DRAFT

Dayton International Airport
Airport Master Plan Volume 1

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Table of Contents

Volume 1

Volume 2

Table of Tables

Table of Figures

Chapter 1:
Introduction

1.1 Introduction

A "pioneer" is, according to the Merriam-Webster Dictionary, "a person or group that originates or helps open up a new line of thought or activity or a new method or technical development." Two of the greatest pioneers in aviation history were Orville and Wilbur Wright, who were lucky to call Dayton their home. Today, when people think of Dayton, Ohio and pioneers, they think of the Wright Brothers. They think of the Birthplace of Aviation – Dayton, Ohio.

As the Birthplace of Aviation, it's critical for Dayton to have an airport that reflects the pioneering acumen of its people. The City wants an airport that reflects what it has been, what it is now, and what it will be. The Dayton International Airport (DAY) Master Plan is a project undertaken by the City of Dayton to accomplish just that. The City aims to further develop its airport so locals, tourists, businesspeople, and all airport users alike will choose to fly Dayton's airport day after day after DAY.

Dayton International Airport's story begins on December 17, 1903 when the Wright Brothers successfully carried out the first controlled, powered flight at Kill Devil Hills, North Carolina. In 1904 and 1905 and they set up an airfield at Dayton's Huffman Prairie and continued their flying success.

Years later in March 1928, as aviation research was growing and improving, local businessmen who were inspired by the Wright Brothers, including E.G. Beichler, President of Frigidaire; Frederick B. Patterson, President of National Cash Register; Charles F. Kettering, Vice President of General Motors and President of the General Motors Research Group formed the Dayton Airport, Inc. The newly founded company acquired about 311 acres of property north of Dayton near Vandalia and set up an airport.

Later that year, the private "Dayton Airport" was transforming to have hangars, an office/machine shop building, a water tower, a gas station, and three runways, each about 75 feet and 500 long. On July 31 and August 1, 1929, the airport held a dedication ceremony and public open house.

However, by 1932, interest for the airport declined. Peoples doubts of "flying machines" combined with the impact of the Great Depression put the airport into economic hardship. Then, in 1934 the City of Dayton agreed to lease the airport from Dayton Airport Inc.

Native Daytonian and three-term Ohio Governor James M. Cox took matters into his own hands when he used connections in Washington DC to receive assurances that if the City of Dayton owned the Airport, the City would be eligible to receive US Works Projects Administration funding for airport improvements. Cox led fundraising efforts in the community and on April 29, 1936, he and the community raised and purchased the airport for $65,000 and sold it to the City for just $1.00.

Thirty-three years to the day after the Wright Brothers' first flight, on December 17, 1936 Dayton Municipal Airport opened with three 3,600-foot-long concrete runways. Soon after, Trans Continental and Western Airways (later "TWA"), began commercial service with three daily flights.

World War II helped the airport grow, as the US Department of Defense bought lands around the Airport for an army training airfield. In 1943, the Airport installed parallel "heavy duty" Runway 6R-24L, giving the airport four runways. The airport kept growing, and in 1952 the airport was renamed the James M.

Cox-Dayton Municipal Airport. A new $5.5 million terminal building broke ground in 1959 to meet the demands for air service.

Despite the terminal building being under construction, TWA began jet service from the airport in 1960. In 1961, the new terminal building opened. Additionally, throughout this decade, Runway 6L-24R opened as a 9,500-foot-long by 150-foot-wide concrete runway.

In 1975, the airport opened a US Customs facility and was renamed "James M. Cox Dayton International Airport." Throughout the 1980s, the airport was fully annexed into the City of Dayton. Emery Worldwide opened a cargo hub at the Airport. Piedmont Airlines opened a Midwest hub at the airport. Plus, to end the decade, a $50 million renovation of the terminal building was completed in 1989.

In the 1990s, the Piedmont hub closed due to Piedmont's merger with US Airways. However, US Airways continued to operate at the airport and retained a corporate headquarter facility for PSA Airlines, Inc, its regional carrier. Furthermore, the first low-cost carrier entered the scene when AirTran Airways began service on August 1, 1995.

The new millennium saw continued change, which began with a $25 million Terminal Building renovation that began in 1998 and was completed in 2002. Following, Frontier began nonstop service from Dayton to Denver on August 31, 2005.

The last Master Plan for Dayton was completed in 2008, and it aimed to ensure that Dayton was the gateway for air travel to and from the Dayton area. A key project since that master plan was the new three-level parking garage with heated access ramps, two outdoor fountains, and the children's artwork display known as "Through the Eyes of Children." Also, a new air traffic control tower was commissioned in 2011, and a new in-line baggage screening system, checkpoint area expansion, and ticket lobby renovation were completed in 2011. Most recently completed was Phase 1 of the terminal improvements, which improved the passenger experience by providing additional lobby space and a new terminal façade.

Since the last 12 years not only Dayton International Airport but also the whole aviation industry has seen fast and drastic changes; nothing in the aviation world stays stagnant too long. Plus, with the onset of the COVID-19 pandemic in 2020, the future in the industry may be more uncertain than ever before.

This Master Plan looks at the last 12 years and into the next 20 to determine what the airport will look like and how it will function. It's a story of the past and the transition into the future. It's a story of a community, a city, and a state. It's a story of an airport—an airport that's easy to and through and seeks to be used day after day.

1.2 Purpose and Need

A master plan is a technical document from an airport management and operation perspective to guide future growth and development. It provides a road map for meeting aviation demand through the foreseeable future while preserving the flexibility necessary to respond to changing industry trends. To supplement the master plan document, an Airport Layout Plan (ALP) is used to graphically depict the existing and proposed conditions of an airport.

An airport must have an approved and up-to-date ALP to receive federal funding for projects; therefore, the Federal Aviation Administration (FAA) recommends that a Master Plan be updated about every seven to ten years or when significant changes occur that warrant an update. These changes can include but are not limited to fleet mix changes, airfield changes (such as runway extensions), new airfield hangar construction, maintenance facility construction, or land purchases/releases.

The previous master plan included projects such as Runway Safety Area modifications, runway extensions, and a new air traffic control tower. This 2008 Master Plan represented the airport development process since 1999 when a master plan for the airport was prepared, but never accepted by the FAA. In the years between 1999 and 2008, the airport greatly changed when its status as a cargo hub became in question. In 2006, Menlo Worldwide Forwarding, formerly known as Emery Forwarding, closed its cargo hub, which led to the creation of the 2008 Master Plan. Now over 10 years later, this Master Plan update will reflect the actual conditions today and determine what facility upgrades are needed at Dayton International Airport.

This 2020 Master Plan update will review the prior planning efforts conducted for the Airport and analyze market conditions and future facility requirements. For this study, a Technical Advisory Committee (TAC) and Regional Advisory Committee (RAC) were formed, consisting of membership from a variety of backgrounds. The TAC members provided technical guidance on the airport usage, while the RAC provides community input. Both committees meet at key milestones throughout this project. This master plan provides development guidelines for the Airport through 2040.

1.3 Master Plan Goals and Objectives

The primary goal of the Master Plan is to create a roadmap for the airport for the next 20 years. The roadmap includes proposed airport development based on projected operational forecasts and peaks. The goals and objectives specifically include:

- Determining forecasts for:
    - Passengers
    - Cargo
    - Aircraft fleet mix
    - Peaking characteristics
- Developing an airside development plan consistent with Dayton International Airport's visions
- Determining future facility requirements
- Evaluating airfield efficiencies and inefficiencies and recommending improvements
- Preparing an Airport Layout Plan (ALP) that graphically depicts future development
    - Ensuring the ALP is approved by the FAA
- Preparing noise contours based on existing and future fleet mix and operational numbers
- Preparing an Airport Capital Improvement Plan (ACIP) that is financially feasible and in line with the Airport's business objectives

1.4 SWOT Analysis

As part of the Master Plan process it is important to survey the users of the airport and the surrounding community to understand the airport's ***S***trengths, ***W***eaknesses, ***O***pportunities, and ***T***hreats (SWOT). DAY management established the Technical Advisory Committee (TAC) and the Regional Advisory Committee (RAC) to help guide the development of the master plan. All committee members received an electronic survey in which they were able to identify their preliminary strengths, weaknesses, opportunities, and threats. This was followed up by a virtual meeting—one for the TAC and one for the RAC—in which everyone discussed SWOTs for DAY.

1.4.1 TAC SWOT Analysis

The TAC consists of users and tenants of the Airport, including:

- FAA representatives
- Airport operations representatives
- Air Traffic Control Representatives
- Airline and cargo operation representatives
- General and corporate aviation representatives
- Fixed Base Operator representatives and other tenants
- Rental car and parking company representatives
- Transportation Security Administration (TSA) representatives
- Local community and regional planning representatives

On October 23, 2020, the TAC met in a virtual meeting to conduct a SWOT analysis for this Airport Master Plan. The preliminary findings from the electronic survey were presented to the TAC, and then the committee members openly discussed which strengths, weaknesses, opportunities, and threats were pertinent to the Airport.

After the discussion, all TAC members received a follow-up electronic survey in which they prioritized their top five strengths, weaknesses, opportunities and threats. Furthermore, these strengths, weaknesses, opportunities, and threats were ranked between 1 and 5 where 1 is the top priority and 5 is the lowest priority among the responses for internal Airport-use. The full data results from the TAC SWOT survey is included in **Appendix A**.

Data results from the TAC SWOT survey is included in the sections below.

1.4.1.1 TAC SWOT Survey Results: Strengths

Figure 1-1 illustrates the response rate of each strength listed on the survey. The top statements chosen are as follows:

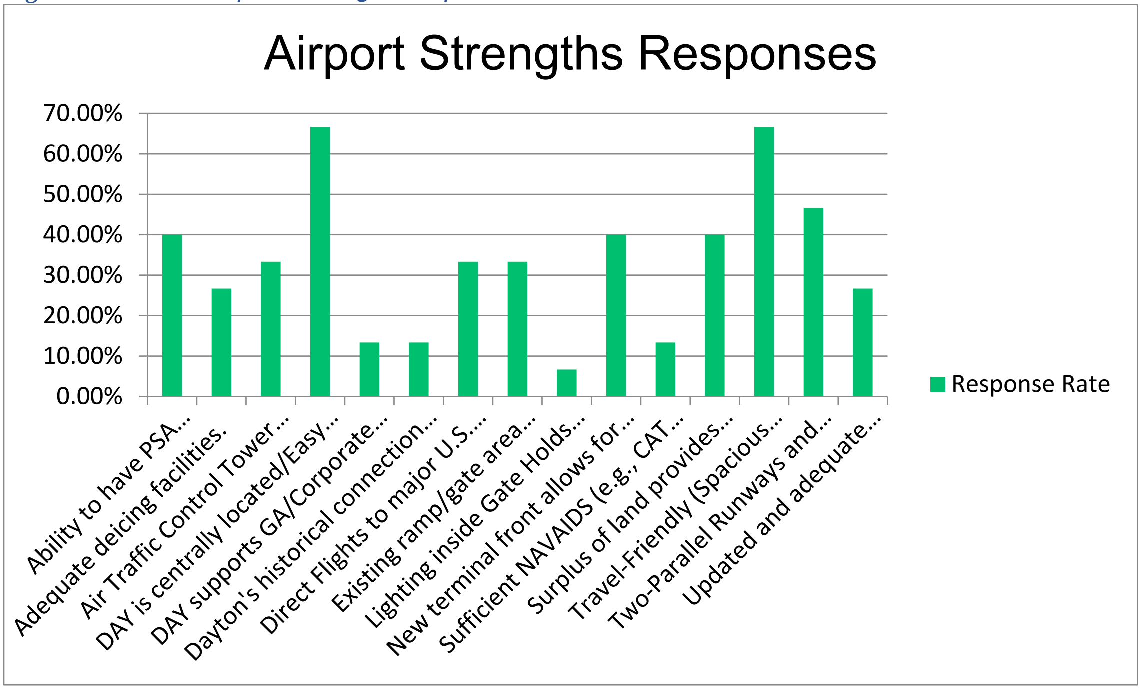
- ***"DAY is centrally located/easy airport access and connection to two major interstates"***
- ***Travel-Friendly (Spacious terminal check-in area, quick security checkpoint, short wait for flight)***

1.4.1.2 TAC SWOT Survey Results: Weaknesses

Figure 1-2 illustrates the response rate for each weakness listed on the survey. The top statements chosen are as follows:

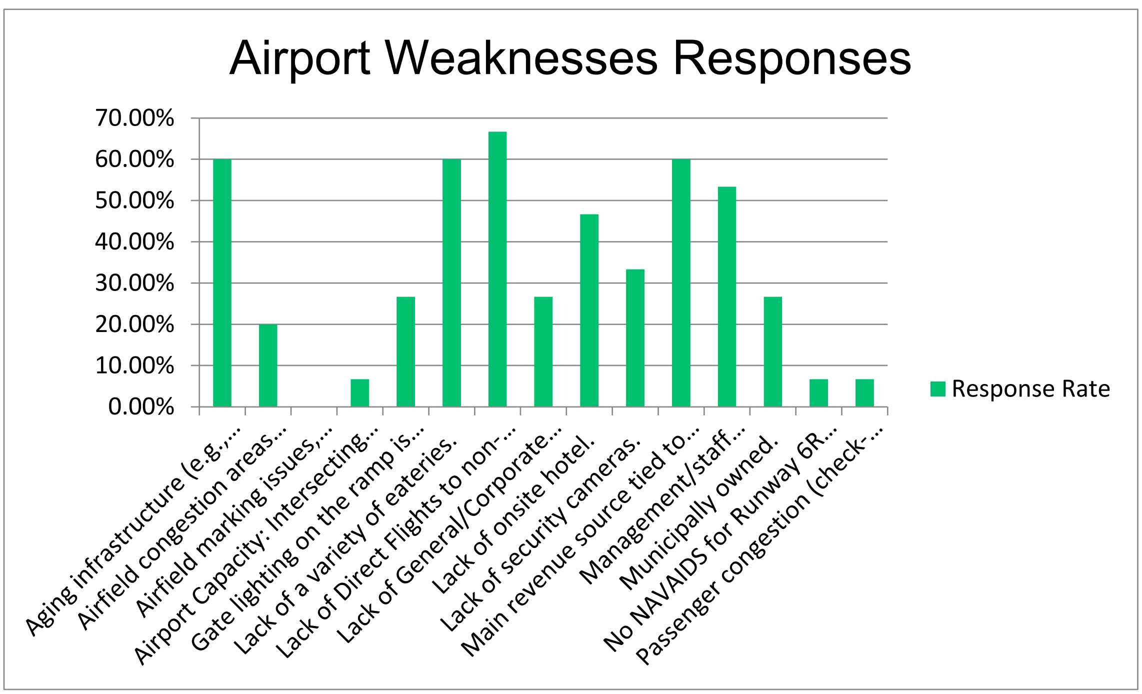
- ***"Lack of Direct Flights to non-hub airports; need for full-time low cost carriers"***
- ***" Aging infrastructure (e.g., Runway 6R signage issues, runway lighting; and passenger terminal; deferred capital projects)"***
- ***"Main revenue source tied to business travelers"***
- ***"Lack of a variety of eateries"***

