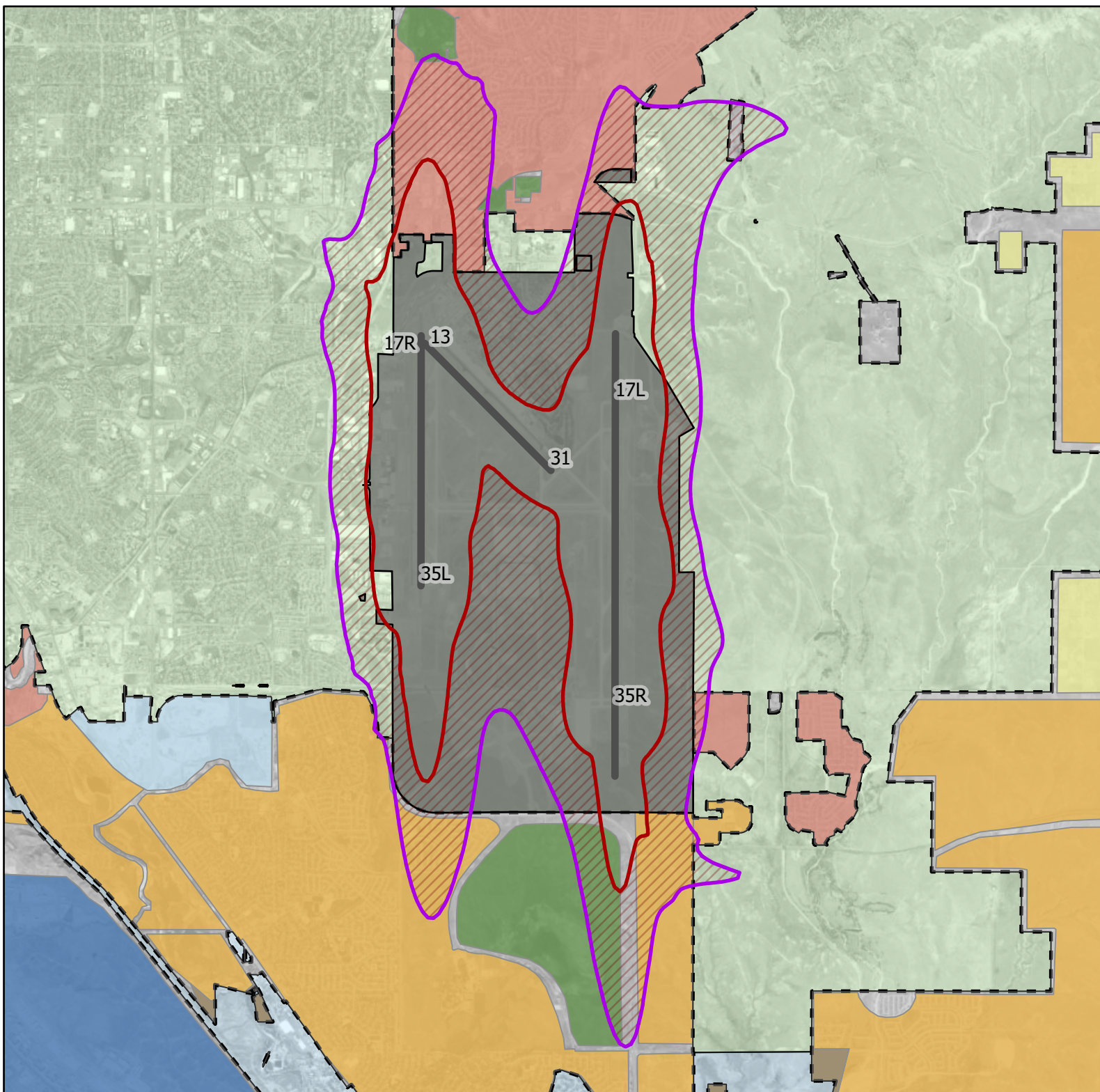
LEGEND

Runway	Accident Potential Zone 1
Accident Potential Zone 2	Clear Zone
Runway Protection Zone	Airport Property Boundary
El Paso County	Colorado Springs

0 0.75 1.5 3 Miles

N

Land Uses: El Paso County - Airport Influence Area



EL PASO COUNTY LAND USE

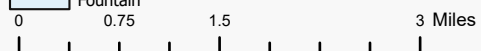
Urban Residential	Employment Center	Military
Large-Lot Residential	Regional Open Space	
Suburban Residential	Incorporated	

El Paso Land Use estimated based off county PlaceType Map

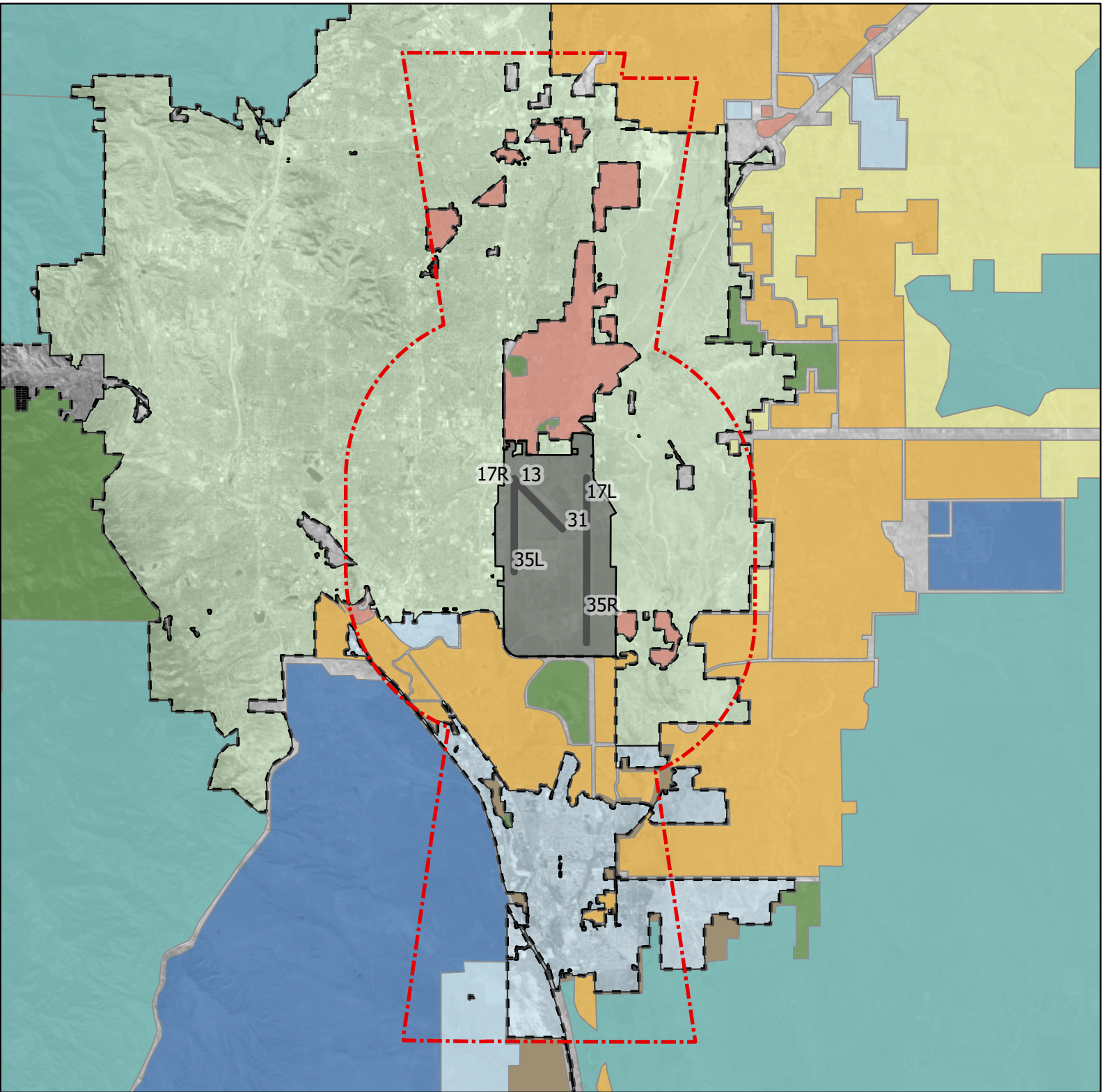
Notification is required for any structure over 200' AGL throughout El Paso County.

LEGEND

	DNL 60 Contour ASV
	DNL 65 Contour ASV
	Airport Influence Area
	Runway
	Airport Property Boundary
	El Paso County
	Colorado Springs
	Fountain



Land Uses: El Paso County - Airport Overlay



EL PASO COUNTY LAND USE

- | | | |
|-----------------------|---------------------|--------------|
| Urban Residential | Employment Center | Incorporated |
| Large-Lot Residential | Regional Open Space | Military |
| Suburban Residential | Rural | |

El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.

LEGEND

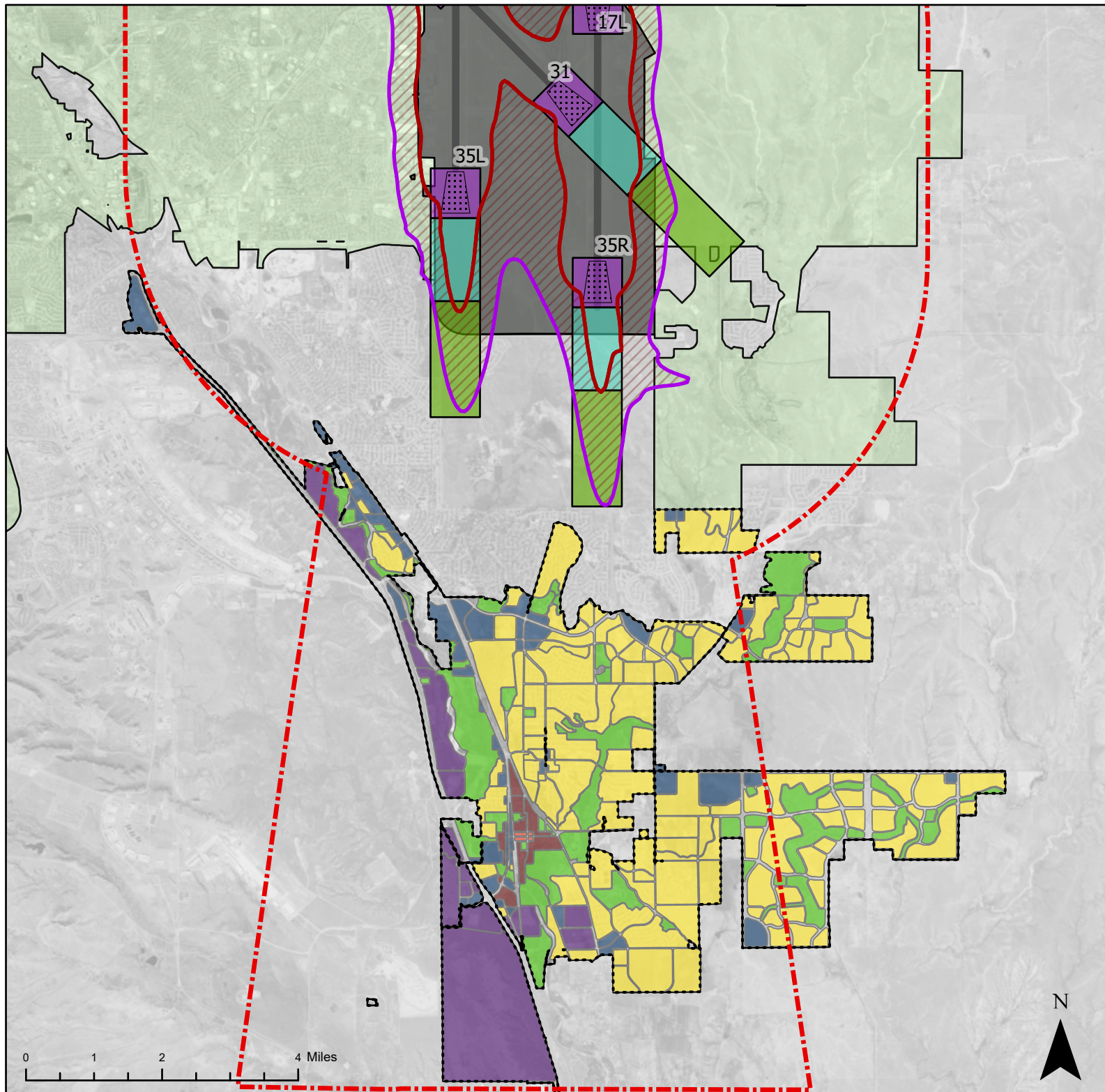
- Runway
- Airport Overlay
- Airport Property Boundary
- El Paso County
- Colorado Springs
- Fountain