Figure 1-1: TAC Airport Strength Responses



Source: DAY; Technical Advisory Committee; Passero Associates

Figure 1-2: TAC Airport Weaknesses Responses



Source: DAY; Technical Advisory Committee; Passero Associates

1.4.1.3 TAC SWOT Survey Results: Opportunities

Figure 1-3 illustrates the response rate for each opportunity listed on the survey.
The top statements chosen are as follows:

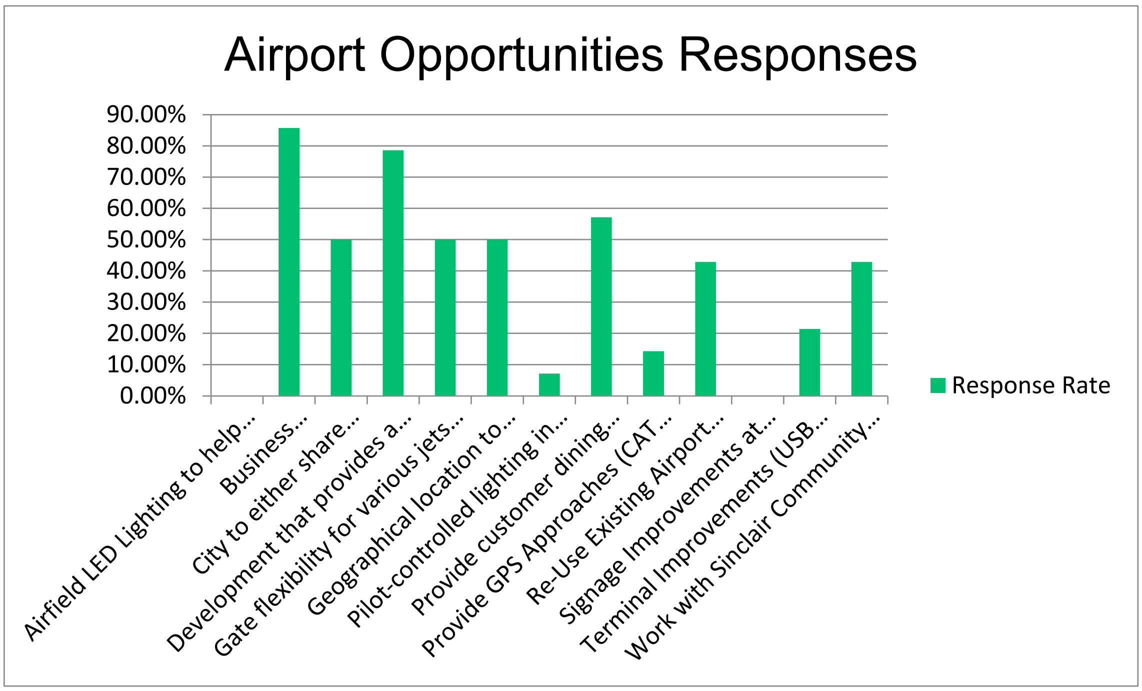
- ***"Business development/corporate aviation growth and development opportunities"***
- ***"Development that provides a continuous revenue stream or increases cargo/travelers"***

1.4.1.4 TAC SWOT Survey Results: Threats

Figure 1-4 illustrates the response rate for each threat listed on the survey. The top statements chosen are as follows:

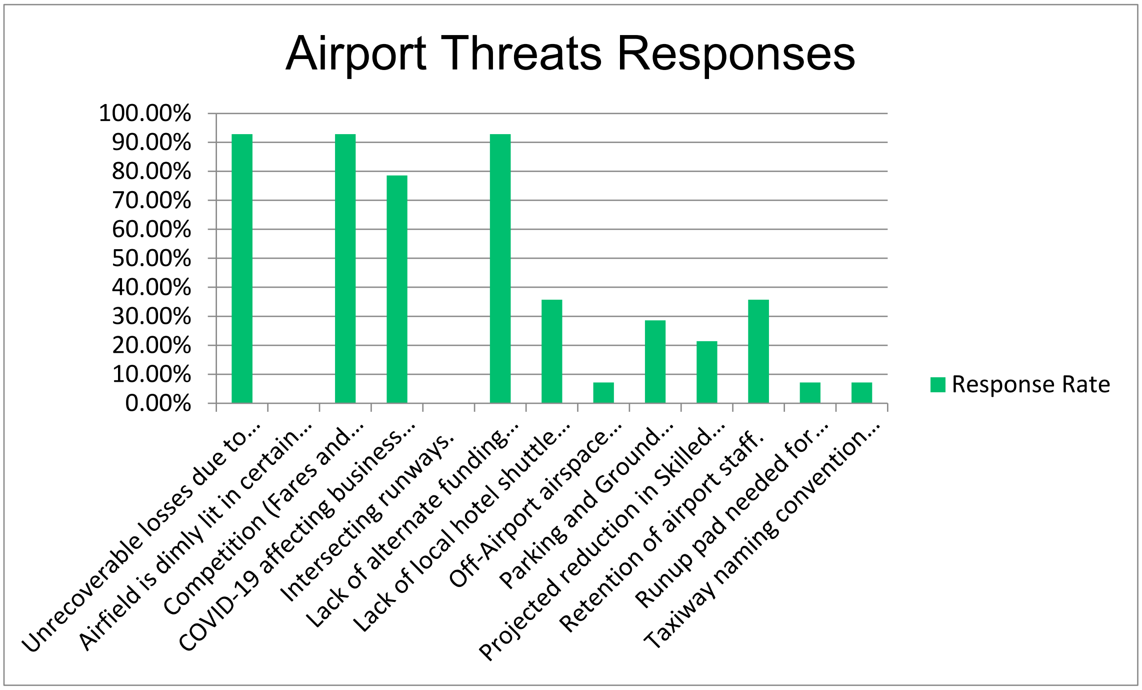
- ***"Unrecoverable losses due to COVID-19 reduced enplanements"***
- ***"Competition (Fares and surrounding airports)"***
- ***"Lack of alternate funding sources"***

Figure 1-3: TAC Airport Opportunity Responses



Source: DAY; Technical Advisory Committee; Passero Associates

Figure 1-4: TAC Airport Opportunity Responses



Source: DAY; Technical Advisory Committee; Passero Associates

1.4.2 RAC SWOT Analysis

Similarly, and also on October 23, 2020, the RAC convened to undergo a virtual SWOT analysis, which was conducted in the same manner as the TAC meeting.

The RAC consists of community membership, including:

- Montgomery County and Miami County representatives
- Representatives from Dayton, Vandalia, Tipp City
- Monroe Township and Butler Township representatives
- Miami Valley Regional Planning Commission (MVRPVC), Dayton Development Coalition, and Ohio Department of Transportation representatives
- Audubon Society and Montgomery County Transportation Improvement District representatives
- University of Dayton and Wright State University representatives
- Wright Patterson Airforce Base representatives

Much like the TAC members, each RAC member received a follow-up electronic survey in which they prioritized their top five strengths, weaknesses, opportunities and threats. The RAC's strengths, weaknesses, opportunities and threats were ranked in the same manner as the TAC where 1 being the highest priority at the Airport, and 5 being the lowest responses for internal Airport-use. The full data results from the RAC SWOT survey are included in **Appendix B**.

Data results from the RAC SWOT survey is included in the sections below.

1.4.2.1 RAC SWOT Survey Results: Strengths

Figure 1-5 illustrates the response rate for each strength listed on the survey. The top statements chosen are as follows:

- ***"Efficient, easy access to I-70/I-75, plentiful parking"***
- ***"Airport is small and user friendly (convenient overall)"***
- ***"PSA Headquarters and having maintenance hanger and crew on site"***

1.4.2.2 RAC SWOT Survey Results: Weaknesses

Figure 1-6 illustrates the response rate for each weakness listed on the survey. The top statements chosen are as follows:

- ***"Inability to influence airlines/airfare"***
- ***"Lack of Direct Flights, lack of Low Cost Carriers, Airlines keep airfares artificially high, competition from surrounding commercial service airports"***
- ***"Aging terminal building, facilities, and infrastructure; limited sanitary sewer infrastructure; lack of fiber instrastructure"***

1.4.2.3 RAC SWOT Survey Results: Opportunities

Figure 1-7 illustrates the response rate for each opportunity listed on the survey. The top statements chosen are as follows:

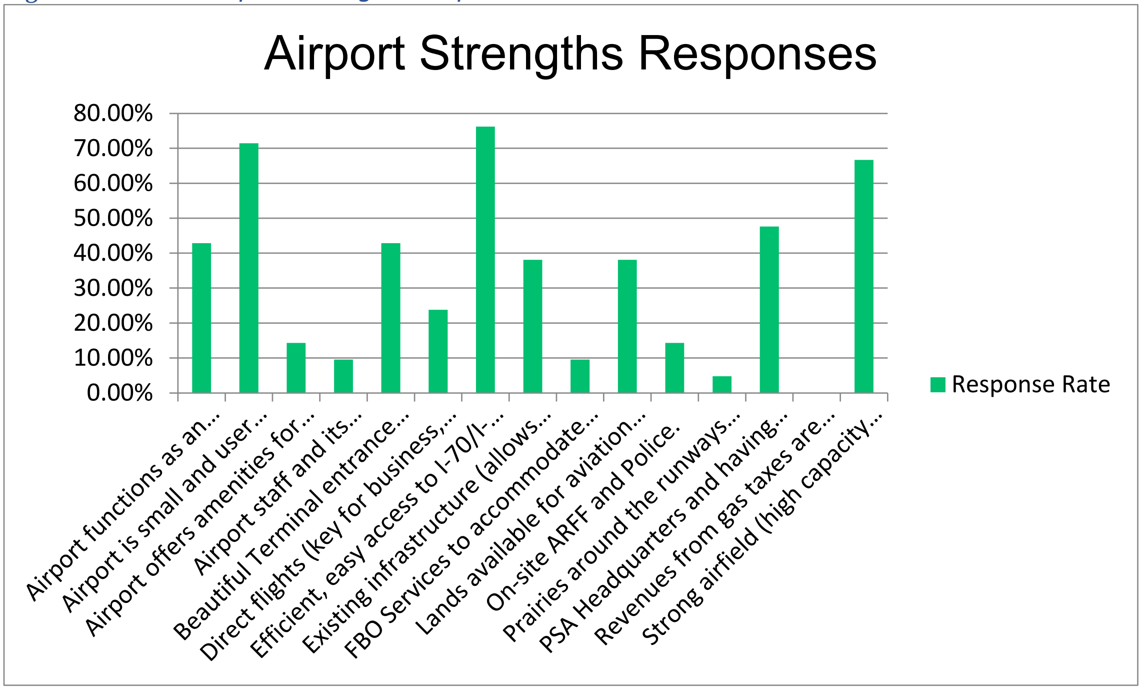
- ***"Creating Partnerships with: Airport users, Airforce Base (WPAFB), URDI, flyOhio, OAA, Jobs Ohio, political and economic leaders, neighboring municipalities"***
- ***"Availability of developable/leasable facilities; excess land for large buildings and development to create continuous revenue stream"***
- ***"Basing Sinclair Aircraft Maintenance School at DAY"***

1.4.2.4 RAC Survey Results: Threats

Figure 1-8 illustrates the response rate for each threat listed on the survey. The top statements chosen are as follows:

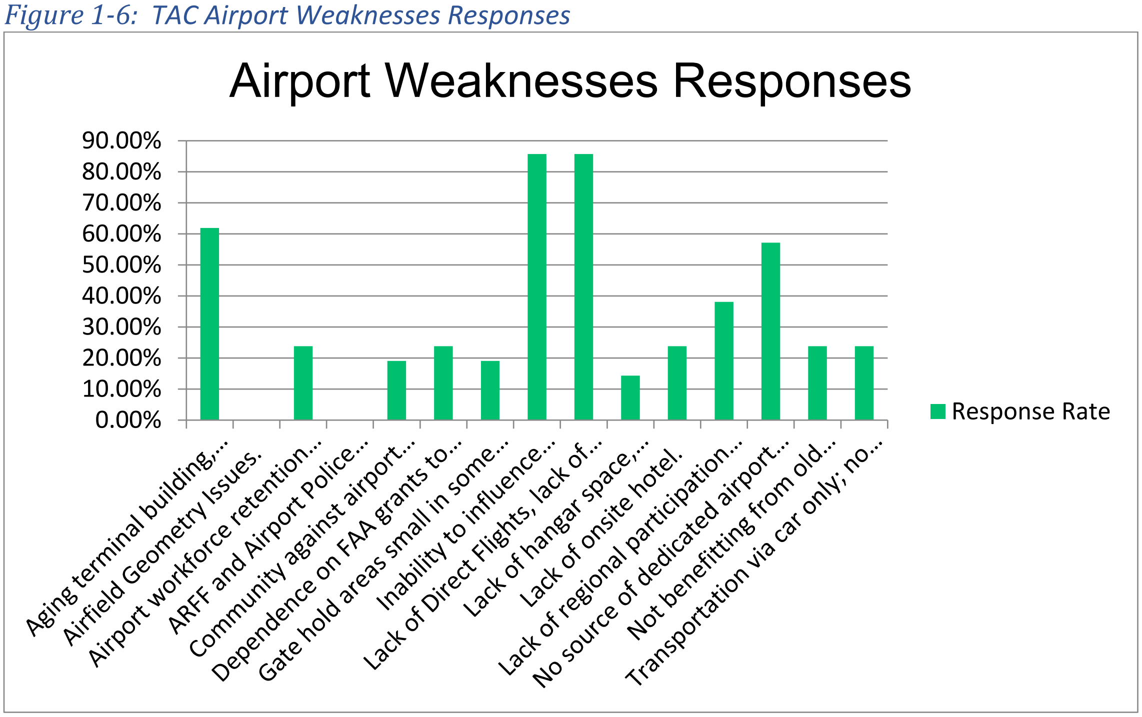
- ***"Loss of low cost air carriers from DAY"***
- ***"General reduced demand for air travel"***
- ***"Inability to influence airlines/airfare (Airlines keep airfare artificially high and limit number of direct flights)"***

Figure 1-5: RAC Airport Strengths Responses



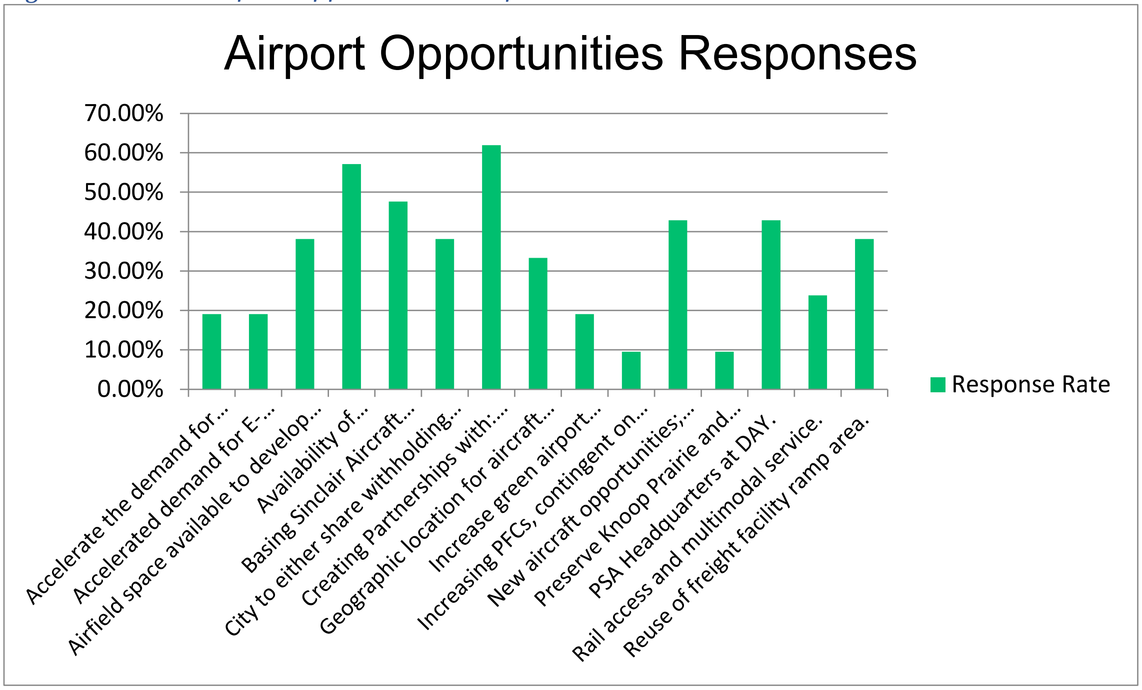
Source: DAY; Technical Advisory Committee; Passero Associates

Figure 1-6: TAC Airport Weaknesses Responses



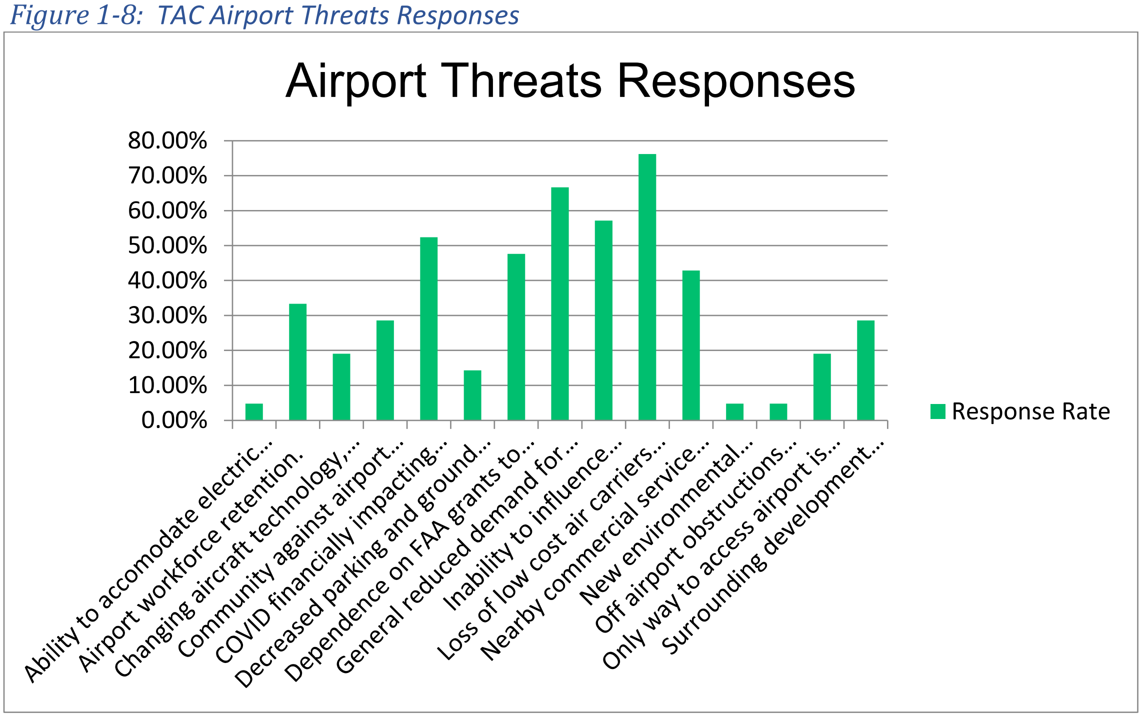
Source: DAY; Technical Advisory Committee; Passero Associates

Figure 1-7: TAC Airport Opportunities Responses



Source: DAY; Technical Advisory Committee; Passero Associates

Figure 1-8: TAC Airport Threats Responses



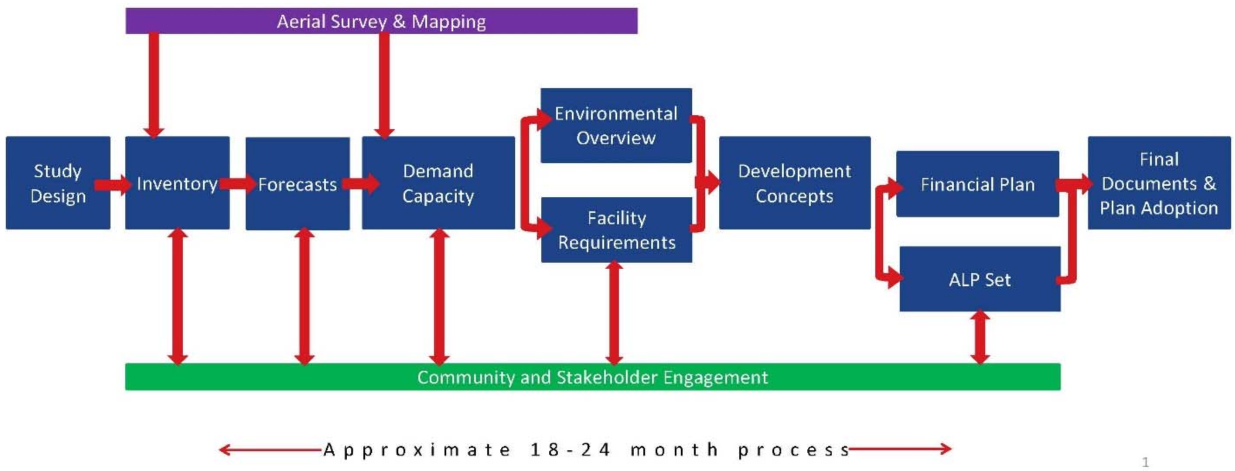
Source: DAY; Technical Advisory Committee; Passero Associates

1.4.2.5 TAC and RAC Survey Summary

Although the TAC and RAC surveys provided invaluable input, not all of the information will be explored in this master plan. However, similar input that both the TAC and RAC provided regarding airside and landside improvements around the Airport will be explored further in this master plan. Such as, airfield geometry and design deficiencies; identifying airfield infrastructure issues; utilizing existing airfield facilities such as the Emery Complex; and identifying areas for potential developments such as an on-site hotel. Furthermore, economic development opportunities for Airport-owned noise land will also be explored in this master plan.

1.4.3 Timeline and Master Plan Direction

In establishing the timeline for this master plan, the master plan was broken into key elements which are shown graphically below.



Although each master plan element includes deliverables, there are two key milestones that will occur in this project. The first milestone will occur after the completion of the forecast element where FAA approval is required to move forward with the rest of the master plan. The second milestone will occur at the end of the project where the FAA conditionally approves the Airport Layout Plan (ALP) after final review.

1.4.3.1 Master Direction

To help move through each element of this master plan, goals and objectives determined from interviews with DAY staff, the TAC and RAC will be explored. These include:

- Identifying the critical aircraft for each runway;
- Reviewing declared distances;
- Examining the overall airfield geometry, including the terminal apron area;
- Examining separation of Runway 18-36 from Runway 6R-24L;
- Examining the length of Runway 6L-24R;
- Examining the Runway Protection Zone and Roadway Alignments;
- Examining obstructions around the airport and maintaining clear instrument approaches;

- Examining cargo facilities;
- Examining the land use/economic development of Airport-owned noise lands;
- Examining existing airfield infrastructure to identify issues;
- Examining existing Airport facilities for re-use, such as the Emery Complex; and,
- Identifying potential areas for developments that can benefit the Airport and passengers such as an on-site hotel.

It should be noted that there may be other issues not listed above, but identified in the facility requirements section of this master plan that will also be explored.

Chapter 2:
Inventory of Existing Conditions

2.1 Inventory of Existing Conditions

An Airport Master Plan starts with collecting and evaluating baseline information relating to the Airport's property, facilities, services, tenants, access, and utilities. This information is vital in determining any expansions necessitated by the existing or anticipated future aeronautical demand.

Passero Associates performed an on-site airport inventory of DAY, and spoke to different stakeholders at the Airport as one of the initial tasks for this master plan. The information presented in this chapter is a culmination of interviews with Airport management/staff; information from the Ohio Department of Transportation (ODOT) and the Federal Aviation Administration (FAA).

2.2 Airport Background

James M Cox Dayton International Airport (referred to in this report as DAY or "the Airport") is a public-use commercial service airport serving the aviation needs of the City of Dayton, OH, and neighboring counties in southwestern Ohio. The Airport Sponsor, the City of Dayton, manages the approximate 924 acres of land the airport is on. There are three Fixed Based Operators (FBO) – Aviation Sales, Inc., Stevens Aviation and Wright Brothers, Aero, Inc. – that provide flight training, aircraft maintenance, aircraft rental, car rental, fueling and sales.

According to the latest FAA 5010, Airport Master Record, DAY has a field elevation of 1,009.1 feet above mean sea level (AMSL). DAY has three runways, denoted as Runways 6L-24R, 6R-24L and 18-36. Each runway has taxiways that provide access to various parts of the airport.

In 2019, approximately 892,000 passengers flew out of DAY. Since DAY is an origin/destination airport, no flight connectivity currently occur at the Airport. Concessionaires at DAY consist of various shops, and airlines currently serving DAY include: Allegiant, American Airlines, Delta and United. These concessionaires will be described in the sections below along with the airport location, role and previous funding that the airport has received.

2.2.1 Airport Location

Located in Montgomery County, the Airport is approximately 13 miles north of Downtown Dayton. The Airport is located off Terminal Drive, a dedicated road to the Airport, which is accessible via I-70 and I-75.

Figure 2-1 identifies the general location of DAY in Ohio, while **Figure 2-2** identifies the immediate area surrounding DAY.

Figure 2-1: DAY Airport Location Map

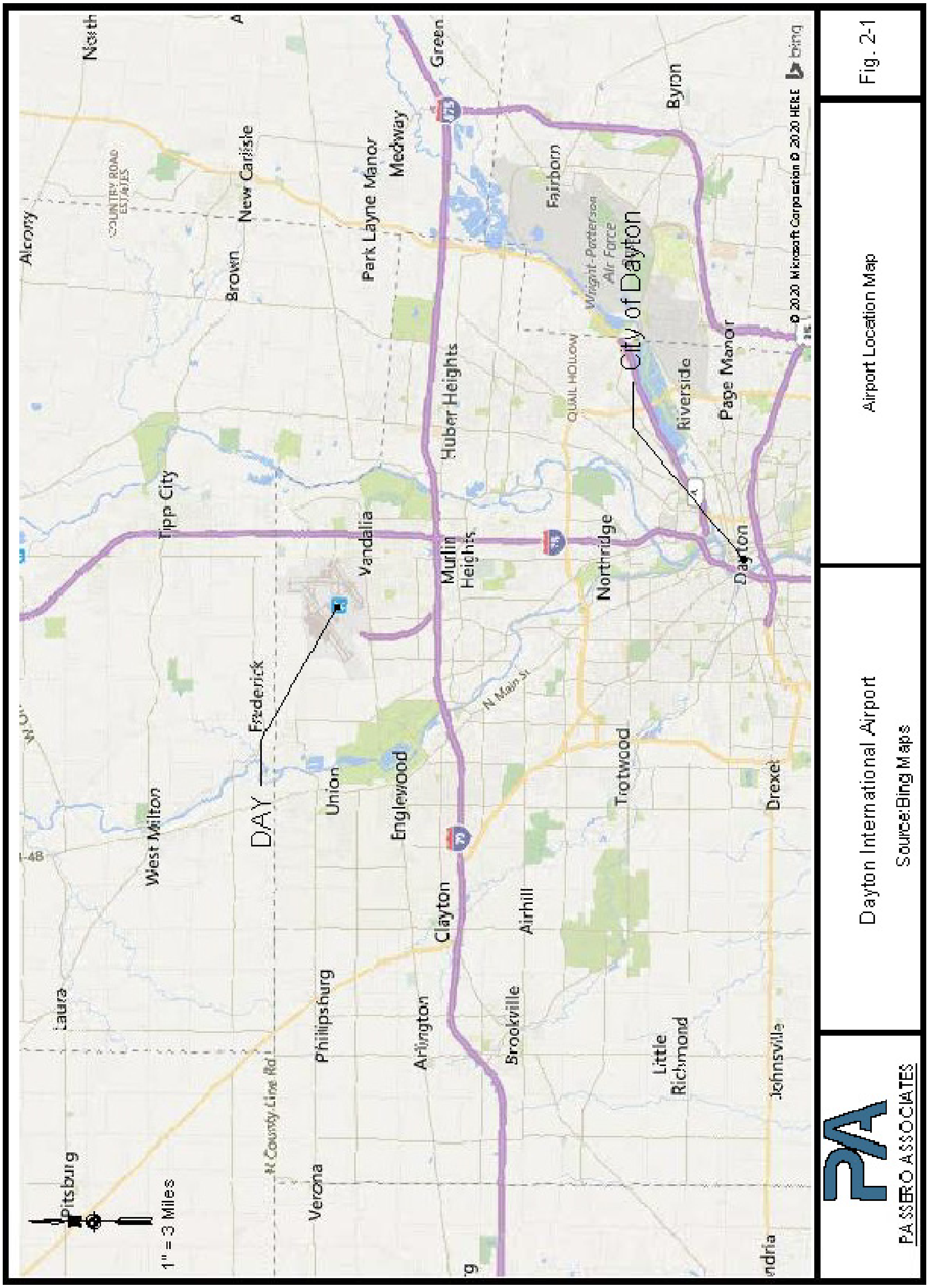


Figure 2-2: DAY Vicinity Map

2.2.2 Airport Business and Concessions

Airport Concessions at commercial service airports are what breathes life into these facilities.