N



0 2 4 8 Miles

Land Use: City of Fountain



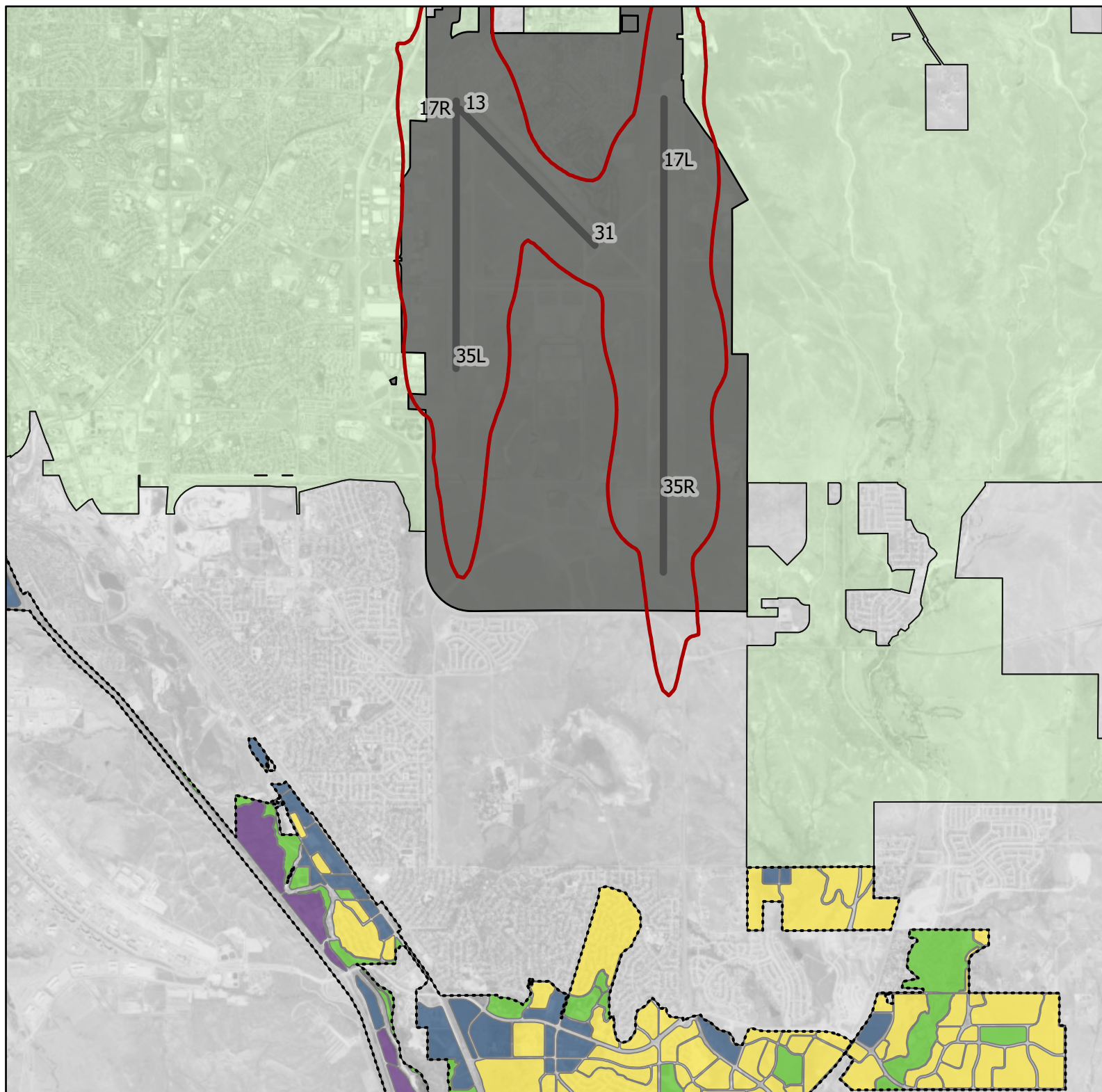
FOUNTAIN LAND USE

Commercial	Public
Historic Downtown	Residential
Industrial	Agriculture
Mixed Use	

LEGEND

DNL 60 Contour ASV	Airport Overlay (AO)
DNL 65 Contour ASV (65 DNL)	Runway
Airport Influence Area (AIA)	Fountain
Clear Zone (CZ)	Airport Property Boundary
Accident Potential Zone 1 (APZ1)	Colorado Springs
Accident Potential Zone 2 (APZ2)	El Paso County
Runway Protection Zone (RPZ)	

Land Use: City of Fountain - 65 DNL Noise Contour ASV



FOUNTAIN LAND USE

- | | |
|-------------------|-------------|
| Commercial | Public |
| Historic Downtown | Residential |
| Industrial | Agriculture |
| Mixed Use | |

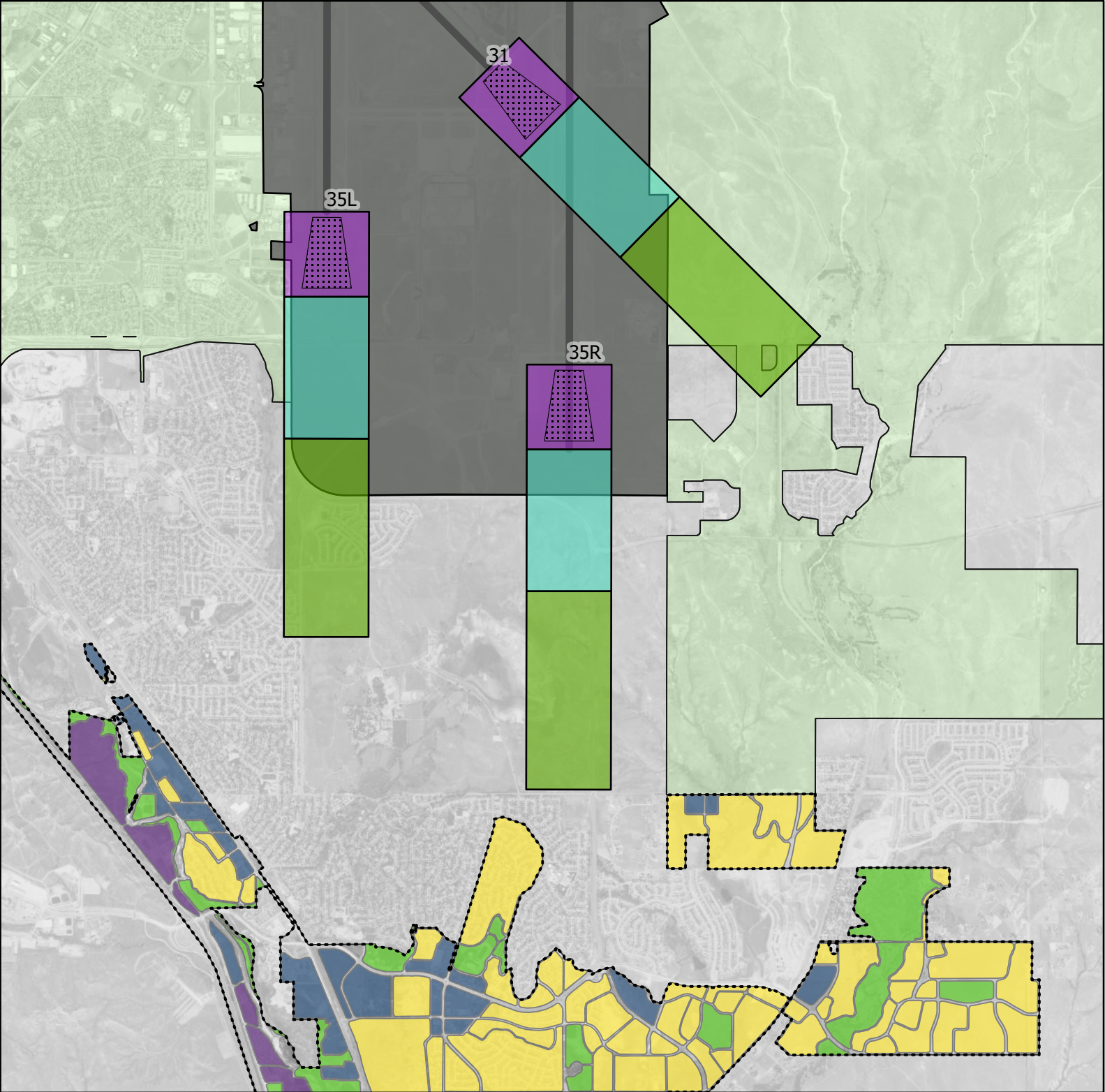
LEGEND

- DNL 65 Contour ASV
- Airport Property Boundary
- Fountain
- Colorado Springs
- El Paso County

0 0.75 1.5 3 Miles

N

Land Use: City of Fountain - Airport and Runway Protection Zones



FOUNTAIN LAND USE

Commercial	Public
Historic Downtown	Residential
Industrial	Agriculture
Mixed Use	

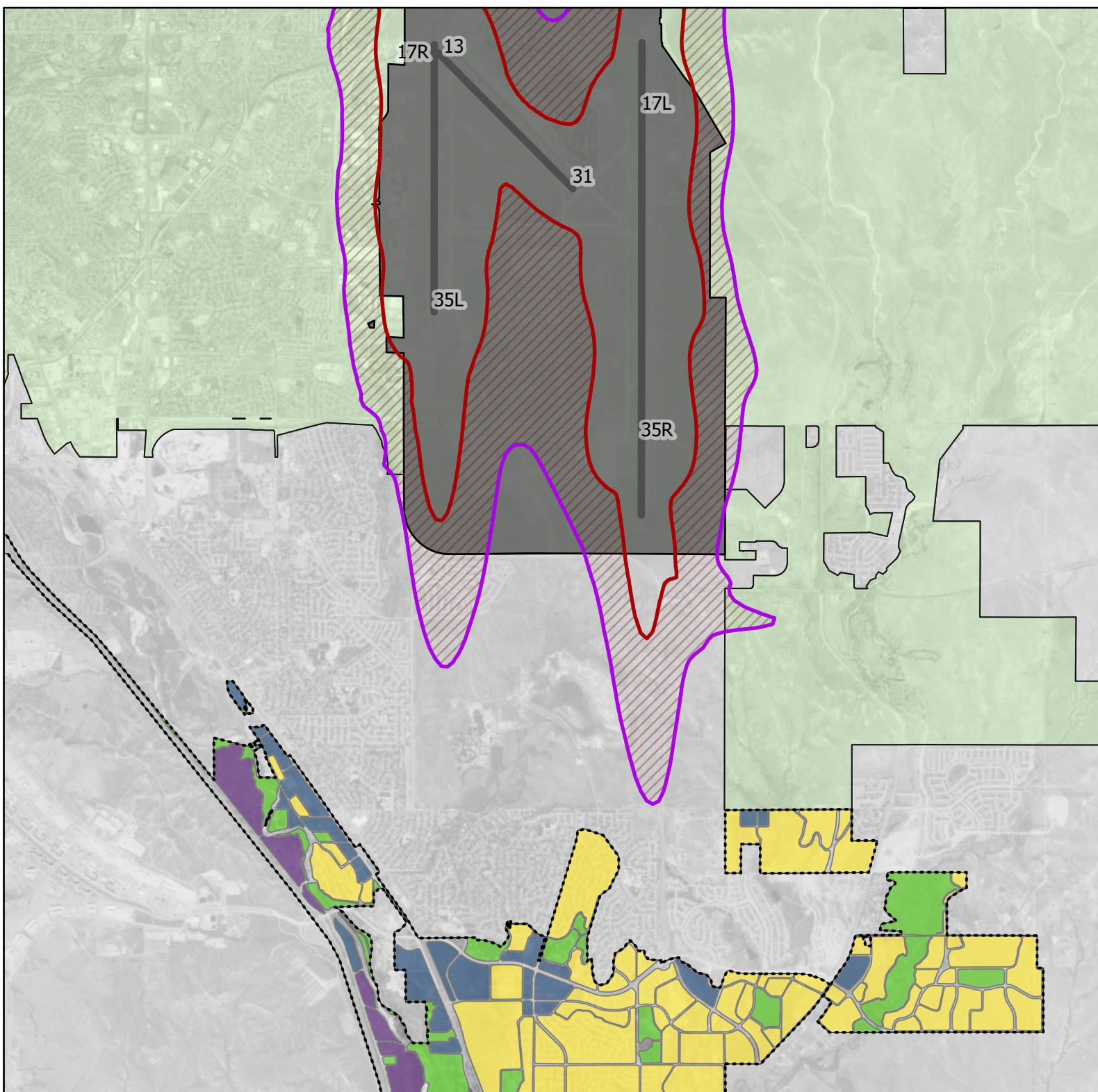
LEGEND

	Accident Potential Zone 1
	Accident Potential Zone 2
	Clear Zone
	Runway Protection Zone
	Airport Property Boundary
	Fountain
	Colorado Springs
	El Paso County