DAY offers a variety of amenities and concessions for travelers. The Airport's interactive website does a good job of advertising airport amenities with three words – *"Dine, Relax, Shop"*. Because restaurants and shops are only two pieces of the airport concession pie, the other pieces that involves travel need to also be explained. Therefore, the following sections will describe the airport businesses and concessions that provide amenities to travelers, and also describe the concessions that accommodate air and ground travel.

2.2.2.1 Dine

There are various dining options at DAY for travelers who have time to grab a bite to eat or a cup of coffee. These options are Max & Erma's, MVP Bar & Grill, Quiznos, Starbucks, 12th Fairway Bar and Grill and Great American Bagel. At the highest rate of infection during the 2020 COVID-19 Pandemic, eating establishments at DAY were temporarily closed. As the infection rates decreased, the eating establishments reopened at limited capacity.

Below is a brief description of each dining establishment.

Max & Ermas

Max & Ermas is a family friendly chain restaurant that is in the main terminal, directly through the main security checkpoint. Hours of operation are typically from 5:00 am – approximately 7:30 pm.

MVP Bar & Grill

MVP Bar & Grill is a family friendly restaurant with a sports theme that is in Concourse B, adjacent to Quiznos. Hours of operation are typically from 5:00 am – approximately 7:30 pm.

Quiznos

Quiznos is a chain restaurant, in Concourse B, that features soups, salads, and oven-roasted sandwiches where patrons can create their own sandwiches with a variety of choices in bread, meats and veggies. Hours of operation are typically from 11:30 am – approximately 7:30 pm.

Starbucks

Starbucks is a chain coffee shop, in Concourse A, that provides a variety of caffeinated and non-caffeinated beverages. In addition, Starbucks also offers a variety of pastries, confections, sandwiches and salads. Hours of operation are typically from 4:30 am – approximately 7:30 pm.

12th Fairway Bar and Grill

12th Fairway Bar and Grill is a unique, family-friendly restaurant and bar in Concourse A. As indicative of the title, this restaurant carries out a golf theme where the walls feature murals of fairways and greens from golf courses in Dayton, Ohio. Hours of operation are typically from 5:00 am – approximately 7:30 pm.

The Great American Bagel

The Great American Bagel is an award-winning bagel bakery and deli with locations all over the U.S. It is located near the main security checkpoint. This restaurant provides bagel meals (e.g., bagel sandwiches), hot/cold caffeinated and decaffeinated beverages, soups, salads and sandwiches. Bagels are made fresh daily. Hours of operation are typically from 4:30 am – approximately 7:30 pm.

2.2.2.2 Relax

Airport travel can be tiring, so it is good for airports to provide amenities for travelers to help relieve stress. DAY offers various amenities for travelers who are military; who need to conduct business at the airport; or, for those who like to observe and learn more about the cultural arts scene in Dayton, Ohio.

A brief description of each of these amenities are included below.

Business Travelers Center

The Business Travelers Center (BTC) is a place where business travelers can conduct meetings. There is also a new café within the BTC – The Wright Stuff – where business travelers can enjoy a quick snack, meal or cocktail. The BTC is free to the public and provides business travelers with free WIFI, fax and copier service. The BTC is funded by the Dayton Chamber of Commerce. Typical hours of operation are Monday-Thursday 6:00 am to 7:00 pm, Friday 6:00 am to 6:00 pm, Saturday the BTC is closed; and, Sunday 12:00 pm to 6:00 pm. The BTC is past security adjacent to Heritage Booksellers, on the way to Concourse B.

U.S.O

The United Service Organizations (USO) is a private, nonprofit organization whose mission is to support the men and women in the armed forces with welfare and recreation-type services. At the DAY USO location, the amenities offered consist of food and beverages, multimedia and gaming, WIFI, and travel services and gifts. Typical hours of operation are 8:00 am – 6 pm daily. The U.S.O is located within the main terminal adjacent to ticketing, baggage claim and the Transportation Safety Agency (TSA), on the unsecured side of the Terminal.

2.2.2.3 Shop

Airport shops provide travelers with last-minute items that may have been forgotten, or items that make air travel more convenient. Some of these items include neck pillows, periodicals, soft drinks, etc. DAY has five shops that travelers can access prior to, or past security.

CNBC Express Kiosk

The CNBC Express Kiosk is located adjacent to baggage claim on the unsecured side of the terminal. It offers periodicals, magazines, books, snacks and beverages. The typical hours of operations vary for the CNBC Express Kiosk. These hours are listed below:

- Sunday: 9:00 am – 9:00 pm
- Monday: 9:00 am – 9:00 pm
- Tuesday: 9:00 am – 7:00 pm

- Wednesday: 9:00 am – 7:00 pm
- Thursday: 9:00 am – 7:00 pm
- Friday: 9:00 am – 9:00 pm
- Saturday: 10:00 am – 4:00 pm

CNBC Store

Similar to the CNBC Kiosk located adjacent to baggage claim, travelers can purchase periodicals, books snacks, magazines etc. in the CNBC Store. The difference, however, is the CNBC Store offers more items for travel (e.g., neck pillows) along with souvenirs. The CNBC news also streams live on TVs within the store. Typical hours of operation are 5:00 am – approximately 7:30 pm Monday through Sunday. The CNBC Store is located past security.

Heritage Booksellers

Heritage Booksellers provides travelers with a vast variety of books to choose from. This store also offers a "Read & Return" program where travelers can buy a book and return it within six months of purchase to receive 50% of their money back. This program is contingent on the condition of the returned book, where a returned book in good condition qualifies for the program and a book in poor condition is donated to local charity. Typical hours of operation are 5:00 am to approximately 7:30 pm. The shop is located past security, heading toward Concourse B. It should be noted that during the 2020 COVID-19 Pandemic, this establishment was temporarily closed.

Wright Stop Travelmart

Much like the CNBC stores, the Wright Stop Travelmart provides an assortment of periodicals, magazines and traveler convenience items. Travelmart is located past security next to Gate A16 and A18. The typical hours of operation are 5:00 am to approximately 7:30 pm. It should be noted that during the 2020 COVID-19 Pandemic, this establishment was temporarily closed.

Dayton Marketplace

The Dayton Marketplace is located past security adjacent to Gate B14. Much like the CNBC Stores, and the Wright Stop Travelmart, travelers can purchase periodicals, magazines and traveler convenience items. In addition to those items, travelers can also purchase souvenirs and gourmet foods. The typical hours of operation are 5:00 am to approximately 7:30 pm Monday through Sunday. It should be noted that during the 2020 COVID-19 Pandemic, this establishment was temporarily closed.

2.2.2.4 Fly

As mentioned earlier in this chapter, DAY has four airlines – Allegiant, American Airlines, Delta and United. At most airports in the U.S., airlines make up most of the market share for airport revenue. A brief synopsis of each of the four airlines will be described below. During the 2020 COVID-19 Pandemic, the flight schedules changed; however, for the purposes of this master plan, the airline destinations noted below are from the pre-pandemic schedules.

Allegiant Airlines

From DAY, passengers can travel to Tampa/St. Petersburg Florida, Fort Myers/Punta Gorda Florida, Daytona Beach Florida, and Sanford/Orlando Florida.

American Airlines

From DAY, passengers can fly to destinations around the U.S. through connections that American Airlines serves. These destinations include Chicago (Illinois), Washington D.C., Dallas/Fort Worth (Texas), New York City (New York), Philadelphia (Pennsylvania, and Charlotte (North Carolina). American Airlines also provides travel to destinations outside the U.S., including various countries in Asia, Europe and the Middle East.

Delta Airlines

Delta provides commercial flights in North America, including the U.S., and to destinations in Africa, Europe, the Middle East and Australia. From DAY, passengers can get direct flights to Minneapolis/St. Paul Minnesota, Detroit (Michigan) and Atlanta (Georgia). These are three of Delta's hub cities. Because DAY is an origin & Destination (O & D) airport, Delta has no connections throughout DAY. However, passengers can fly out of DAY and connect in any of the three hub cities to fly to other locations within the U.S., or anywhere else in the world.

United Airlines

United provides commercial flights in North America, including the U.S., and to destinations in Africa, Europe, the Middle East and Australia. From DAY, passengers can get direct flights to Chicago (Illinois), Denver (Colorado), Houston (Texas), and Washington, DC.

2.2.3 Airport Role

Airports play several roles on scales ranging from local to national. To fill their roles, airports apply for grants that allow them to continue supporting the local, state, regional, and national communities.

2.2.3.1 DAY Role in Ohio

The Ohio Department of Transportation (ODOT) establishes roles for each public-use airport in Ohio. DAY is classified as an **"Air Carrier"** airport. The ODOT System Plan classifies air carrier airport roles as airports that are intended to support commercial airline activities. Furthermore, if there are no capacity constraints, air carrier airports can also support all types of general aviation activities.

2.2.3.2 DAY Role Nationally

Under the Airport and Airways Improvement Act, the Secretary of Transportation is required to publish a national plan for the development of public-use airports. This plan is published as the National Plan of Integrated Airport Systems (NPIAS) and includes all commercial service, reliever (high-capacity general aviation airports in metropolitan areas) and select general aviation airports.

The 2019 NPIAS report covers approximately 3,330 existing and proposed airports that are included in the national airport system, classifying four categories – Commercial Service(Large Hub, Medium Hub, Small Hub, Nonhub, Nonprimary Commercial Service, Nonhub), Reliever Airport and General Aviation Airport. DAY's category is classified as a **"Commercial Service-Primary"** airport in the NPIAS. Based on the Airport

Improvement Program (AIP) handbook, Commercial Service-Primary airports are publicly owned airports that have more than 10,000 passenger enplanements each calendar year and receive scheduled passenger service, thereby eligible for grant funding under the AIP program.

2.2.4 Previous Airport Grants

Appendix C contains DAY's grant history for the past 10 years. This information serves as a historical guideline for major investment at the airport, and baseline for future development eligibility.

2.3 Airport Development Areas

As a part of this Master Plan, each part of the Airport is broken up into separate areas. This will be useful when describing different areas of the airport during the future development phase of this Master Plan. **Figure 2-3A** identifies each of these areas, and a brief description for each is included in the following sections.

2.3.1 Airport Operating Area (AOA)

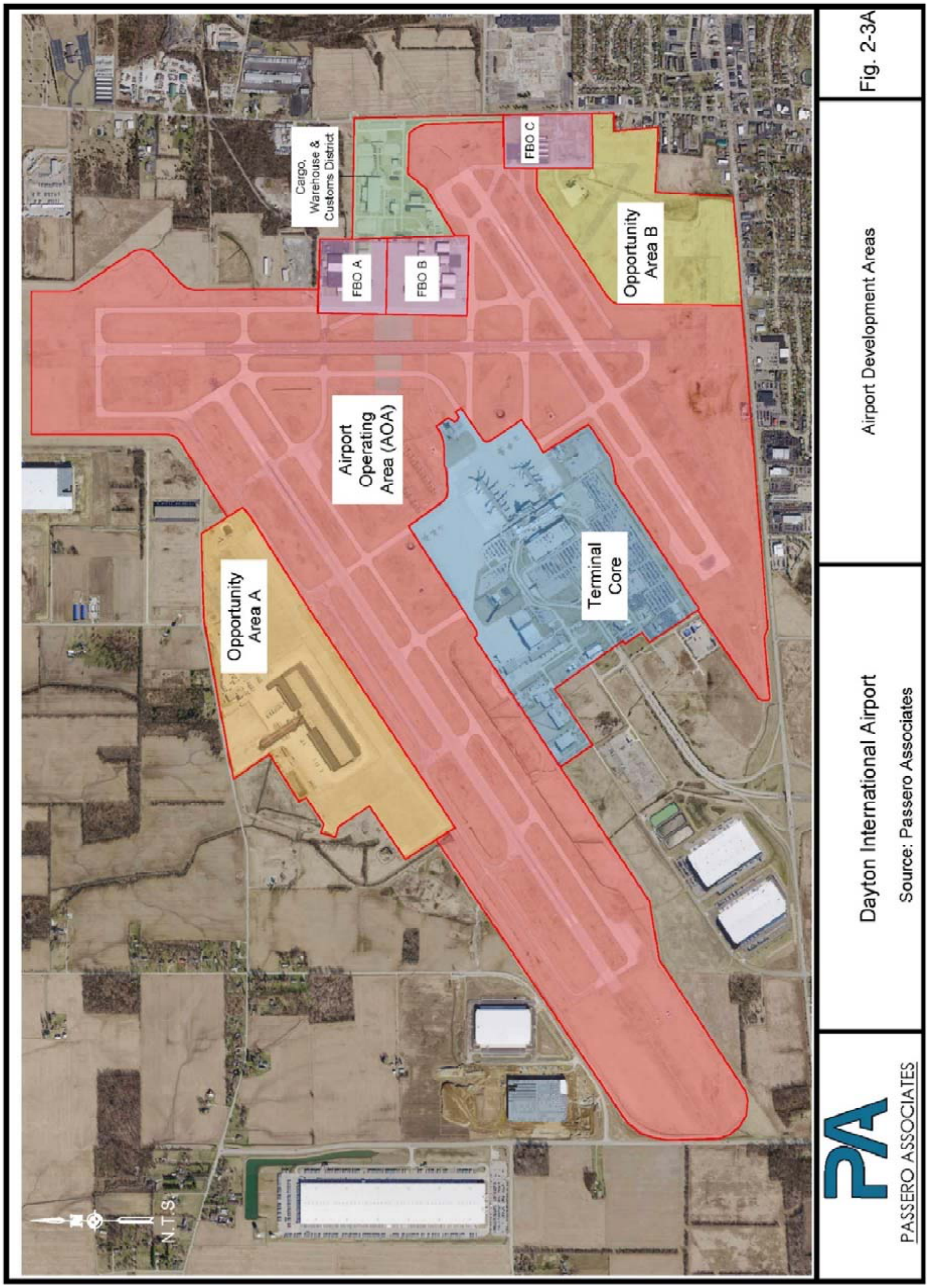
The Airport Operating Area (AOA) at DAY consists of the runway and taxiway environments along with their associated critical areas, which are crucial for landing, takeoff and taxiing. Each of the taxiways are described in greater detail in the sections that follow.