N

0 0.5 1 2 Miles

Land Use: City of Fountain - Airport Influence Area



FOUNTAIN LAND USE

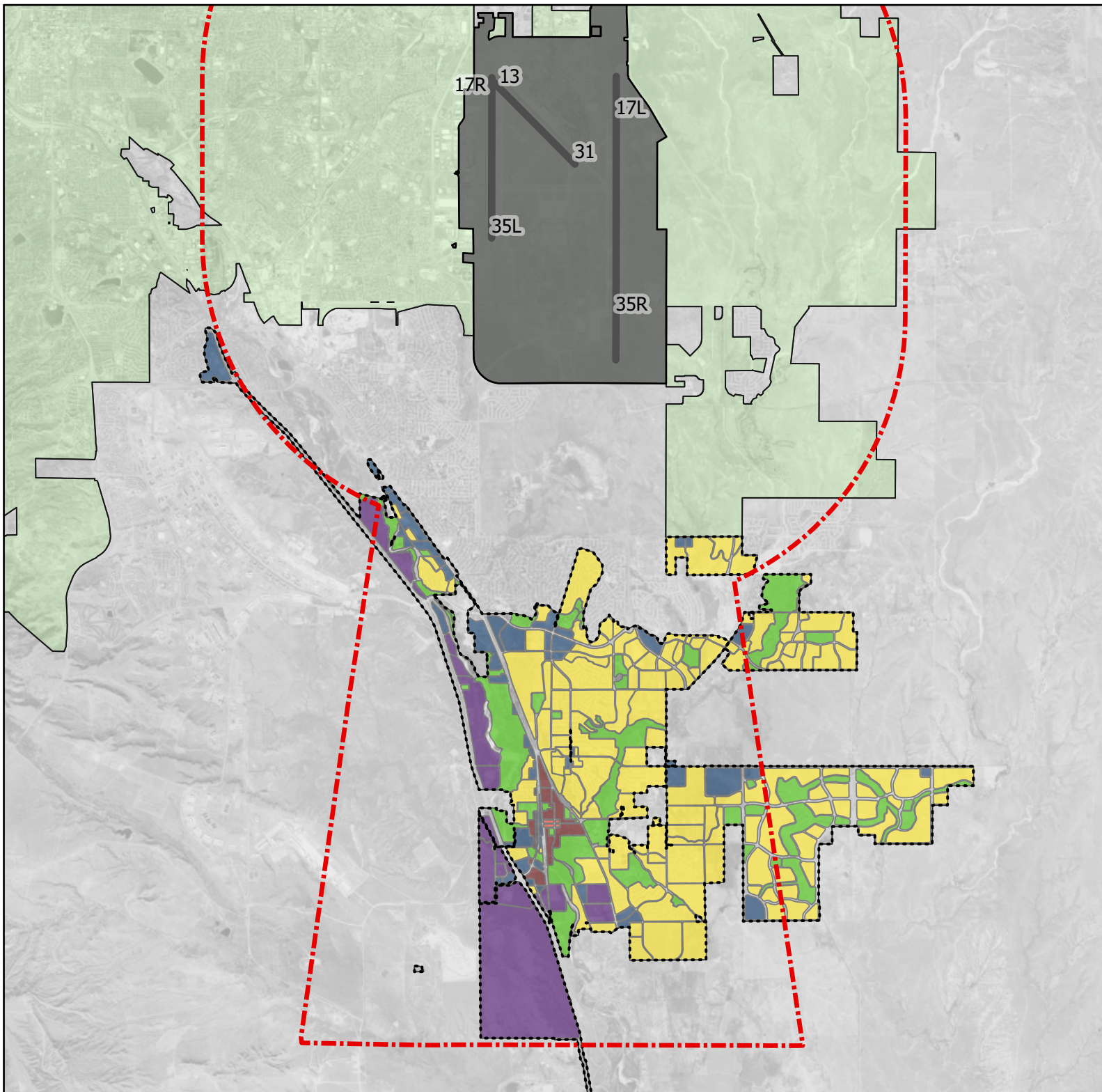
- | | |
|-------------------|-------------|
| Commercial | Public |
| Historic Downtown | Residential |
| Industrial | Agriculture |
| Mixed Use | |

LEGEND

- DNL 60 Contour ASV
 - DNL 65 Contour ASV
 - Airport Influence Area
 - Airport Property Boundary
 - Fountain
 - Colorado Springs
 - El Paso County
- 0 0.75 1.5 3 Miles



Land Use: City of Fountain - Airport Overlay

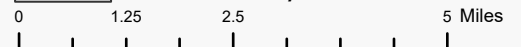


FOUNTAIN LAND USE

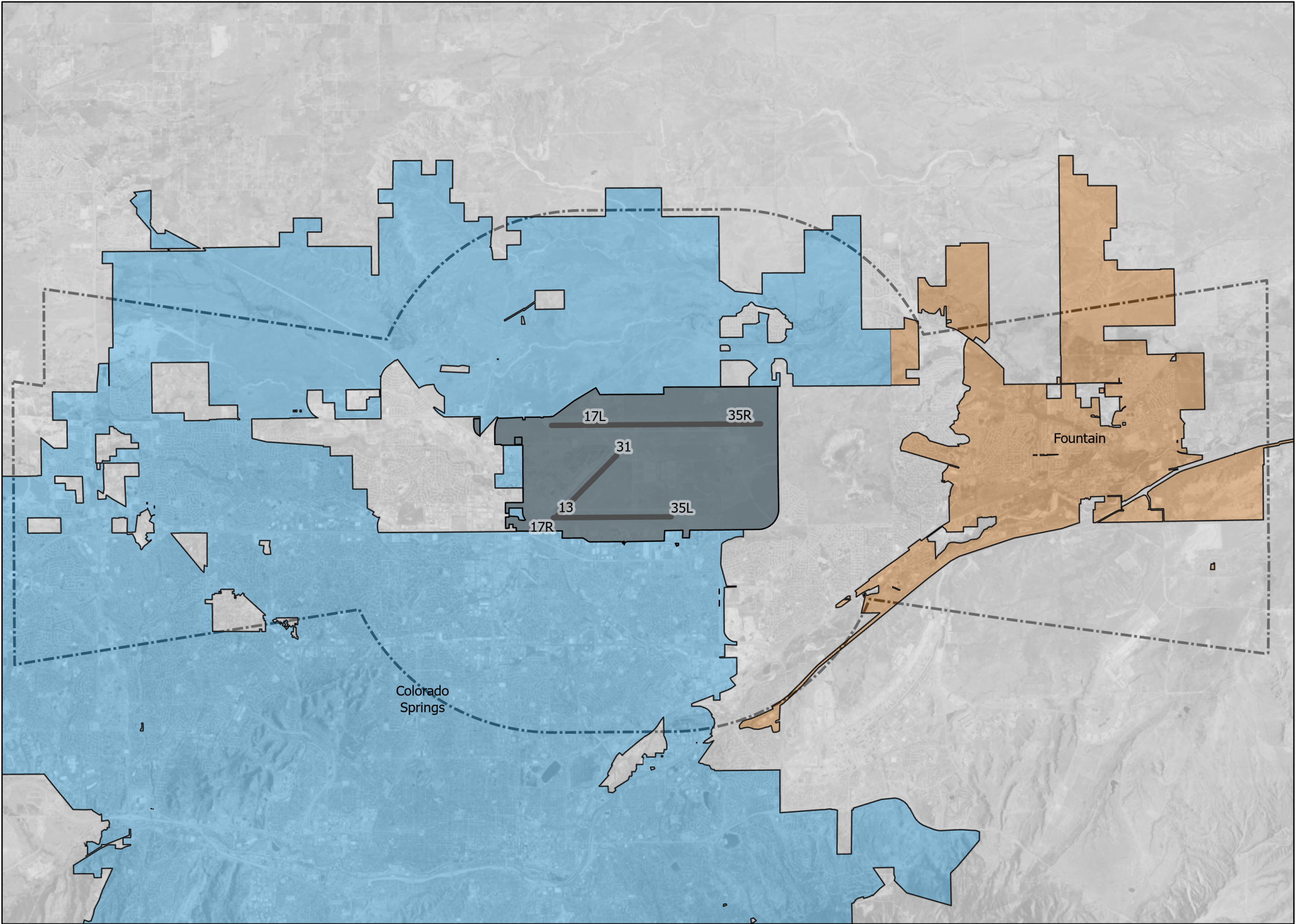
Commercial	Public
Historic Downtown	Residential
Industrial	Agriculture
Mixed Use	

LEGEND

	Airport Overlay
	Airport Property Boundary
	Fountain
	Colorado Springs
	El Paso County



Colorado Springs Airport - Area Wide Overlay



LEGEND

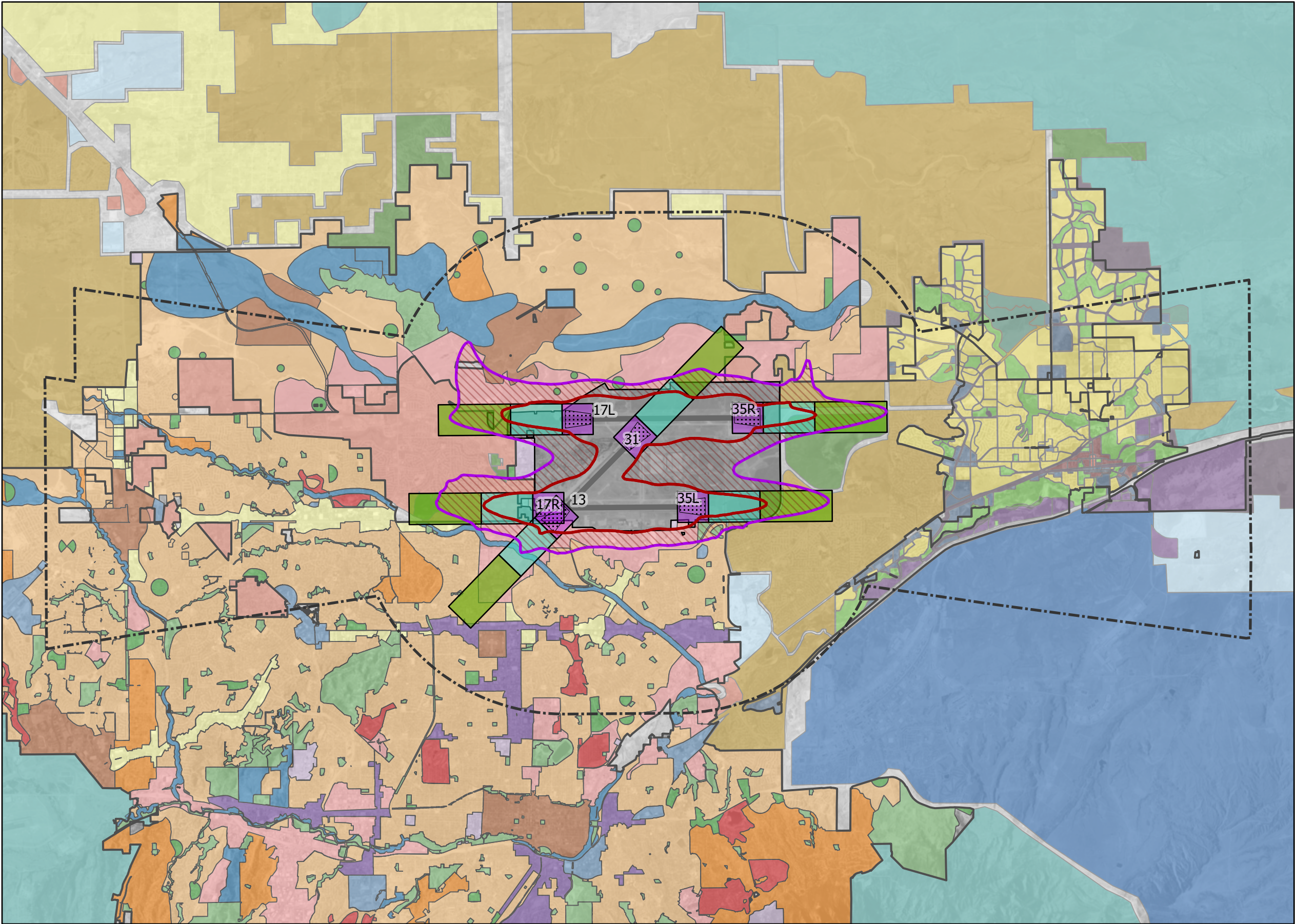
- Runway
- Airport Overlay (AO)
- Airport Property Boundary
- Colorado Springs
- Fountain
- El Paso County

Notification is required for any structure over 200' AGL throughout El Paso County.



0 0.75 1.5 3 Miles

COS: Overlay and Subzones

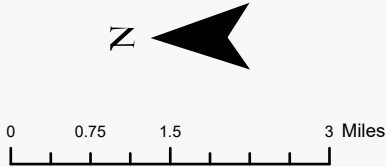


FUTURE LAND USE

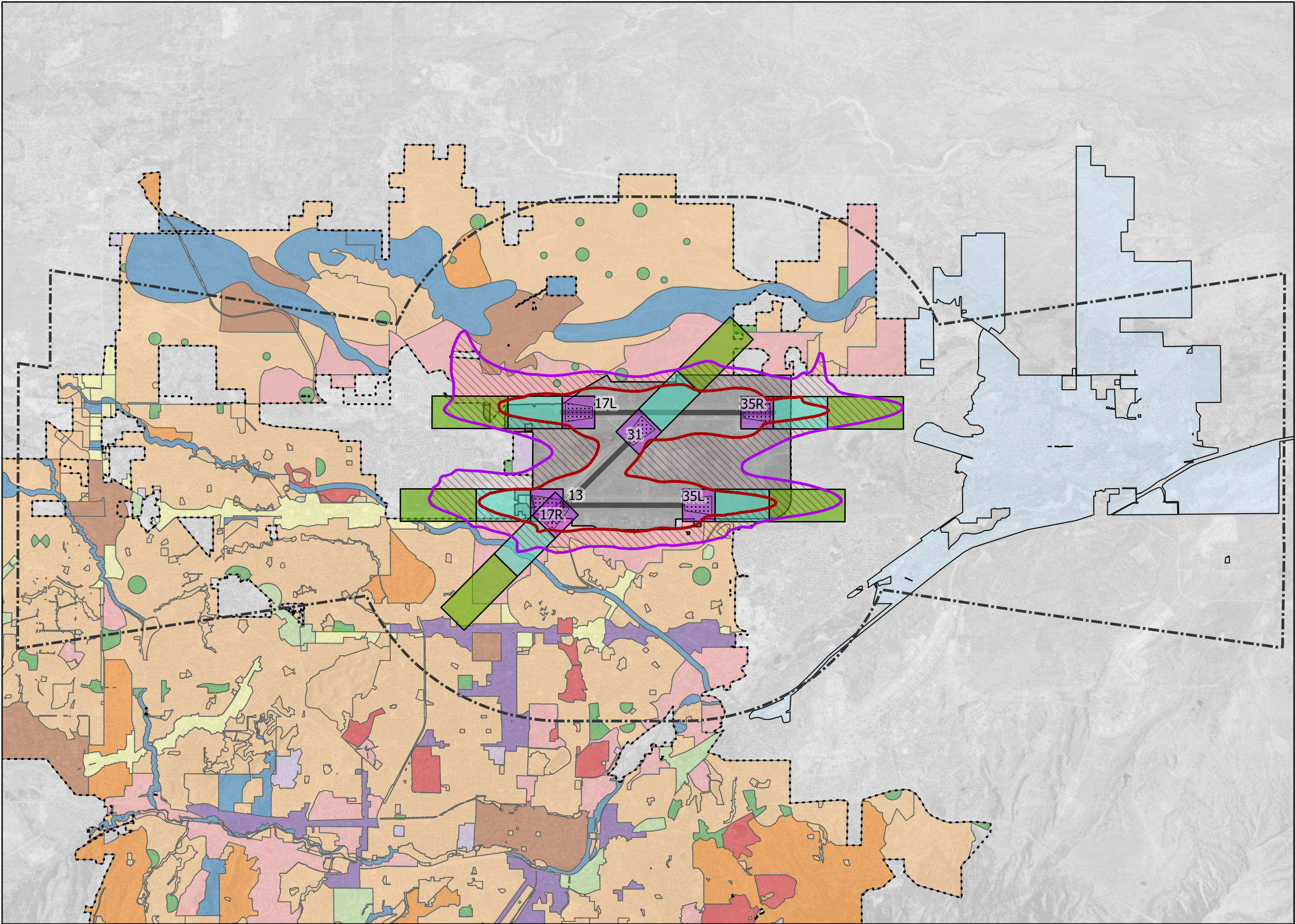
- Fountain**
- Commercial
 - Historic Downtown
 - Industrial
 - Mixed Use
 - Public
 - Residential
 - Agriculture
- El Paso County**
- Urban Residential
 - Large-Lot Residential
 - Suburban Residential
 - Employment Center
 - Regional Open Space
 - Rural
 - Incorporated
 - Military
- Colorado Springs**
- Candidate Open Space
 - Commercial Center
 - Community Activity Center
 - Employment Center
 - Existing Golf Course / Cemetery
 - Existing Park Land / Open Space
 - General Residential
 - Low Residential
 - Major Institutional
 - Mature Redevelopment Corridor
 - New / Developing Corridor
 - Regional Center

LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV (65 DNL)
- Airport Influence Area (AIA)
- Airport Overlay (AO)
- Accident Potential Zone 1 (APZ1)
- Accident Potential Zone 2 (APZ2)
- Clear Zone (CZ)
- Runway Protection Zone (RPZ)
- Runway
- Airport Property Boundary
- City Boundaries
- El Paso County



Land Uses: City of Colorado Springs



FUTURE LAND USE

- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor
- New / Developing Corridor
- Regional Center
- Airport Overlay (AO)

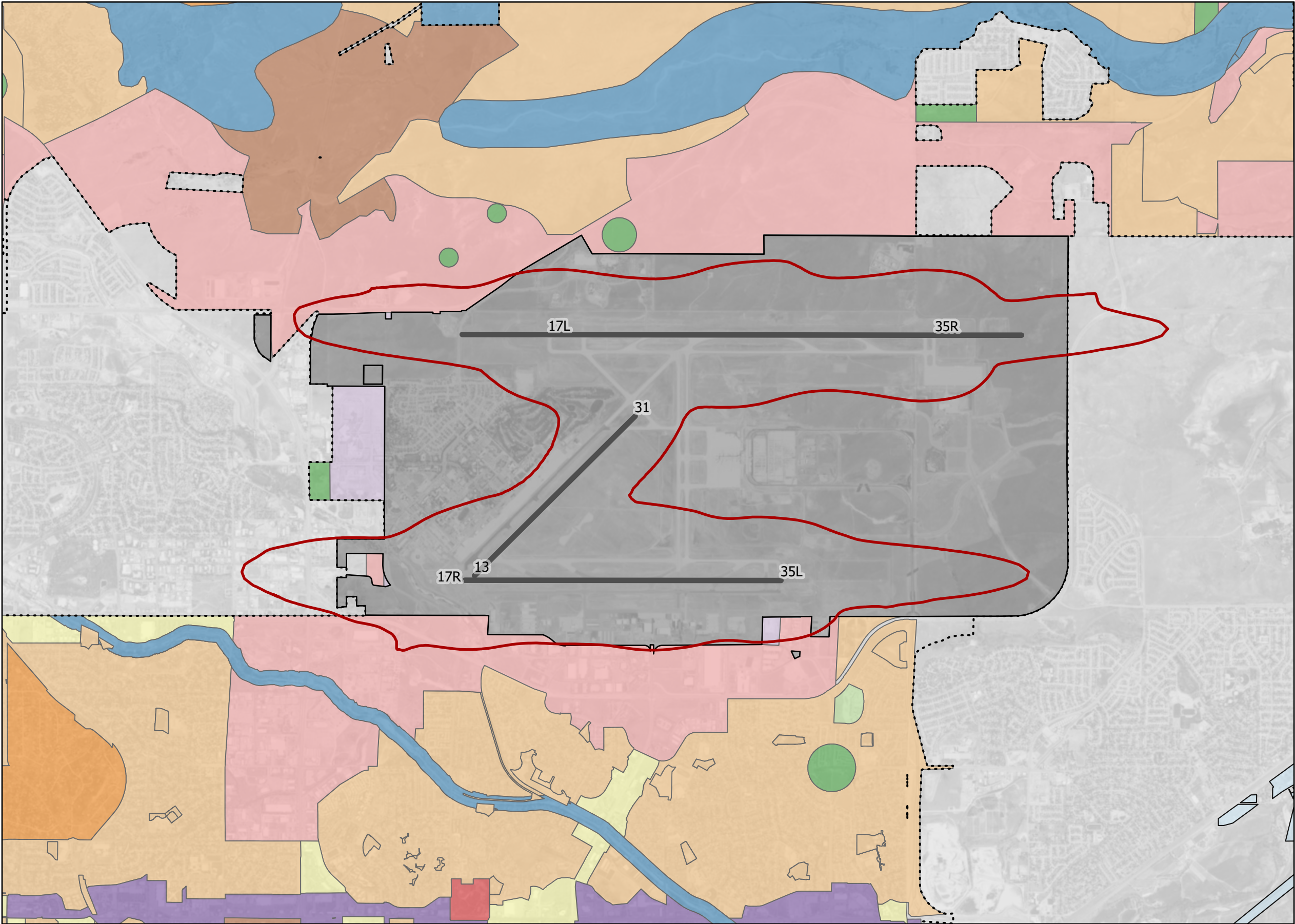
LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV (65 DNL)
- Airport Influence Area (AIA)
- Accident Potential Zone 1 (APZ1)
- Accident Potential Zone 2 (APZ2)
- Runway Protection Zone (RPZ)
- Clear Zone (CZ)
- Runway
- Airport Property Boundary
- Colorado Springs
- Fountain
- El Paso County
- Airport Overlay (AO)



0 1 2 4 Miles

Land Uses: City of Colorado Springs - 65 DNL Noise Contour ASV



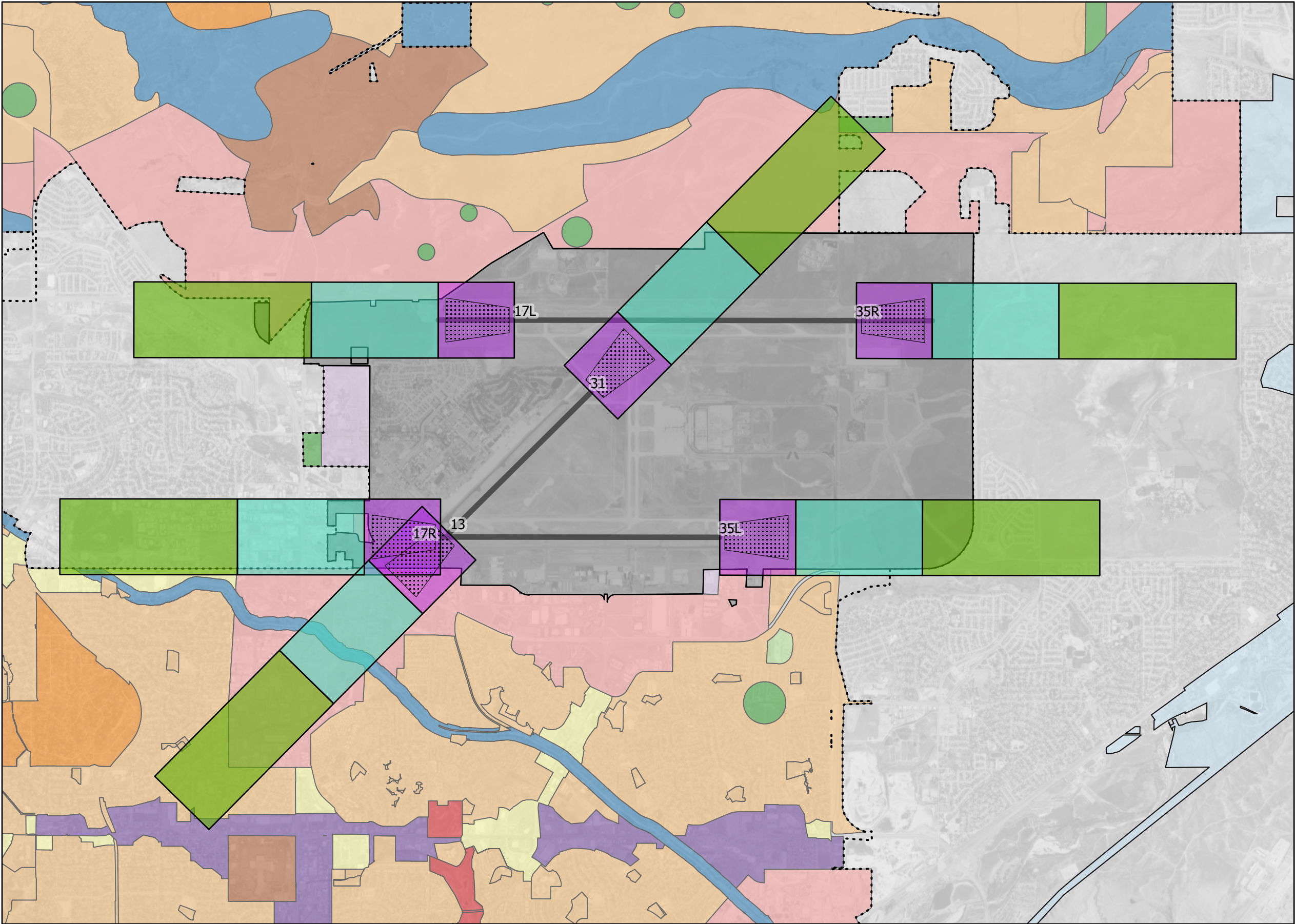
FUTURE LAND USE

- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor
- New / Developing Corridor
- Regional Center

LEGEND

- DNL 65 Contour ASV
- Airport Overlay (AO)
- Runway
- Colorado Springs
- Airport Property Boundary
- Fountain
- El Paso County

Land Uses: City of Colorado Springs - Airport and Runway Protection Zones



FUTURE LAND USE

- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor
- New / Developing Corridor
- Regional Center

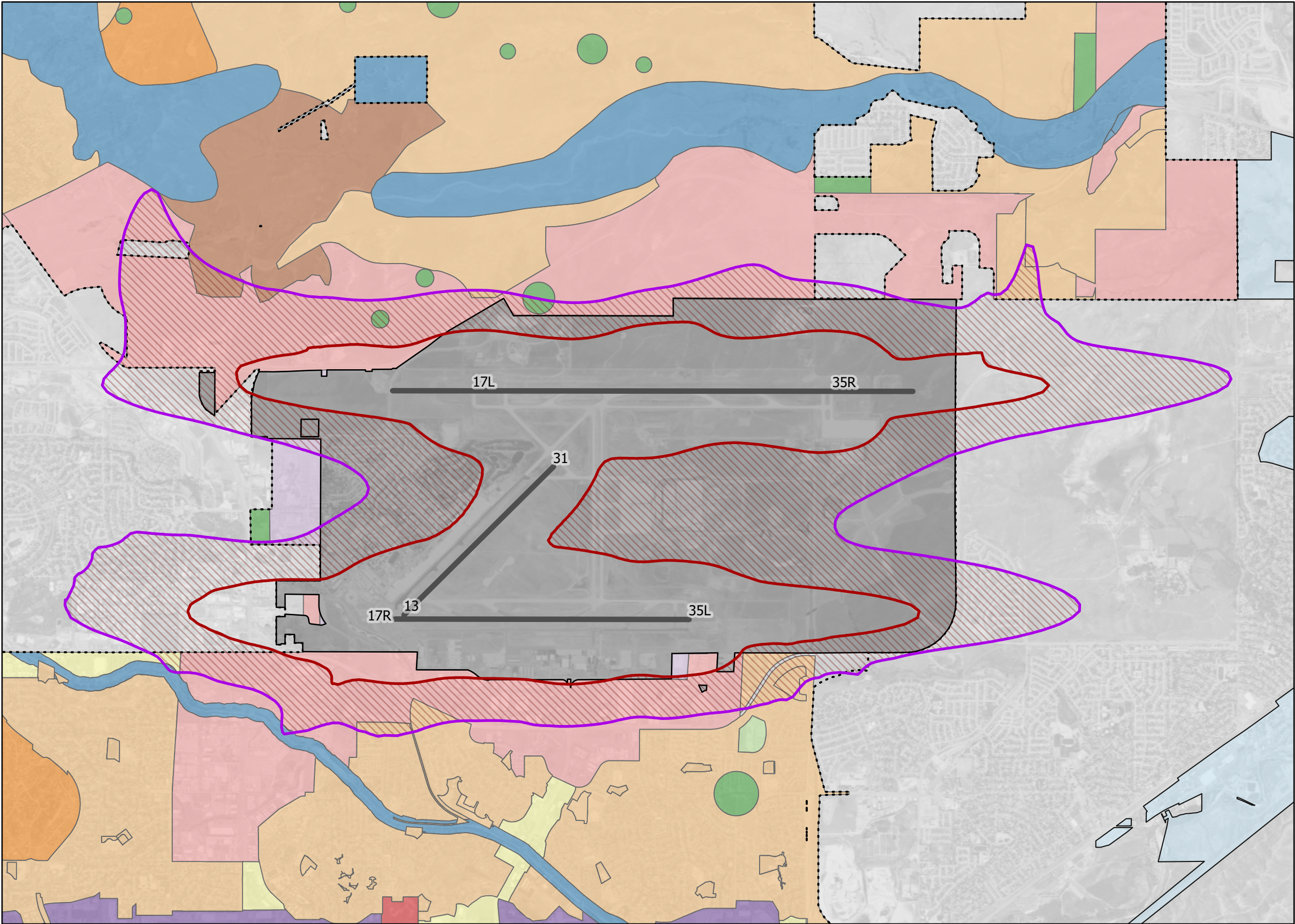
LEGEND

- Airport Overlay (AO)
- Runway
- Runway Protection Zone
- Accident Potential Zone 1
- Accident Potential Zone 2
- Clear Zone
- Colorado Springs
- Airport Property Boundary
- Fountain
- El Paso County



0 0.42 0.85 1.7 Miles

Land Uses: City of Colorado Springs - Airport Influence Area

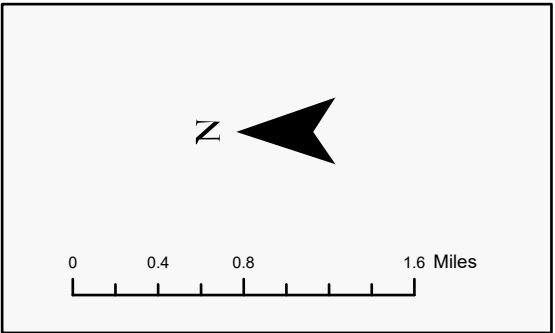


FUTURE LAND USE

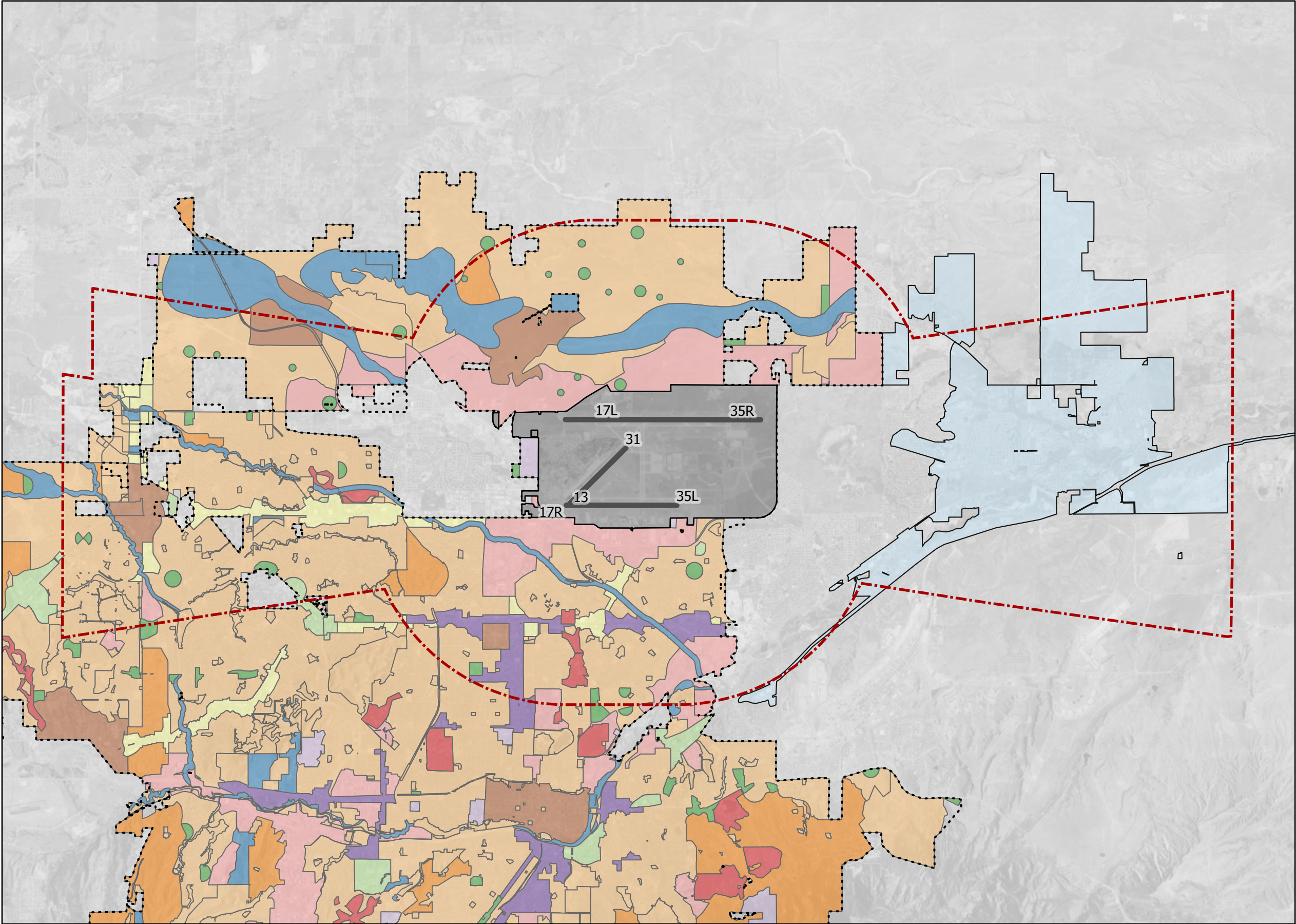
- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor
- New / Developing Corridor
- Regional Center

LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV
- Airport Influence Area
- Airport Overlay (AO)
- Runway
- Colorado Springs
- Airport Property Boundary
- Fountain
- El Paso County



Land Uses: City of Colorado Springs - Airport Overlay



FUTURE LAND USE

- Candidate Open Space
- Commercial Center
- Community Activity Center
- Employment Center
- Existing Golf Course / Cemetery
- Existing Park Land / Open Space
- General Residential
- Low Residential
- Major Institutional
- Mature Redevelopment Corridor
- New / Developing Corridor
- Regional Center

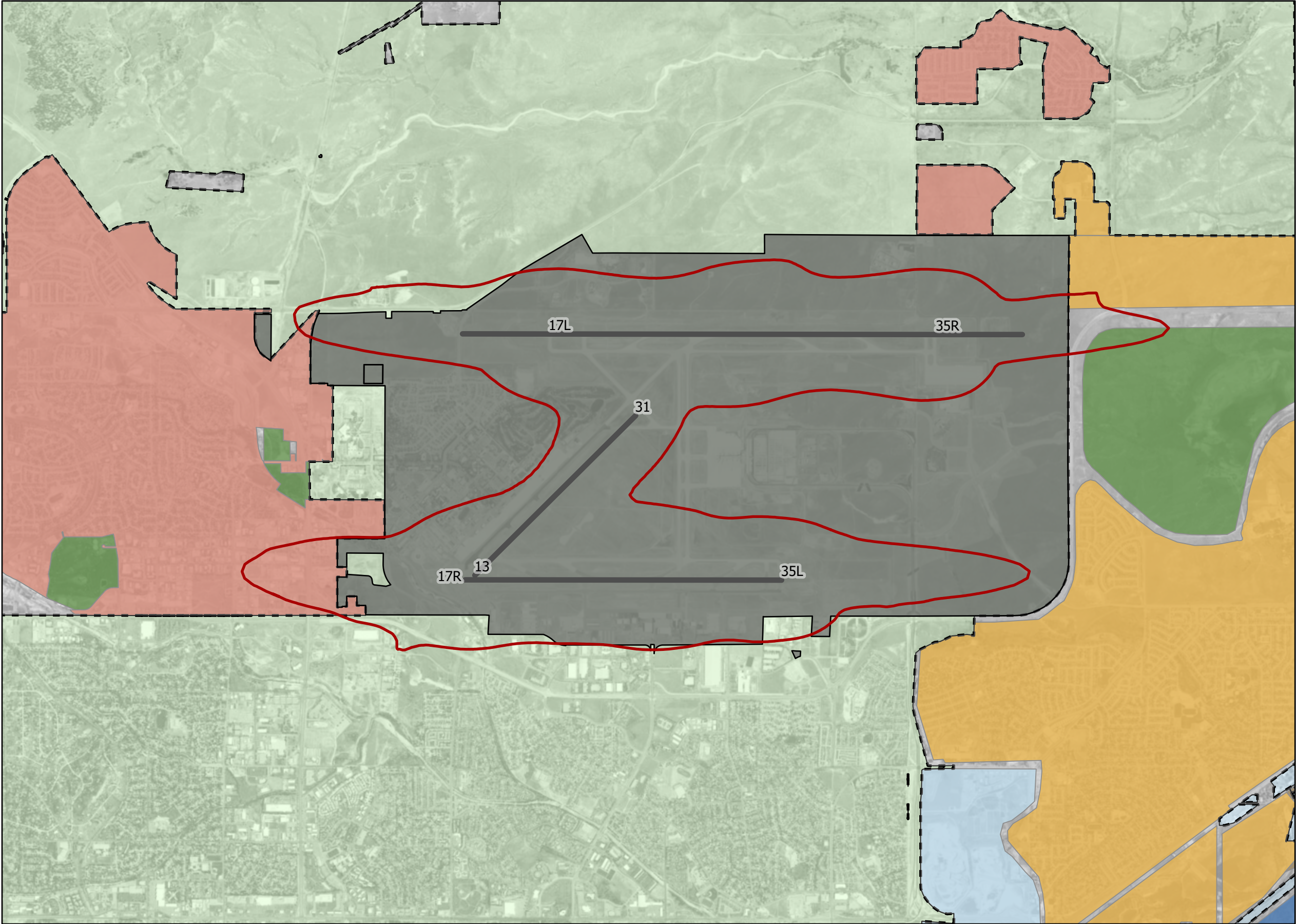
LEGEND

- Airport Overlay (AO)
- Runway
- Colorado Springs
- Airport Property Boundary
- Fountain
- El Paso County



0 1 2 4 Miles

Land Uses: El Paso County - 65 DNL Noise Contour ASV



FUTURE LAND USE

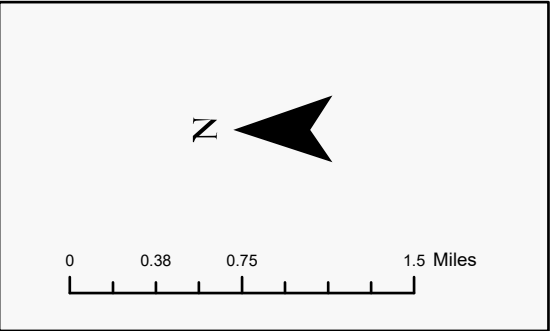
- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

LEGEND

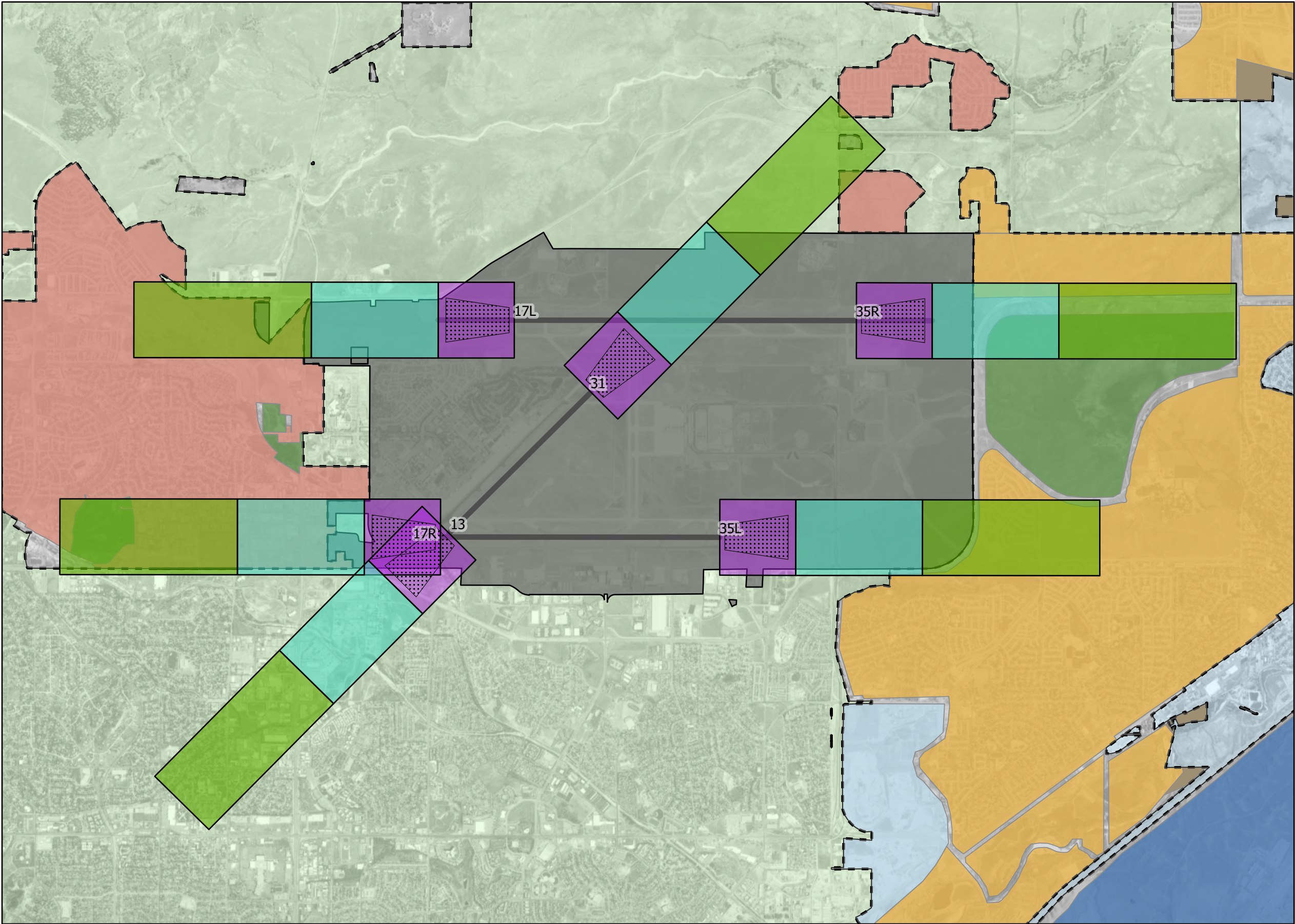
- DNL 65 Contour ASV
- Runway
- Airport Property Boundary
- El Paso County
- Colorado Springs
- Fountain

El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.