Regarding the critical areas surrounding the runway, the Runway Safety Area (RSA) can reduce the risk of damage to an aircraft in the event of an overshoot, undershoot or excursion from the runways. The Runway Object Free Area (ROFA) is the area that must be kept free of objects, except for acceptable navigational equipment needed for air navigation or aircraft ground maneuvering purposes. The AOA also includes the Runway Protection Zone (RPZ) which is an area at ground level prior to the threshold or beyond runway. The purpose of the RPZ is to enhance the safety and protection of people and property on the ground.

2.3.2 Terminal Core

This area includes the commercial passenger terminal, public/employee parking, rental car services, and airport entrance roads. In addition, airport facilities such as the Air Traffic Control Tower (ATCT), deicing facilities and the Air Rescue and Fire Fighting (ARFF) station are included in this area.

Figure 2-3: Airport Development Areas



2.3.3 FBO Area A

The General Aviation (GA) Area A includes the FBO Wright Bros. Aero, Inc. and a portion of apron for GA and transient parking. There are also maintenance and box hangars in this area.

2.3.4 FBO Area B

The GA Area B includes the second FBO – Stevens Aviation, Inc. – which shares apron space with Wright Bros. Aero Inc. A portion of the apron is used for GA and transient parking. There are also maintenance and box hangars in this area.

2.3.5 FBO Area C

The GA Area C includes the third FBO Aviation Sales, Inc. There are four t-hangars and one corporate/maintenance hangar in this area. There is also apron space available for GA and transient parking.

2.3.6 Opportunity Areas

These areas either consist of open space that is available for development, or vacant buildings that are prime for development opportunities. Although two areas were identified for potential development, other areas may also be identified later on in this master plan.

2.3.7 Cargo, Warehouse and Customs District

This area is just east of the FBO Areas A and B. Delta Cargo, the U.S. Customs facility, and other warehouses are in this area.

2.4 Previous and On-Going Studies

To support the effort of updating the DAY Airport Master Plan and ALP drawings, previous studies and reports relating to the Airport and adjacent properties were referenced.

The following sections identify and discuss the most substantive elements of previous studies and reports in regard to the Airport's Master Plan.

2.4.1 2008 Airport Master Plan Update

The 2008 DAY Airport Master Plan identified the need to assess the demand for airport services in the growing population of City of Dayton, OH and Montgomery County. The primary goals were to identify the needs of the Airport; construct a new ATCT and conduct a siting study; conduct a runway length analysis; conduct a feasibility study for the potential relocation of Runway 18-36; RSA alternatives analysis for Runway 6R-24L; alternative Runway 6R-24L extension analysis; and, update the aviation activity forecast.

2.4.2 Commercial Development Areas

The 2008 master plan identified several areas adjacent to DAY that could foster development conducive to the Airport. Below is a breakdown of each area along with any lands **that have been released** from airport property since the 2008 master plan, as shown in **Figure 2-3B**. These lands will be described further in the sections below. Please note that development initiatives for the commercial development opportunity areas will be analyzed and determined in the facility requirement and alternative phases of this master plan.

2.4.2.1 Commercial Development Opportunity Areas

Since the 2008 master plan, the Sponsor acquired and converted noise land (i.e., land within the 65+ Day-Night Average Sound Level range, or dNL) into land for commercial development. It should be noted that any land acquired through an Airport Improvement Program (AIP) land grant that will be used for non-aeronautical purposes must be released of Federal obligation for aeronautical use.

Table 2-1 Provides a breakdown of each area of land identified for commercial development.

Table 2-1. Commercial Development Area Breakdown

Commercial Development Areas	Location	Total Acreage Acquired Land for Development	Utilities	Ground Access	dNL Noise Level
Commercial Development Area A	West of AOA Area	471.27	None	W. National Rd., Frederick Pike Rd., Martindale Rd.	75, 70
Commercial Development Area B	North of Opportunity Area A	48.47	None	Peters Pike	65, 60
Commercial Development Area C	East of AOA Area	29.00	None	N Dixie Dr., Frost Rd.	65

Source: Passero Associates; DAY Noise Land Re-Use Plan

2.4.2.2 Parcels Released since 2008 Master Plan

With the acquisition of noise land, the Sponsor also released noise land through exchanges, or sales.

Table 2-2 provides a breakdown of each noise land parcel released since 2008.

Table 2-2. Breakdown of Noise Land that have been Released Since 2008 Master Plan

Released Noise Land Areas	Location	Total Acreage Acquired Land for Development	Utilities	Nearest Ground Access	Noise dNL
Release Area A	Northwest of AOA Area	158.69	Yes	Jackson Rd. Industrial Ln., Dog Leg Rd.	75, 70
Release Area B	North of Opportunity Area A	211.22	Partial	Peters Pike, Lightner Blvd., Ginghamsburg-Frederick Rd.	65, 60
Release Area C	East of AOA Area	11.35	None	S. CR-25A	65

Source: Passero Associates; DAY Noise Land Re-Use Plan

2.4.3 The City of Vandalia Comprehensive Plan

Although DAY is located in the City of Dayton, the Airport borders the City of Vandalia. Vandalia's comprehensive plan stated that the decisions of the airport may affect the direction of the future land use plan and National Road corridor. Because of this, the development alternatives analysis in this Master Plan will reference the future development alternatives from the Vandalia Comprehensive Plan.

2.4.4 2040 Long Range Transportation Plan: Miami Valley

The Miami Valley Regional Planning Commission (MVRPC) is the regional planning commission for Darke, Greene, Miami, Montgomery, Preble, and northern Warren Counties in west-central Ohio. As such, the MVRPC is responsible for developing, implementing and updating transportation plans for the region. The most recent plan was updated in 2006.

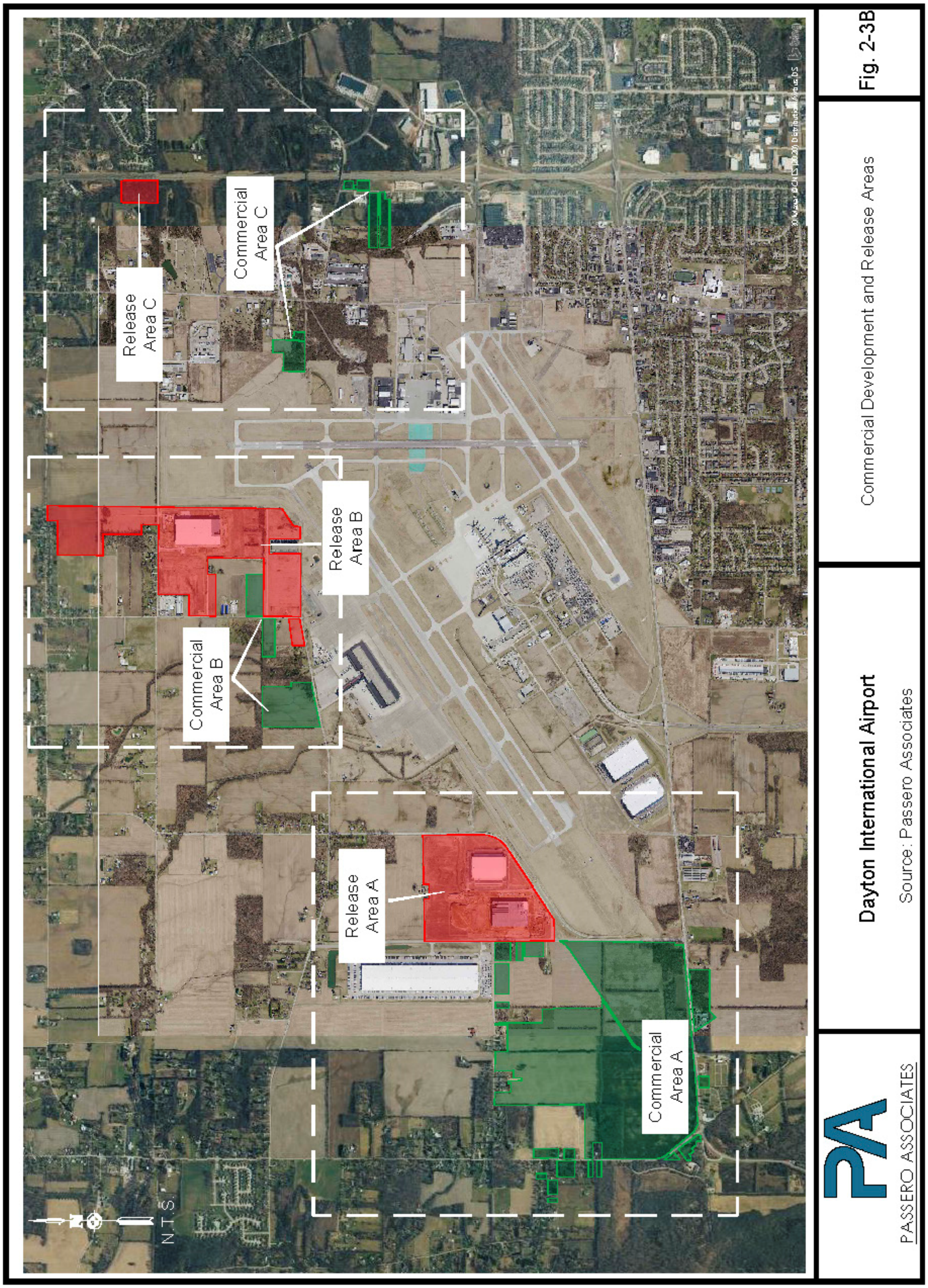
Regarding DAY, future transportation initiatives adjacent to the airport include:

- **I-70 Widening in Montgomery County** – This project has various phases and entailed constructing a third lane on I-70 to address capacity needs. Specific to DAY, the widening on I-70 was underway between S.R. 48 and Airport Access Road in 2016.

- **US Logistics Improvements** – The purpose of this project was to improve US 40 from Airpark Boulevard to Peters Pike Road with a five-lane cross section. Furthermore, this project proposed improvements at the interchange at Airport Access Road and US 40.

  This project was under construction during the time this master plan was completed.

Figure 2-3B: Commercial Development and Release Areas



- **Multi-Modal Rail Extension** – This is a multi-phase project to connect the CSXT mainline to DAY. More specifically, Phase II of this project included the construction of the new track from I-75 bridge travelling west to the eastern property boundary of DAY.

  This project is on hold during the time this master plan was completed.

- **Old National Road Trail** – This project proposes constructing a bikeway parallel to US 40 from Frederick Pike Rd. to the Taylorsville Dam (Great Miami Trail), and through DAY's property boundary and the City of Vandalia.

2.5 Climate

The climatic conditions commonly experienced at an airport can play a large role in the layout and usage of the facilities. Weather patterns characterized by periods of low visibility and cloud ceilings often lower the capacity of an airfield, and wind direction and velocity dictate runway usage.

2.5.1 Wind

Weather reporting equipment in airports generally can either be an Automated Weather Observing Systems (AWOS) or an Automated Surface Observing Systems (ASOS). Both can be used to measure cloud cover and ceiling, visibility, wind speed and direction, temperature, dew point, precipitation accumulation, icing (freezing rain), sea level pressure for altimeter setting, and to detect lighting.
Currently, DAY has an ASOS located on-site. The orientation of runways for takeoff and landing operations is primarily a function of prevailing winds taken together with the ability of aircraft fleet. The most desirable runway configuration will provide the largest wind coverage for a given maximum crosswind component. The crosswind component is the vector of wind velocity and direction, which acts at a right angle to the runway. Furthermore, runway wind coverage is the percentage of time in which operations can safely occur because of acceptable crosswind components. The FAA has set the criterion for desirable wind coverage for a runway system at 95% based on different allowable crosswind components based on the runway design code (RDC) for each runway with: 10.5 knots (12 mph) for small aircraft categorized as A-I and B-I; 13 knots (15 mph) for A-II and B-II; 16 knots (18 mph) for A-III and B-III and C-I through D-III; and, 20 knots (23 mph) for A-IV through D-IV. If 95 percent wind coverage is not provided for the maximum crosswind component for the design aircraft, then the addition of a crosswind runway should be considered. Ten years of data was obtained from the National Climatic Data Center for 2010-2019.

Table 2-3 depicts wind coverage for each runway individually, and then combined, for varying wind speeds. As depicted, Runways 6-24 and 18-36 provide at least 95% wind coverage for all crosswind component speeds, except IFR weather at 10.5 knots.