Land Uses: El Paso County - Airport and Runway Protection Zones



FUTURE LAND USE

- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

LEGEND

- Runway
- Accident Potential Zone 1
- Accident Potential Zone 2
- Clear Zone
- Runway Protection Zone
- Airport Property Boundary
- El Paso County
- Colorado Springs
- Fountain

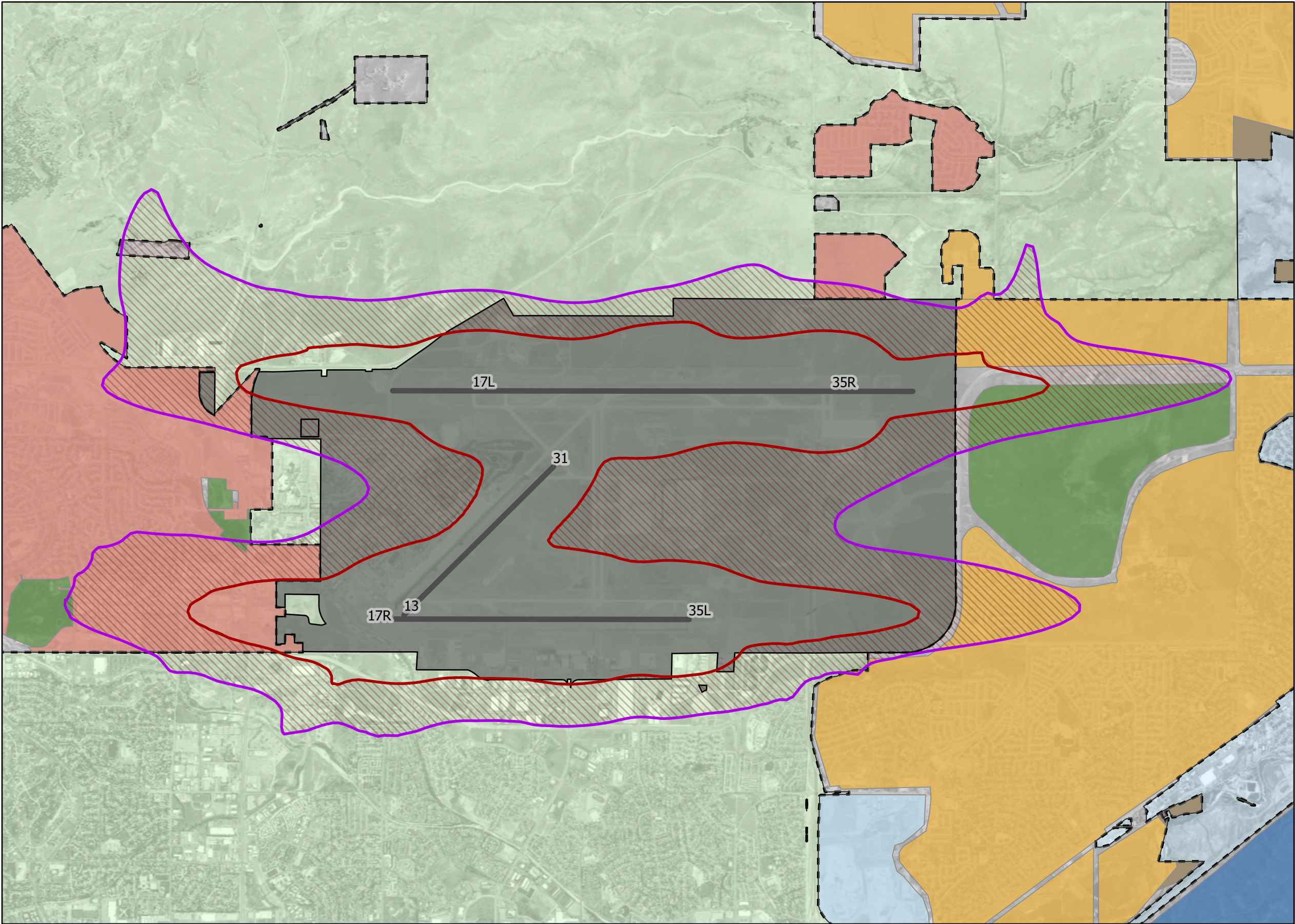
El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.



0 0.42 0.85 1.7 Miles

Land Uses: El Paso County - Airport Influence Area



FUTURE LAND USE

- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV
- Airport Influence Area
- Runway
- Airport Property Boundary
- El Paso County
- Colorado Springs
- Fountain

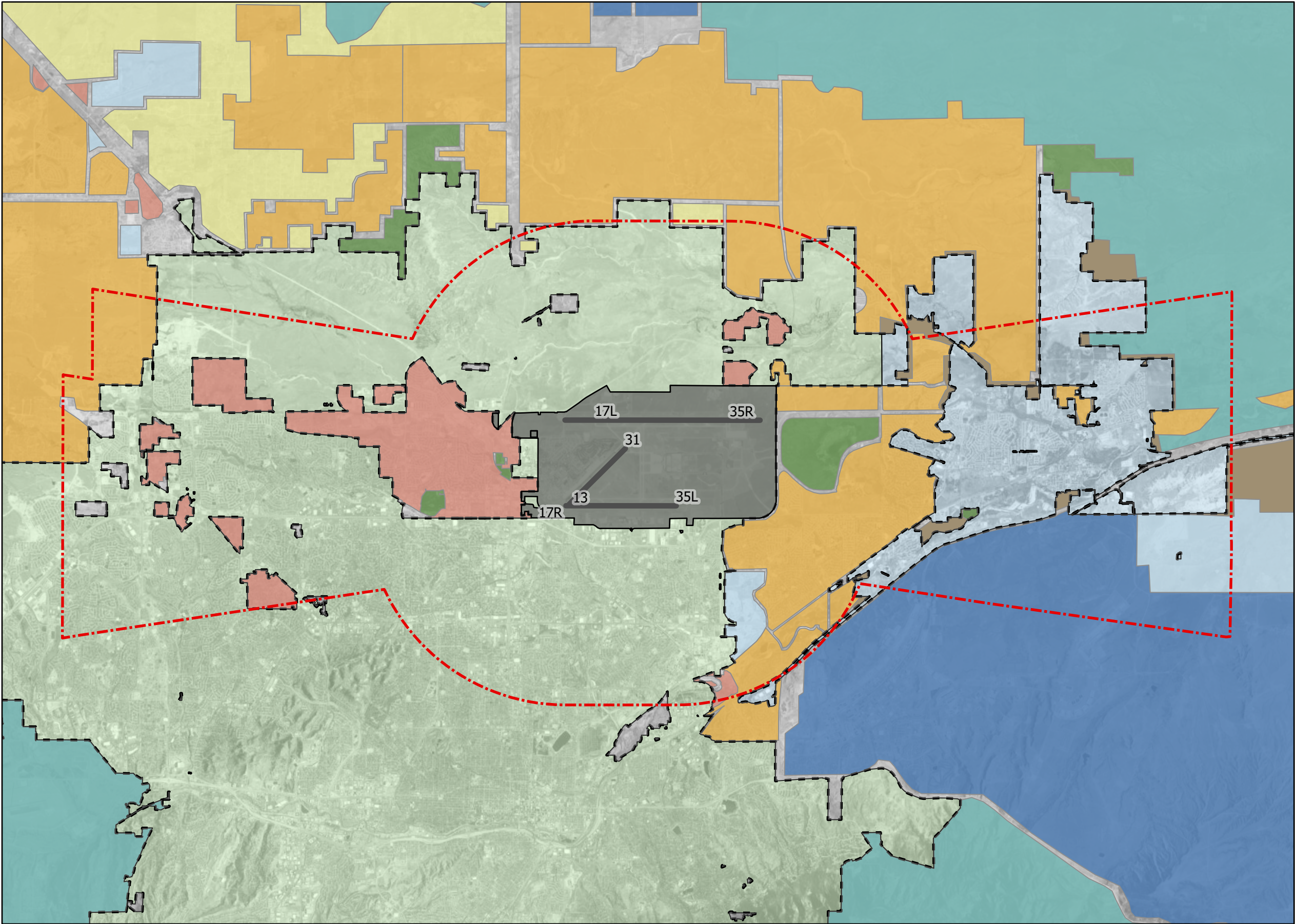
El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.



0 0.4 0.8 1.6 Miles

Land Uses: El Paso County - Airport Overlay



FUTURE LAND USE

- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

LEGEND

- Runway
- Airport Overlay
- Airport Property Boundary
- El Paso County
- Colorado Springs
- Fountain

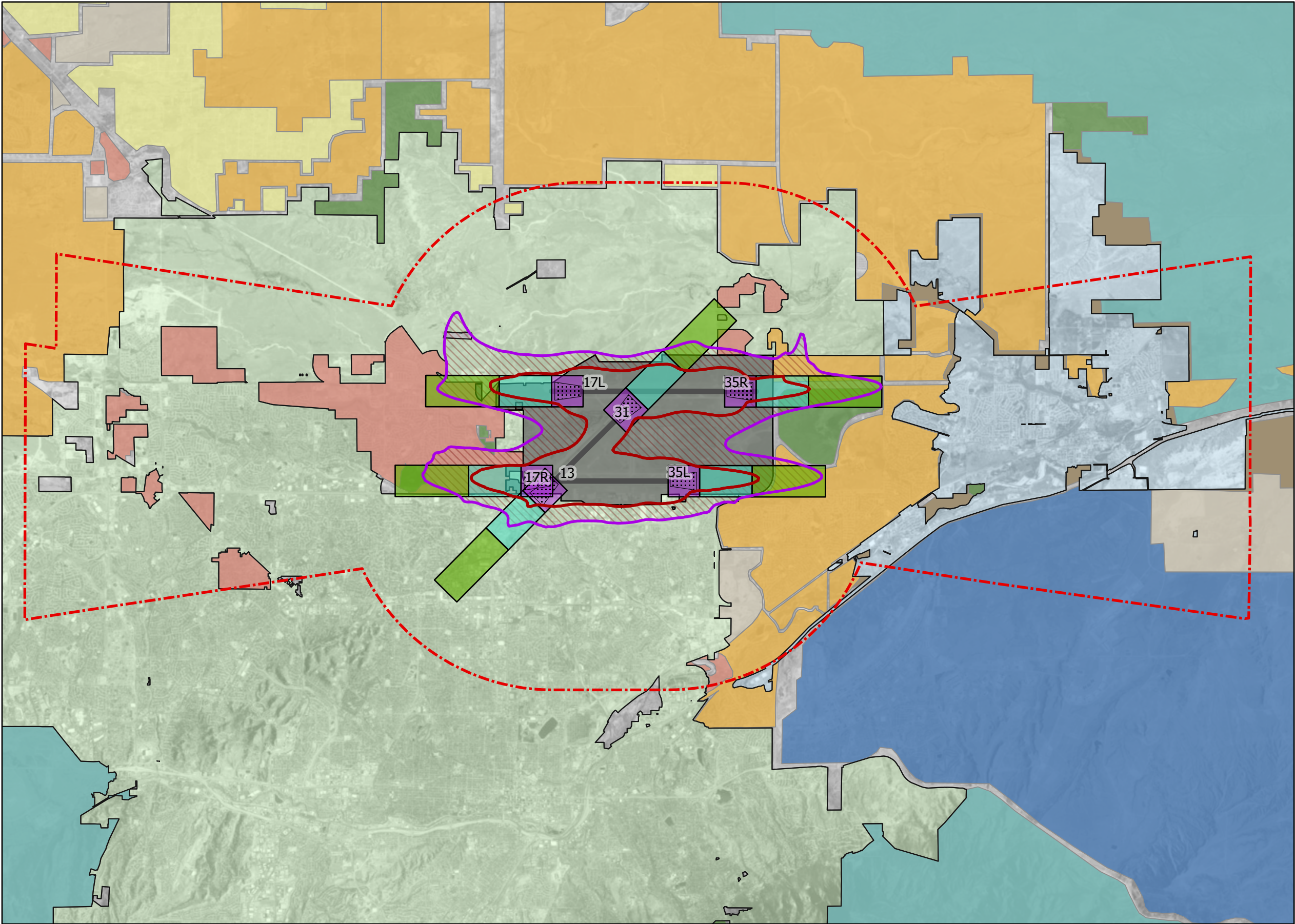
El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.



0 1 2 4 Miles

Land Uses: El Paso County



FUTURE LAND USE

- Urban Residential
- Large-Lot Residential
- Suburban Residential
- Employment Center
- Regional Open Space
- Rural
- Incorporated
- Military

LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV (65 DNL)
- Clear Zone (CZ)
- Accident Potential Zone 1 (APZ1)
- Accident Potential Zone 2 (APZ2)
- Runway Protection Zone (RPZ)
- Airport Influence Area (AIA)
- Airport Overlay (AO)
- Runway
- Airport Property Boundary
- El Paso County
- Colorado Springs
- Fountain

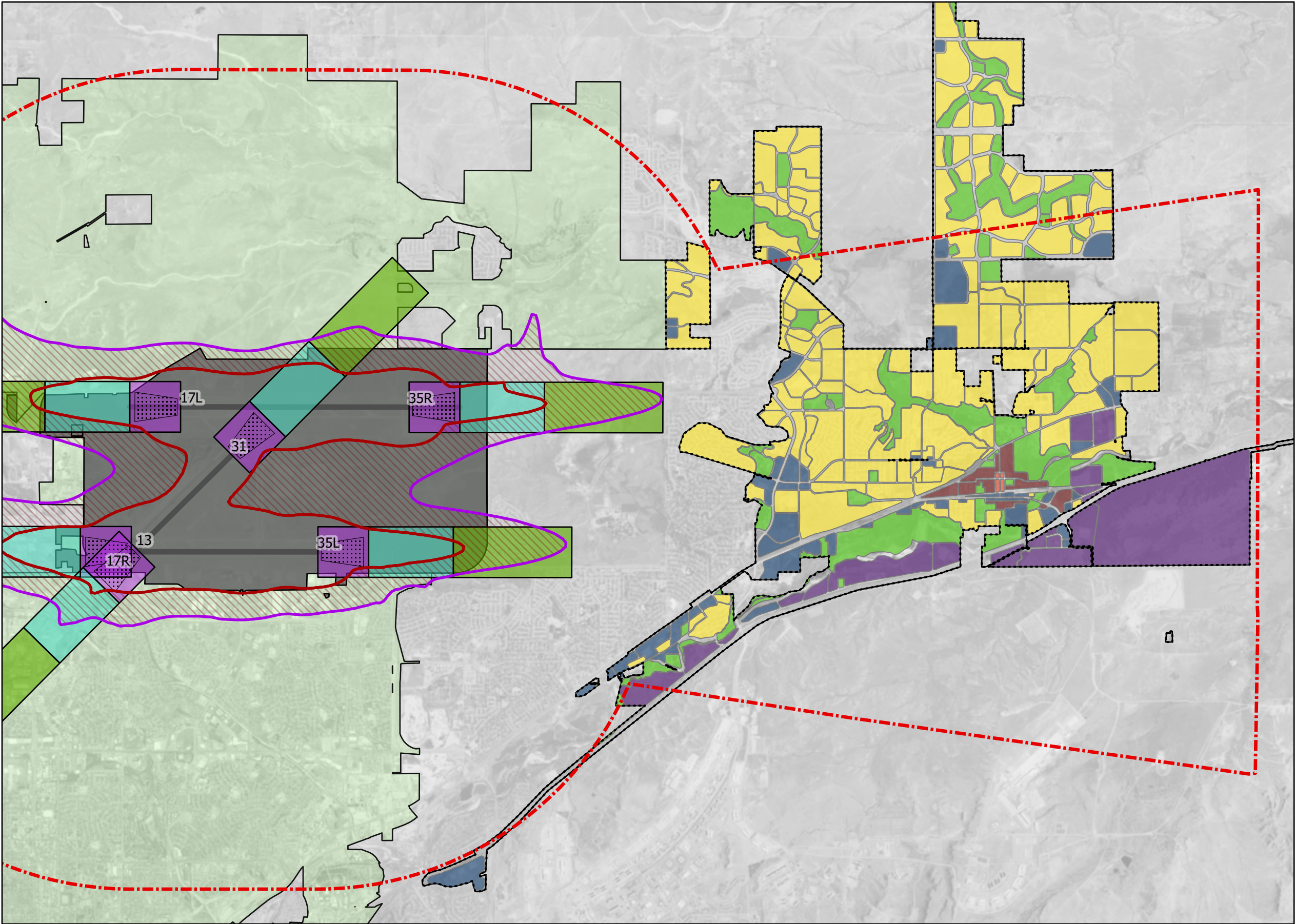
El Paso Land Use estimated based off county PlaceType Map

Notification is required for any structure over 200' AGL throughout El Paso County.



0 1 2 4 Miles

Land Use: City of Fountain



FUTURE LAND USE

- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

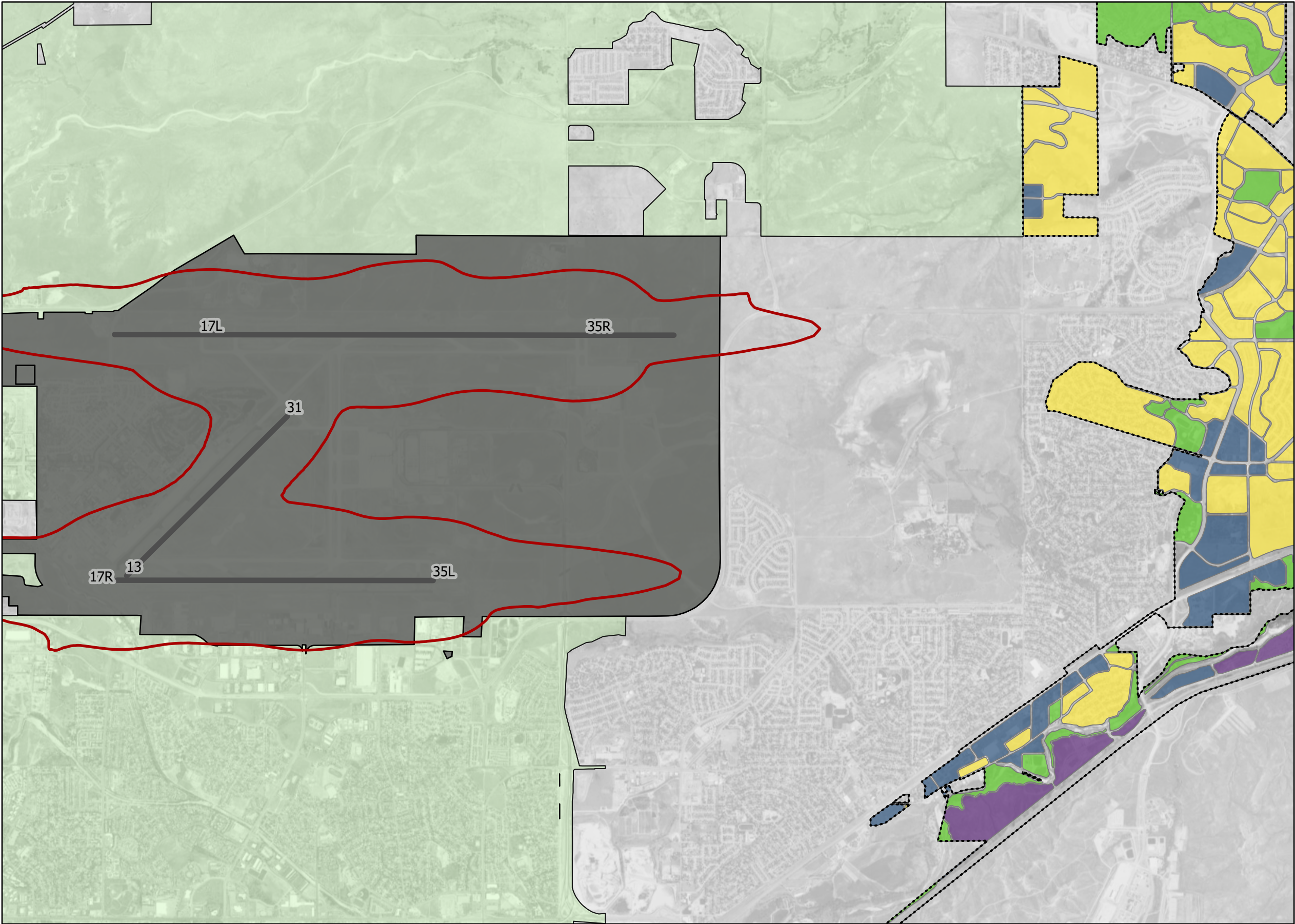
LEGEND

- DNL 60 Contour ASV
- DNL 65 Contour ASV (65 DNL)
- Airport Influence Area (AIA)
- Clear Zone (CZ)
- Accident Potential Zone 1 (APZ1)
- Accident Potential Zone 2 (APZ2)
- Runway Protection Zone (RPZ)
- Airport Overlay (AO)
- Runway
- Fountain
- Airport Property Boundary
- Colorado Springs
- El Paso County