Table 2-3. Percent Wind Coverage

All Weather				
Runway	**10.5 kt**	**13 kt**	**16 kt**	**20 kt**
Runway 6-24 (Both Runways)	88.6%	94.19%	98.36%	99.66%
Runway 18-36	85.97%	91.56%	96.6%	98.94%
All Runways	**95.19%**	**98.19%**	**99.49%**	**99.93%**
IFR Weather (Ceiling between 250 feet and 1000 feet; Visibility between 3/4 and 3 Statute Miles)				
Runway	**10.5 kt**	**13 kt**	**16 kt**	**20 kt**
Runway 6-24 (Both Runways)	83.3%	90.91%	96.89%	99.22%
Runway 18-36	84.93%	91%	96.31%	98.68%
All Runways	**93.23%**	**97.27%**	**99.09%**	**99.82%**
VFR Weather (Ceiling > 1000 feet; Visibility > 3 Statute Miles)				
Runway	**10.5 kt**	**13 kt**	**16 kt**	**20 kt**
Runway 6-24 (Both Runways)	89.37%	94.67%	98.57%	99.73%
Runway 18-36	85.95%	91.52%	96.57%	98.96%
All Runways	**95.41%**	**98.29%**	**99.54%**	**99.94%**

Source: National Climatic Data Center, 2010-2019, DAY, Wind coverage calculated from FAA AGIS wind rose generator

2.5.2 Mean Max Temperature

Meteorological data was obtained through the National Climatic Data Center (NCDC) consisting of 10 years of hourly observation and environmental conditions as reported by the Automated Surface Observing System (ASOS) located at DAY. This data was analyzed to explore ceiling, visibility, and wind conditions at the Airport.

For the Dayton, Ohio area around DAY, the mean max temperature is 84.8° F with the average hottest month being in July.

Precipitation

Much like the mean max temperature discussed in the previous section, the NCDC records precipitation annually. For areas around DAY, the months with the heaviest precipitation was March, April, September, October and November. During this time, the average precipitation ranged from 1.8 to 2.8 inches.

Appendix D provides a more comprehensive analysis of typical meteorological conditions in the area.

2.6 Existing Aviation Facilities

The airside components generally consist of movement of aircraft particularly the runway and taxiway environment. Airport related facilities are divided into two types – airside and landside. The documentation of existing facilities is needed for future sections of this master plan.

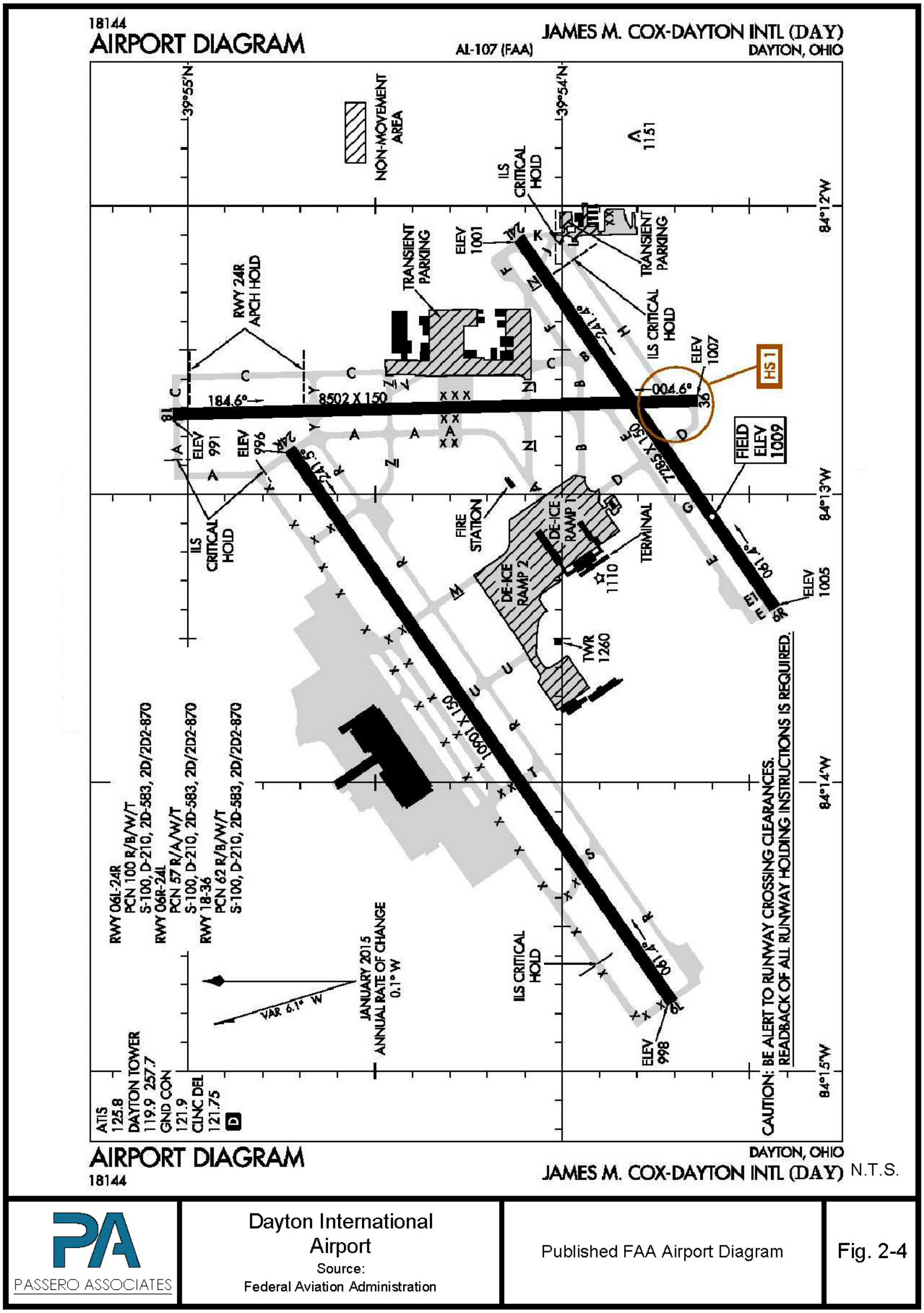
2.6.1 Airside Facilities

This section presents the existing airside components at DAY, which helps the Sponsor compare where the Airport currently is to where the Airport may be in the future based on forecasts. The airside components generally consist of:

- Runway(s)
- Taxiway(s)
- Apron(s)
- Pavement Management Study
- Pavement Markings
- Airfield Electrical Vault
- Airfield lighting
- Airfield signage
- Visual and nonvisual takeoff and landings aids
- Airfield/Airspace
- Existing instrument approaches

Figure 2-4 depicts the published FAA Airport Diagram for all airside facilities at DAY.

Figure 2-4: Published FAA Airport Diagram (DAY)



2.6.1.1 Runways

DAY currently has three runways, denoted as Runways 6L-24R, 6R-24L and 18-36 which measure 10,901 feet x 150 feet, 7,285 feet x 150 feet and 8,502 feet x 150 feet, respectively. According to the FAA 5010, Runway 6L-24R is made from both asphalt and concrete. Runway 6R-24L is made from asphalt. Runway 18-36 is made from asphalt.

There are no documented threshold displacements to the runways.

Existing latitude, longitude and mean sea level (MSL) elevations for all four runway ends at DAY are detailed in **Table 2-4.**

Table 2-4: Existing Runway End and Threshold Coordinates and Elevations

	RUNWAY 6L END	RUNWAY 24R END	RUNWAY 6R END	RUNWAY 24L END	RUNWAY 18 END	RUNWAY 36 END
LAT.	39° 53' 42.39" N	39° 54' 43.65" N	39° 53' 25.99" N	39° 54' 6.91" N	39° 55' 2.35" N	39° 53' 38.37" N
LONG.	84° 14' 45.66" W	84° 12' 50.61" W	84° 13' 23.65" W	84° 12' 6.76" W	84° 12' 43.38" W	84° 12' 40.56" W
ELEV.	997.9’ (MSL)	995.6' (MSL)	1,005' (MSL)	1,001.1' (MSL)	990.7' (MSL)	1,007.2' (MSL)

Source: Woolpert

Magnetic Declination

Magnetic declination, sometimes called magnetic variation, is the angle between magnetic north and true north. This angle varies relative to one's position on the earth's surface and changes over time. Current magnetic declination information was obtained from the National Geodetic Survey (NGS).

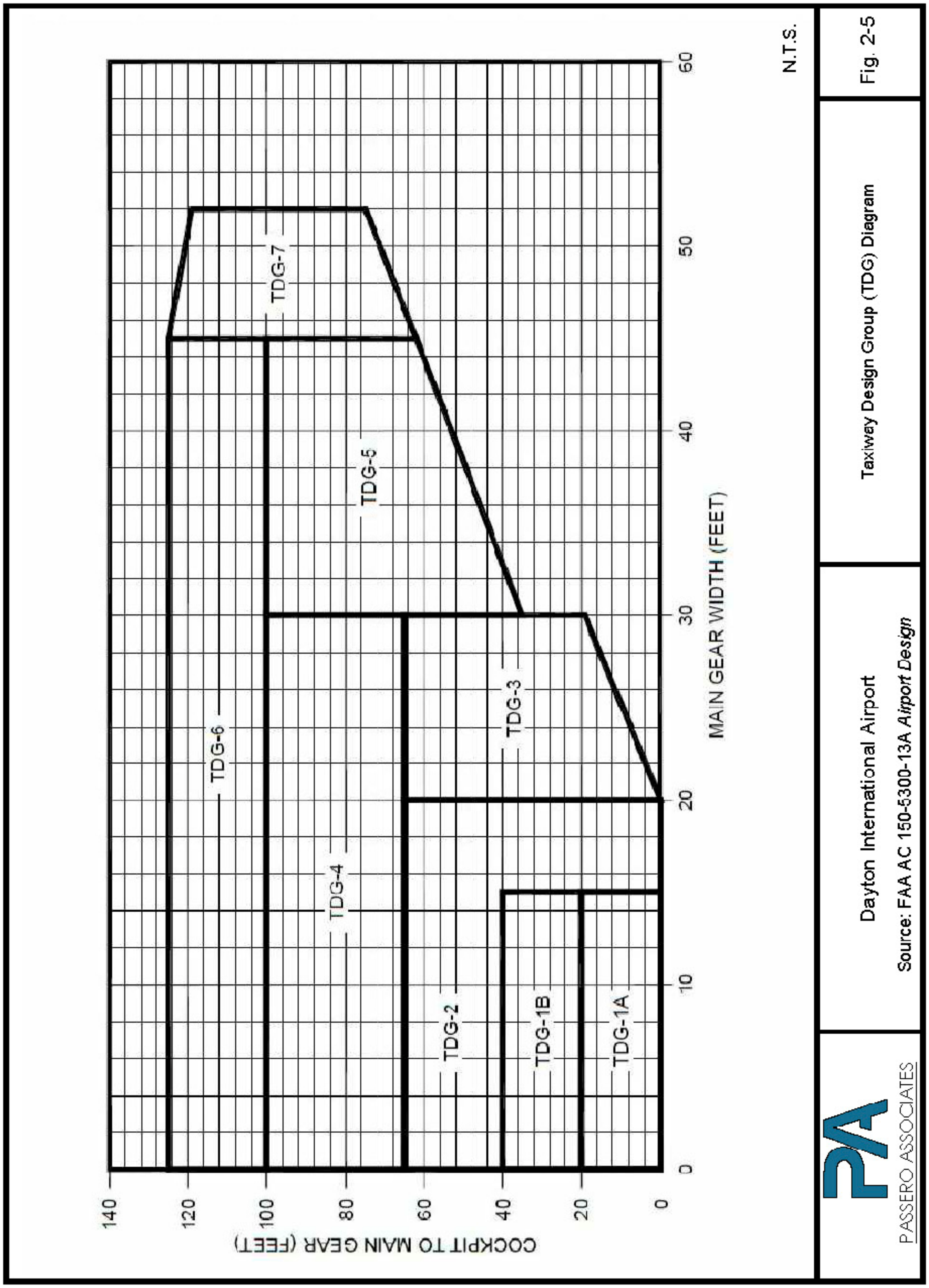
Magnetic Declination = 6° 16' W ± 0° 23' changing by 0° 2' W per year

Magnetic declination for the DAY area was calculated to be 6° 16' W ± 0° 23’ changing by 0° 2' west per year. Being that airport runways are designated based on a magnetic bearing to the nearest unit of 10, this information will be used in subsequent chapters to validate the accuracy of the current runway designations at DAY or determine which runway designations are most appropriate for the airfield throughout the planning period.

2.6.1.2 Taxiways

This section provides detailed information on the taxiway and taxilane system at DAY. Unlike runways, taxiway geometry standards are based on Taxiway Design Group (TDG) of the critical aircraft. As shown in **Figure 2-5**, TDG is determined by the critical aircraft’s main gear width, and nose to main gear length. Taxiway protection, separation and wingtip clearance is based on the Airplane Design Group (ADG). Please note that an assessment of safety areas and geometries will be included in the facility requirements section of the master plan. The following section will succinctly describe each taxiway at DAY.

Figure 2-5: Taxiway Design Group (TDG) Diagram



Taxiway A

Taxiway A intersects with Taxiways N, Z, R and Y and provides direct access to Runways 24R and 18 from the Terminal Area. This taxiway also provides indirect access to Runways 6L via Taxiway R. Taxiway A measures 75 feet in width. There are Instrument Landing System (ILS) hold lines prior to Runways 18 and 24R where aircraft will hold while the ILS on both runways are active. Taxiway A is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway B

Taxiway B crosses Runway 18-36, and intersects with Taxiways C and F before ending at Runway 6R-24L. This taxiway provides access to the transient apron via Taxiway C. Furthermore, Taxiway B provides indirect access to Runway 18, via Taxiway C. Taxiway B measures 75 feet in width. Taxiway B is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway C

Taxiway C branches off of Taxiways B and F and continues north connecting directly to the FBO transient parking aprons and Runway 18. Taxiway C measures 75 feet in width. Taxiway C is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway D

Taxiway D extends southeast from the Main Terminal area, crossing Taxiway E and Runway 6R-24L, and to the Runway 36 end. Although Taxiway D provides the necessary direct connection to Runway 36, aircraft taxiing from toward Taxiway H occasionally miss the turn and accidentally enter Runway 6R-24L. This discrepancy has caused the FAA to document this areas as a Hotspot (i.e., HS 1). Mitigation measures for this documented hotspot will be analyzed further in later chapters of this Master Plan. Taxiway D measures 75 feet in width. Taxiway D is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway E

Taxiway E is a partial parallel taxiway that connects to Runway 6R, crosses Taxiway D and connects to Runway 18-36. Therefore, pilots taxiing from the Main Terminal area can access Runway 6R via Taxiways D and E. Taxiway E measures 75 feet wide. There is a run-up pad off Taxiway E, adjacent to Taxiway E1 and Runway 6R. Furthermore, there is one Taxiway connector (i.e., Taxiway E1) just northeast of Runway 6R. Taxiway E1 measures approximately 90 feet wide. Taxiway E and E1 are equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway F

Taxiway F is a partial parallel taxiway that connects to Runway 24L. To access Taxiway F from the commercial airline services terminal, aircraft needs to travel on Taxiway B until a connection can be made with Taxiway F. Taxiway F measures 75 feet wide. There is a run-up pad off Taxiway F, adjacent to Runway 24L. Taxiway F is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway G

Taxiway G is a connector taxiway between Taxiway E to Runway 6R-24L. Taxiway G measures 90 feet wide. Taxiway G is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway H

Taxiway H is a partial parallel taxiway on the southside of Runway 6R-24L, connecting from Runway 18-36 to the FBO transient parking apron, near Runway 24L. Furthermore, Taxiway H intersects with Taxiways J, K and L before indirectly connecting to Runway 24L via Taxiway K. Taxiway H measures 65 feet wide. There is an Instrument Landing System (ILS) hold position on Taxiway H in which aircraft are required to hold while the ILS is active for Runways 24L and 36. Taxiway H is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway J

Taxiway J connects the FBO transient parking area to Taxiways H and K, and Runway 6R-24L. Taxiway J measures 75 feet wide. Taxiway J is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway K

Taxiway K intersects with Taxiway H and provides access to Runway 24L. Taxiway K measures 65 feet wide. Taxiway K is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway L

Taxiway L connects the FBO transient parking apron to Taxiway H and provides access to Runway 24L. Taxiway L measures 75 feet wide. Taxiway L is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway M

Taxiway M provides access from the Main Terminal Area to Runway 6L-24R crossing over Taxiway R. Taxiway M measures 75 feet wide. Taxiway M is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway N

Taxiway N branches off of Taxiway A and connects the Main Terminal Area with the Transient Parking Area. Taxiway N measures 75 feet wide. Taxiway N is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway R

Taxiway R is a full parallel taxiway to Runway 6L-24R on the southside of the Runway. Aircraft going and coming from the Main Terminal Area can access Taxiway R via Taxiways U and M. Taxiway R also intersects with Taxiways Z, and Y. There are two run-up aprons off Taxiway R in which one apron is adjacent to Runway 6L, and the second bisects Taxiways R and Z. Taxiway R measures 75 feet wide. Taxiway R is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway S

Taxiway S is a taxiway connector that connects Taxiway R with Runway 6L-24R. Taxiway S measures approximately 100 feet wide. Taxiway S is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway T
Taxiway T is a taxiway connector that connects Taxiway R with Runway 6L-24R. Taxiway T measures approximately 100 feet wide. Taxiway T is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway U
Taxiway U provides access from the commercial airline services terminal, to Runway 6L-24R, and cross over to Taxiway R. Taxiway U measures approximately 100 feet wide near Taxiway R, and 75 feet wide near the commercial airline services terminal. Taxiway U is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway V
Taxiway V branches off Taxiway Z and connects to the FBO transient apron. Taxiway V measures approximately 72 feet wide. Taxiway V is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway W
The closed Taxiway W pavement connects to both ends of Runway 6L-24R, and Taxiway A. Taxiway W was the primary taxiing route on and off the former Emery site to Runway 6L-24R and the rest of the airport. Taxiway W closed indefinitely around 2012; however, the previous ALP recommended re-opening Taxiway W to service a potential development area on the east side of the airfield.

Taxiway Y
Taxiway Y connects Taxiway R, A and C to Runways 6L-24R and 18-36 from the Main Terminal and Transient Apron areas. Taxiway Y measures approximately 90 feet wide. Taxiway Y is equipped with Medium Intensity Taxiway Lights (MITLs).

Taxiway Z
Taxiway Z branches off Taxiway R. Taxiway Z measures approximately 75 feet wide. Taxiway Z is equipped with Medium Intensity Taxiway Lights (MITLs).

2.6.1.3 Aprons
This section provides details on the aprons at DAY. Parking aprons, also referred to as ramps, are areas that are typically located in the non-movement area of an airport, and near or adjacent to the terminal area. The purpose of an apron is to accommodate aircraft during loading and unloading of passengers and cargo. In addition, services such as fueling, maintenance and short/long-term aircraft parking take place on aprons. At DAY, there are three active parking apron areas. These areas are, the commercial service apron area, FedEx apron area, and FBO Apron Area (FBO Apron 1, FBO Apron 2 and FBO Apron 3). These apron areas are depicted in **Figure 2-6**, and are explained in greater detail below.

Commercial Passenger Terminal Apron Area
The commercial passenger terminal apron measures approximately 272,572 Square Yards (SY), and is centrally located on the airfield. This includes all pavement for aircraft parking and taxilanes. As depicted in **Figure 2-7**, the commercial passenger terminal apron is broken down into four areas. These areas include the air carrier enplanement/deplanement area, deicing area 1 and deicing area 2 and two Remain Overnight (RON) apron areas.

Figure 2-6: Overall Apron Area Map at DAY

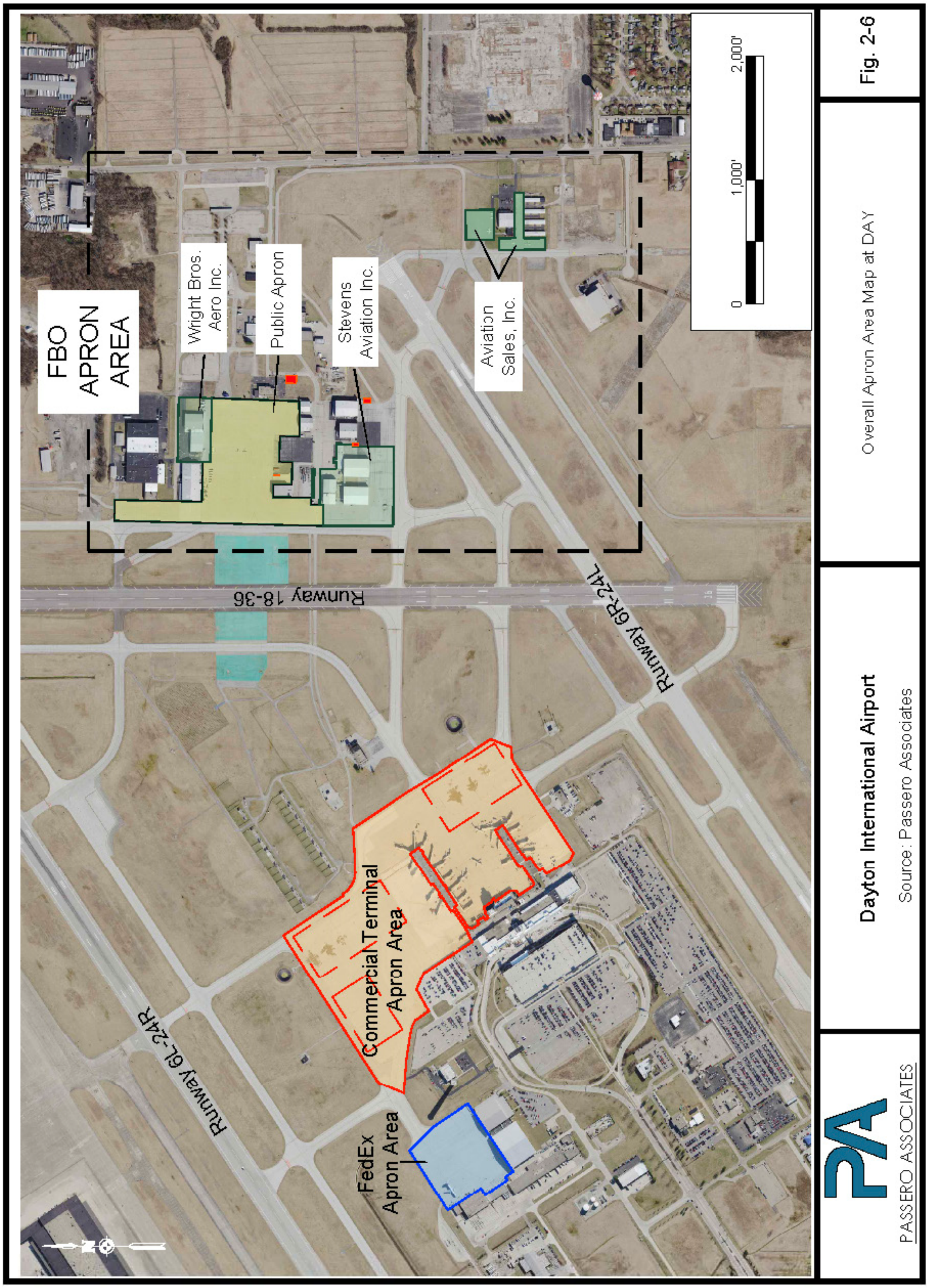
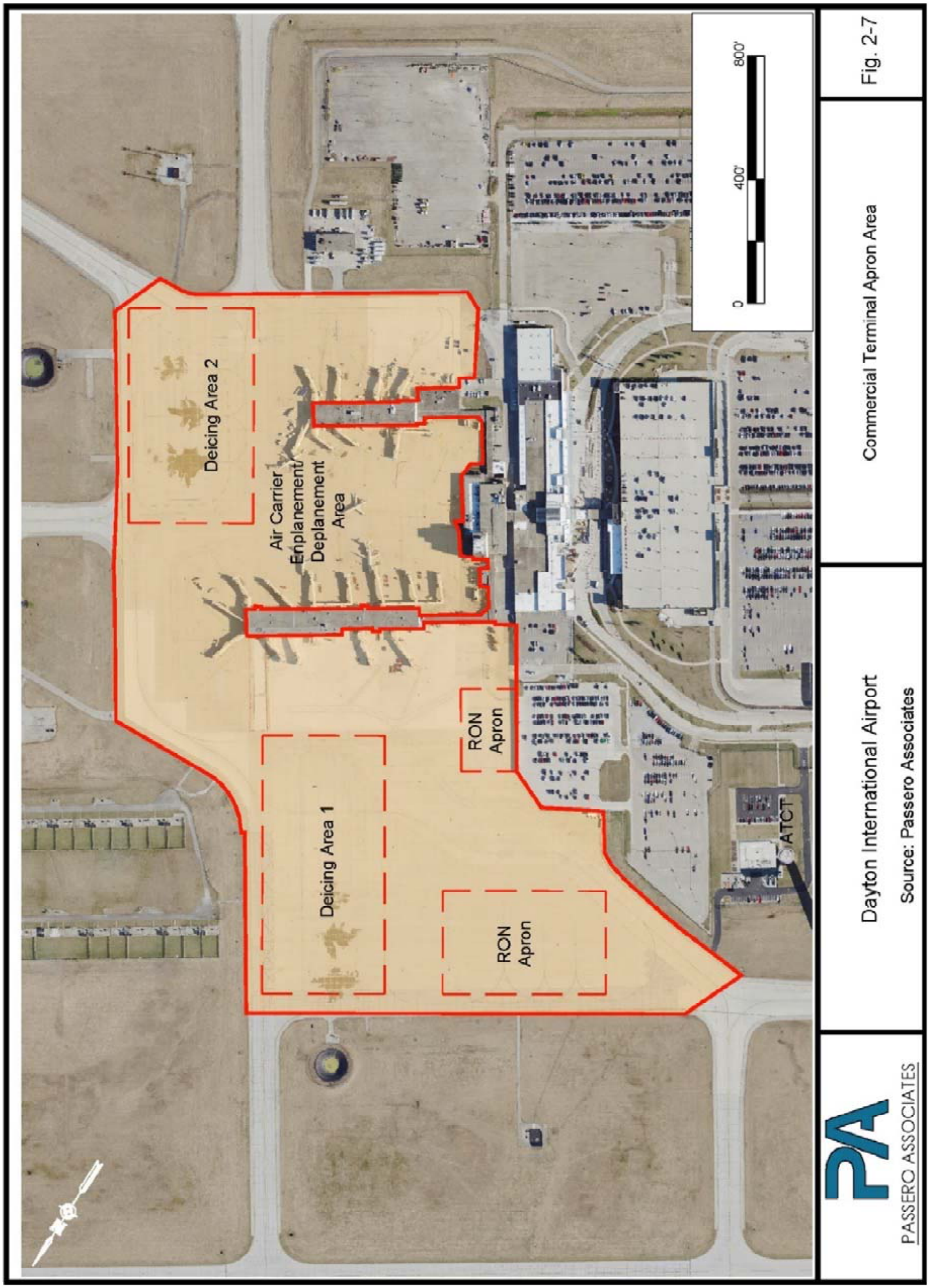


Figure 2-7: Commercial Passenger Terminal Apron Area



FedEx Apron Area

The FedEx apron is located southwest of Taxiway U, and west of the commercial passenger terminal. The FedEx apron measures approximately 40,643 SY, and is depicted in **Figure 2-8**.

FBO Apron 1 – Wright Brothers Aero Inc.

As depicted in **Figure 2-9**, the Wright Brothers Aero Inc. apron area measures approximately 141,052 SY. Wright Brothers Aero Inc. shares the central apron with Stevens Aviation Inc. There are six staging positions for fuel trucks on this apron. This apron is located east of Taxiway C.

FBO Apron 2 – Stevens Aviation, Inc.

Figure 2-10 depicts the apron area for Stevens Aviation, Inc. As stated above, Stevens Aviation Inc. shares the central apron space with Wright Brothers, Aero Inc. This apron is located east of Taxiway C, and south of the Wright Brother, Aero Inc. facilities.

FBO Apron 3 – Aviation Sales, Inc.

As depicted in **Figure 2-11**, the Aviation Sales, Inc. apron area measures approximately 3,725 SY Aviation Sales, Inc. also has five hangars (One clearspan hangar, and four t-hangars) in this area for aircraft parking. This apron is located east of Taxiway K.