0 0.5 1 2 Miles

Land Use: City of Fountain - 65 DNL Noise Contour ASV



FUTURE LAND USE

- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

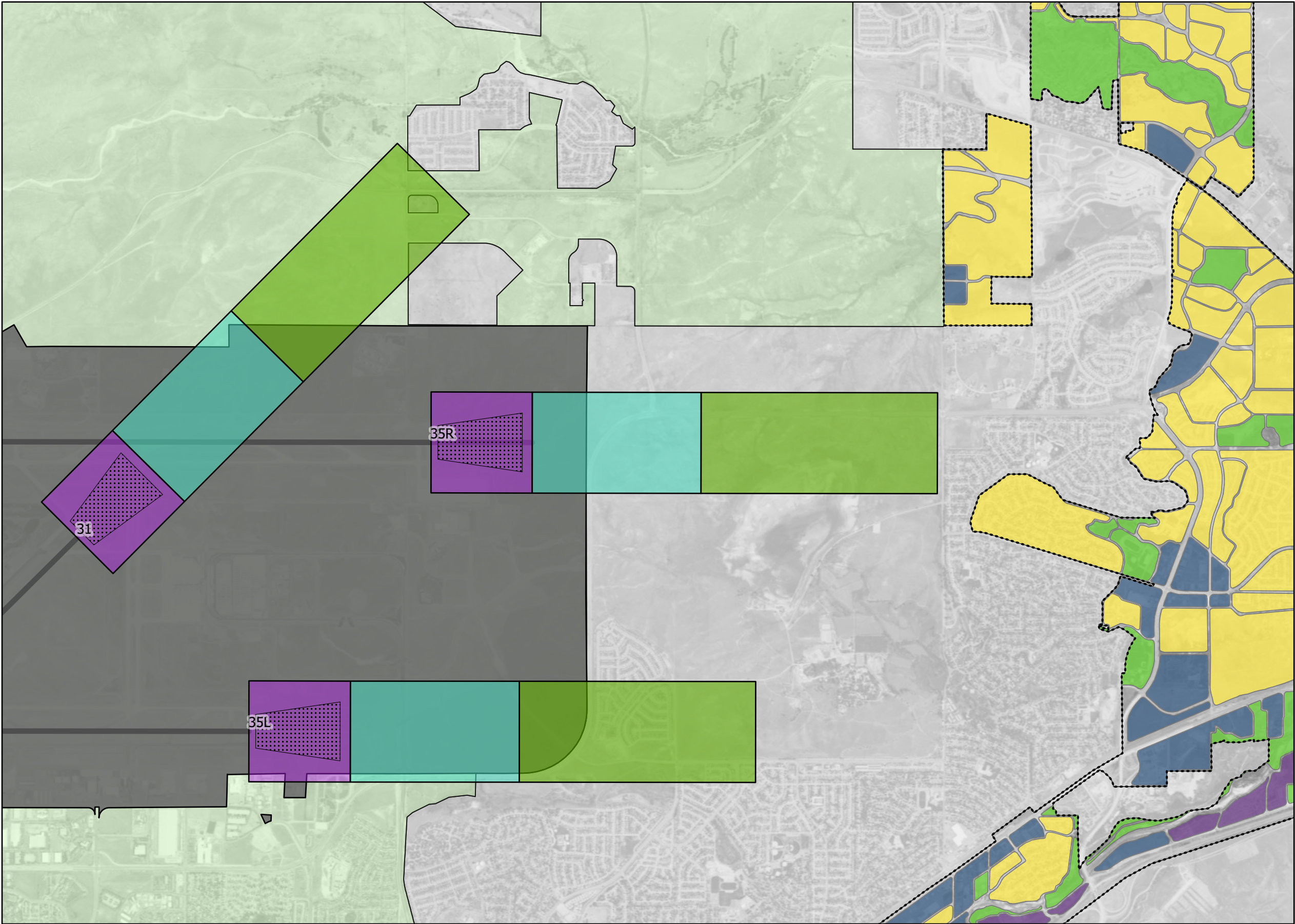
LEGEND

- Runway
- Fountain
- Colorado Springs
- El Paso County
- DNL 65 Contour ASV



0 0.38 0.75 1.5 Miles

Land Use: City of Fountain - Airport and Runway Protection Zones

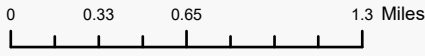


FUTURE LAND USE

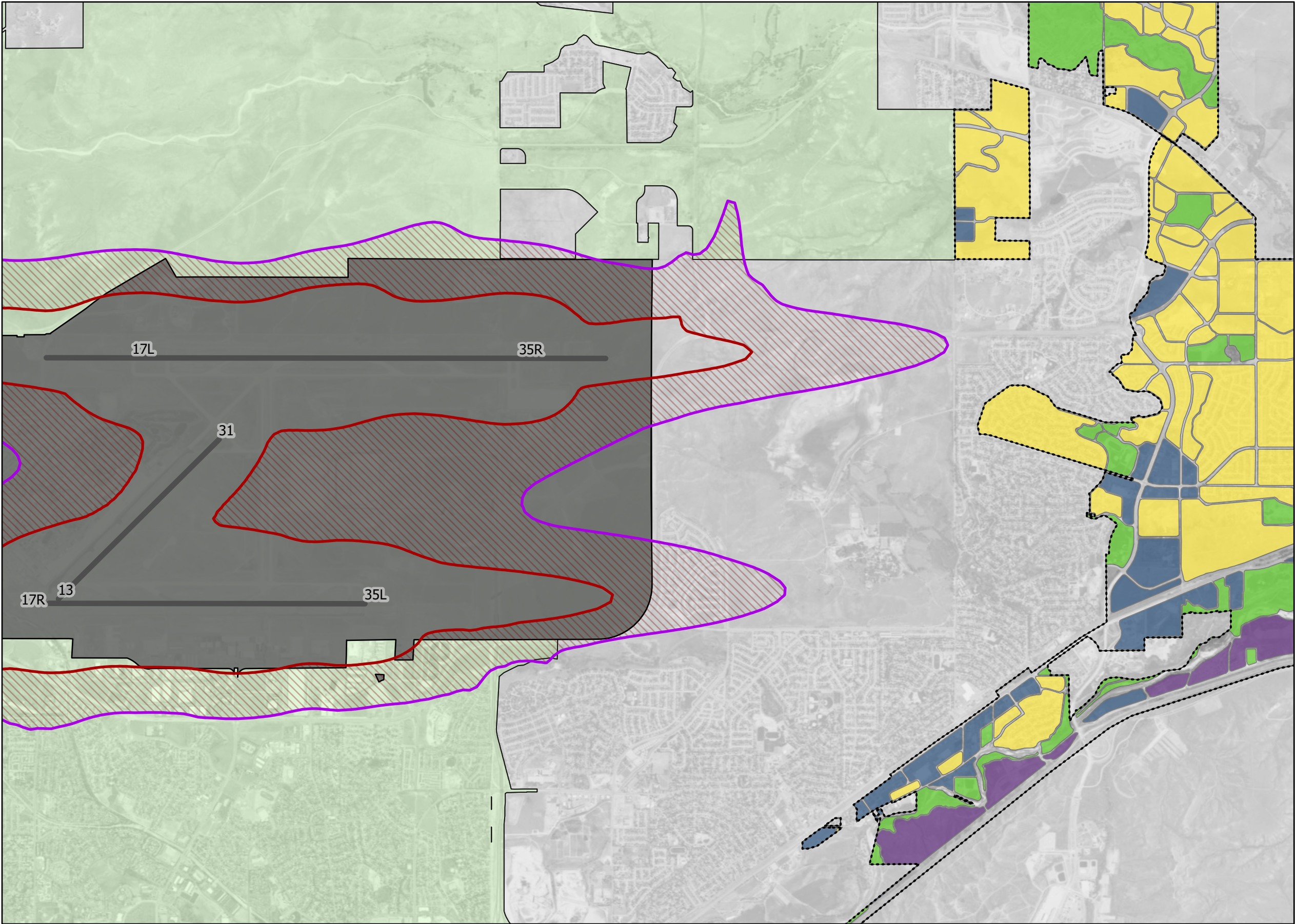
- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

LEGEND

- Runway
- Accident Potential Zone 1
- Accident Potential Zone 2
- Clear Zone
- Runway Protection Zone
- Fountain
- Colorado Springs
- El Paso County



Land Use: City of Fountain - Airport Influence Area



FUTURE LAND USE

- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

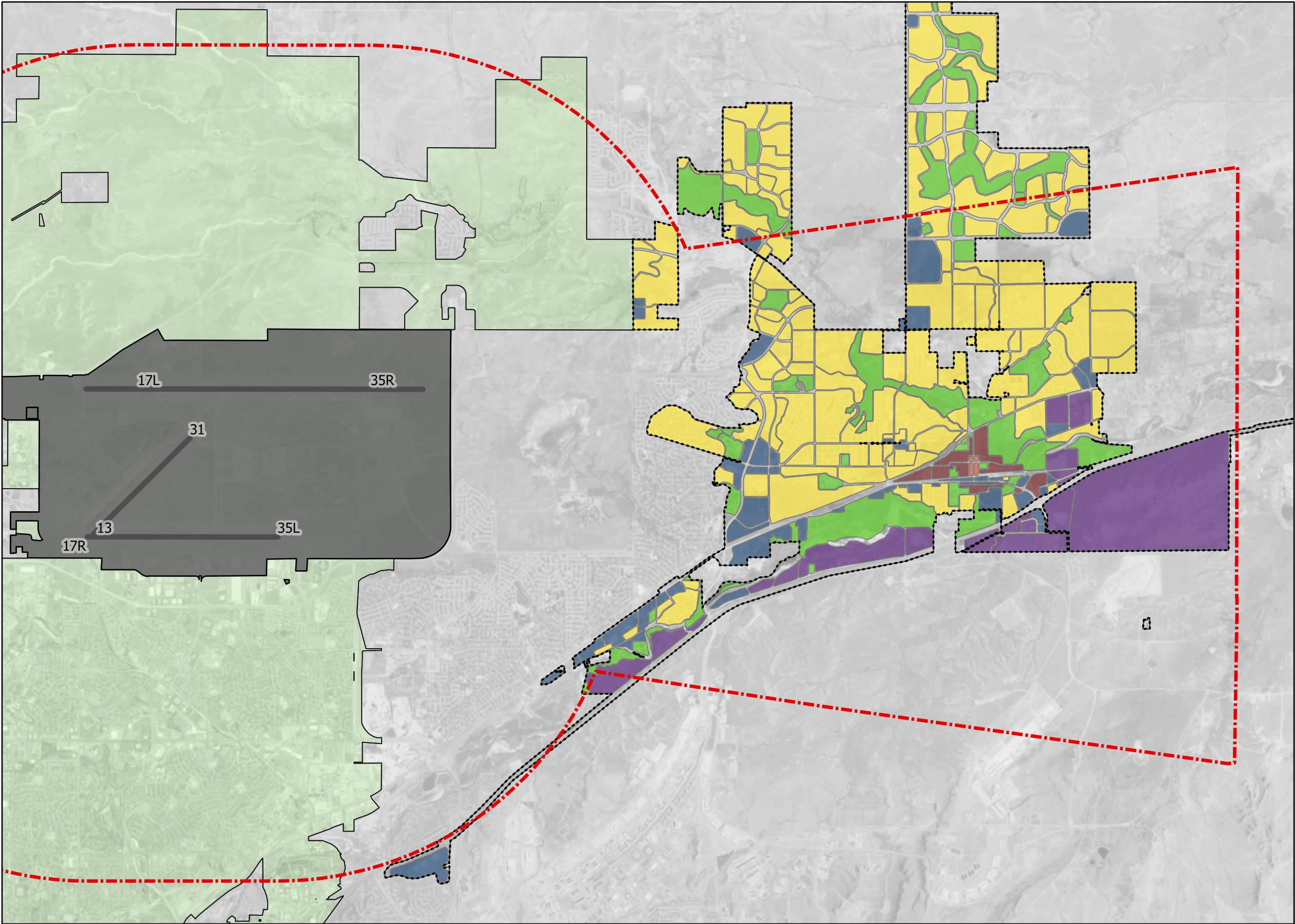
LEGEND

- Runway
- Fountain
- Colorado Springs
- El Paso County
- Airport Influence Area
- DNL 60 Contour ASV
- DNL 65 Contour ASV



0 0.38 0.75 1.5 Miles

Land Use: City of Fountain - Airport Overlay



FUTURE LAND USE

- Commercial
- Historic Downtown
- Industrial
- Mixed Use
- Public
- Residential
- Agriculture

LEGEND

- Runway
- Fountain
- Airport Overlay
- Colorado Springs
- El Paso County



0 0.5 1 2 Miles

Appendix F: Recorded Noise Disclosure Statement

APPENDIX E

SAMPLE REAL ESTATE TRANSFER DISCLOSURE STATEMENT

REGARDING AIRPORT NOISE, FOR THE CITIES OF PACIFICA, SOUTH SAN
FRANCISCO, SAN BRUNO, AND MILLBRAE

THIS DISCLOSURE STATEMENT CONCERNS THE REAL PROPERTY SITUATED IN THE CITY OF _____, COUNTY OF SAN MATEO, STATE OF CALIFORNIA, DESCRIBED AS _____. THIS STATEMENT IS A DISCLOSURE OF THE CONDITION OF THE ABOVE DESCRIBED PROPERTY IN COMPLIANCE WITH ORDINANCE NO. ____ OF THE CITY OR COUNTY CODE AS OF _____. IT IS NOT A WARRANTY OF ANY KIND BY THE SELLER(S) OR ANY AGENT(S) REPRESENTING ANY PRINCIPAL(S) IN THIS TRANSACTION, AND IS NOT A SUBSTITUTE FOR ANY INSPECTIONS OR WARRANTIES THE PRINCIPAL(S) MAY WISH TO OBTAIN.

I.

SELLERS INFORMATION

The Seller discloses the following information with the knowledge that even though this is not a warranty, prospective Buyers may rely on this information in deciding whether and on what terms to purchase the subject property. Seller hereby authorizes any agent(s) representing any principal(s) in this transaction to provide a copy of this statement to any person or entity in connection with any actual or anticipated sale of the property.

THE FOLLOWING ARE REPRESENTATIONS MADE BY THE SELLER(S) AS REQUIRED BY THE CITY OF OR COUNTY OF SAN MATEO AND ARE NOT THE REPRESENTATIONS OF THE AGENT(S), IF ANY, THIS INFORMATION IS A DISCLOSURE AND IS NOT INTENDED TO BE PART OF ANY CONTRACT BETWEEN THE BUYER AND SELLER.

1. San Francisco International Airport is the fifth largest airport by volume in the United States and the seventh largest by volume in the world.

2. The property is subject to noise from aircraft overflight.

3A. Per Pacifica Ordinance No. 619-C.S., at its closest point is located 2.5 miles from San Francisco International Airport and its closest point, the 1983 CNEL contour area is 4.1 miles from San Francisco International Airport.

3B. Per South San Francisco Ordinance No. 1289-2001 San Francisco International Airport is within 3.75 miles of all residential property in South San Francisco.

3C. Per San Bruno Ordinance No. 1646, at their closest point, dwelling units in the City of

San Bruno are located approximately 0.25 miles from the San Francisco International Airport's outer perimeter of its developed area. At their farthest point, dwelling units within San Bruno are located approximately 4.0 miles from the San Francisco International Airport's outer perimeter of its developed area.

4. After January 1, 1993, if the subject property is constructed or reconstructed after its total or partial destruction, or if it is reconstructed or renovated at a cost equal to 25% or more of the current market value of the home, it must be insulated against aircraft noise to meet FAA noise insulation program standards, as required by amendments to the local building codes.

5. If the subject property has already received noise insulation pursuant to the FAA Noise Insulation Program, the owner may not deliberately or willfully act to reduce or destroy the effectiveness of the noise mitigation measures.

6. The attached maps for each above mentioned city outline the 1983 65 CNEL Noise Contour. The city ordinances require that these specific maps are made part of the disclosure. Additional information may be obtained from resources including, but not limited to the following Aircraft Noise Insulation offices:

City of Pacifica Aircraft Noise Insulation Office: 170 Santa Maria Avenue, Pacifica, CA, 94044, (650) 738-7341

City of San Bruno Aircraft Noise Insulation Project: 881 W. San Bruno Avenue, San Bruno, CA, 94066, (650) 877-8689

City of South San Francisco Aircraft Noise Insulation Project: 2850 Galway, South San Francisco, CA, 94080, (650) 877-8600

County of San Mateo Aircraft Noise Insulation Office: 455 County Center, Second Floor, Redwood City, CA, 94063, (650) 363-4417

The San Francisco International Airport's website www.flyquietsfo.com will allow you to locate your property relative to the 65 CNEL Noise Contour.

☐ If this box is checked, the subject property falls within the Aircraft Noise Footprint based on the FAA 1983 CNEL Noise Exposure Map.

Seller certifies that the information herein is true and correct to the best of the Seller's knowledge as of the date signed by the Seller.

Seller _____ Date _____

Seller _____ Date _____

II.

BUYER(S) AND SELLER(S) MAY WISH TO OBTAIN PROFESSIONAL ADVICE AND/OR INSPECTIONS OF THE PROPERTY AND TO PROVIDE FOR APPROPRIATE PROVISIONS IN A CONTRACT BETWEEN BUYER AND SELLER(S) WITH RESPECT TO ANY ADVICE/INSPECTIONS/DEFECTS.

I/WE ACKNOWLEDGE RECEIPT OF A COPY OF THIS STATEMENT.

Seller _____ Date _____ Buyer _____ Date _____

Seller _____ Date _____ Buyer _____ Date _____

Agent (Broker Representing Seller) By _____ Date _____
(Associate Licensee or Broker-Signature)

Agent (Broker Obtaining the Offer) By _____ Date _____
(Associate Licensee or Broker-Signature)

A REAL ESTATE BROKER IS QUALIFIED TO ADVISE ON REAL ESTATE. IF YOU DESIRE LEGAL ADVICE, CONSULT YOUR ATTORNEY.