Private Apron

As depicted in **Figure 2-11**, the transient apron area is located north of Aviation Sales, Inc. This apron measures approximately 6,343 SY. Besides aircraft parking, fueling operations also occur on this apron. This apron Is located east of Taxiway K, and is directly north of Aviation Sales, Inc. facilities.

2.6.1.4 Pavement Management Study

A pavement management study was undertaken as part of this master plan to determine the pavement conditions. This independent study identifies the Pavement Condition Index (PCI) which is helpful in the future expenditure planning for capital improvements. The PCI is used to assess the overall condition of the pavement with an index between 0 (Failed pavement condition) and 100 (Good pavement condition). The condition of all pavement at DAY is provided by PCI values, and illustrated in **Figure 2-12**.

Figure 2-8: FedEx Apron Area

Figure 2-9: FBO Apron 1: Wright Brothers, Aero Inc.

Figure 2-10: FBO Apron 2: Stevens Aviation, Inc.

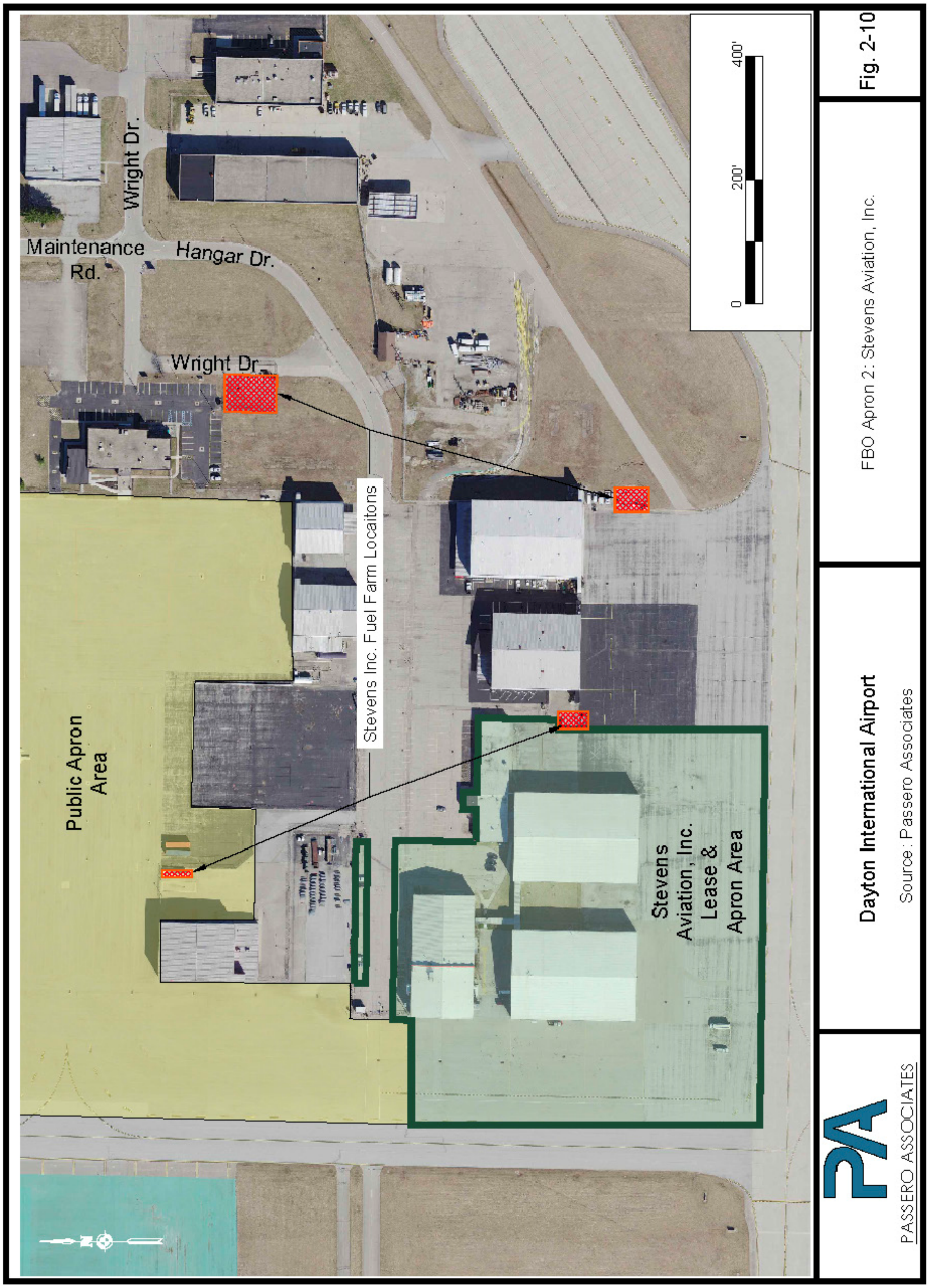


Figure 2-11: FBO Apron 3: Aviation Sales, Inc.

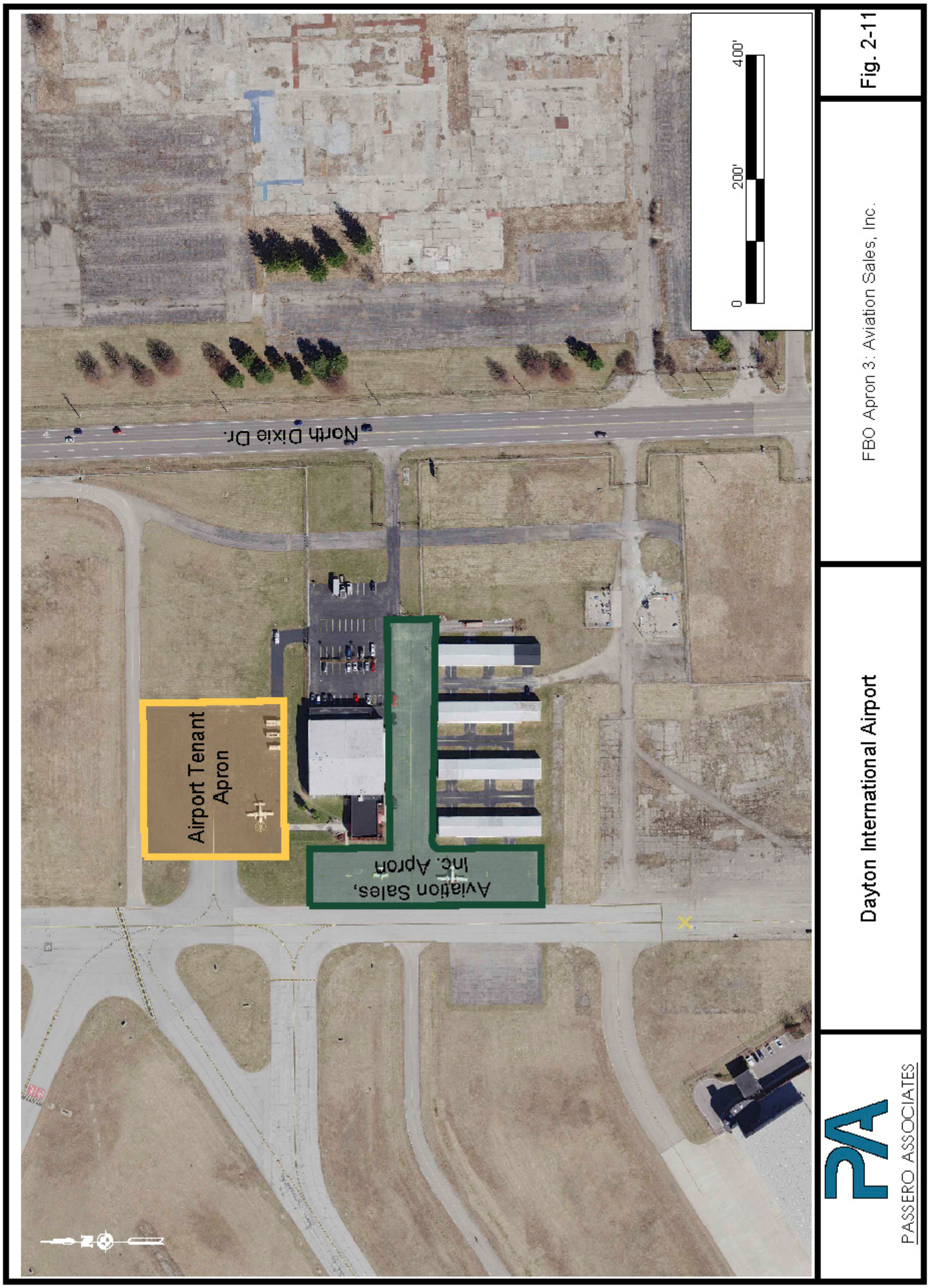
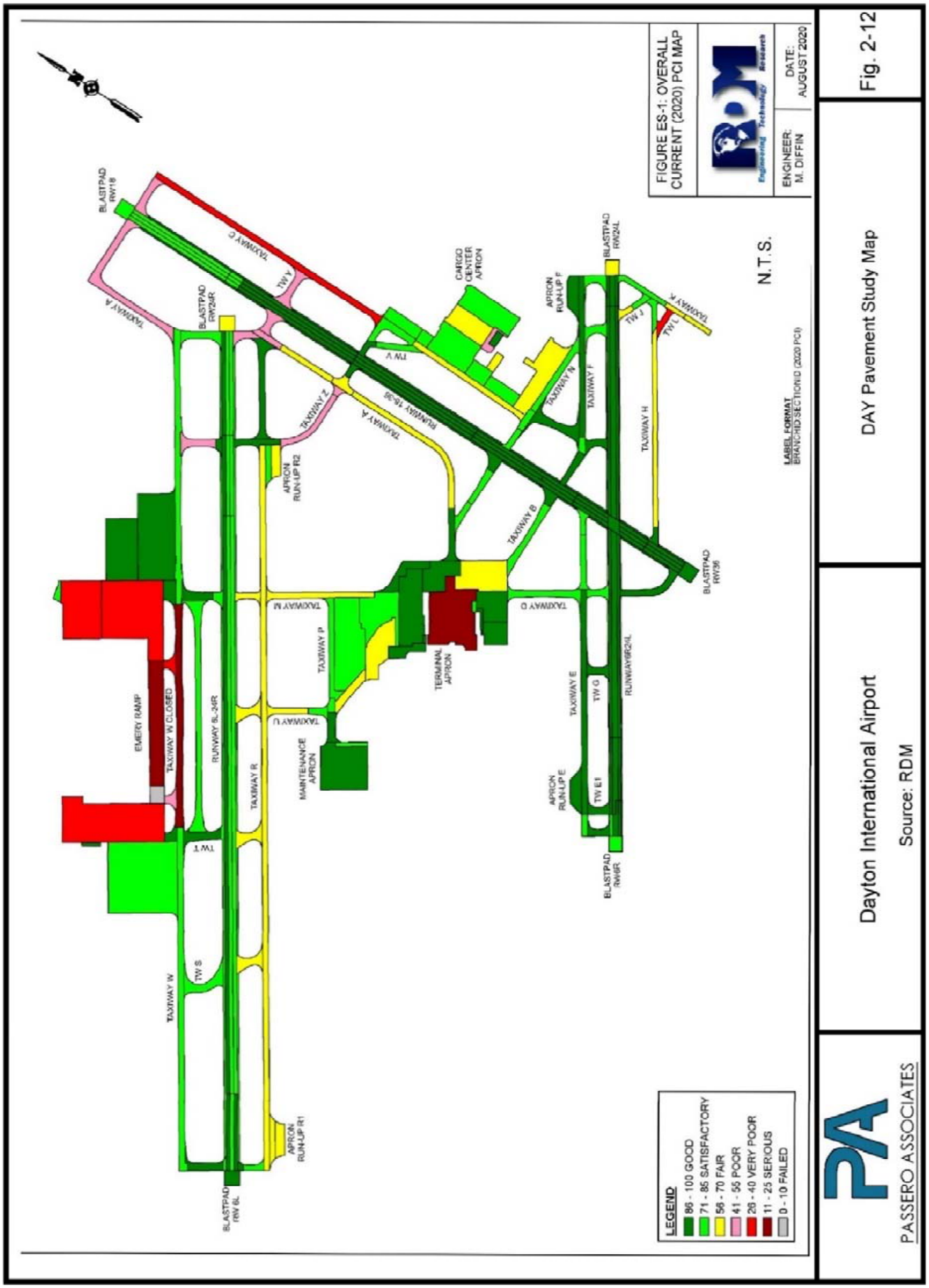


Figure 2-12: DAY Pavement Study Map



2.6.1.5 Pavement Markings

Pavement markings delineate the various movement areas of the airfield. There are several types of runway markings based on the type of instrument to runways.

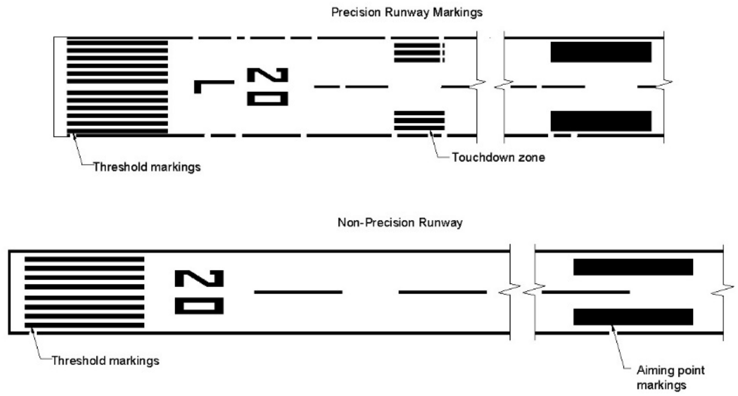


Figure 2-13: Precision and Non-Precision Runway Markings
Source: Federal Aviation Administration

As noted on the FAA National Flight Data Center (NFDC) database, Runways 6L-24R, 6R-24L, and 18-36 have Precision Instrument (PIR) approach markings (i.e., threshold, runway designation, touchdown zone, aiming points and dashed centerline markings). This is appropriate because five of the six runway ends have precision instrument approach procedures. All PIR markings are listed in "Good" condition on the FAA NFDC.

All taxiways at DAY have visible yellow centerline and yellow edge striping. Furthermore, there are hold-position markings located on taxiways prior to runway intersections, and runway ends. A runway hold-position marking on taxiways connecting to runways consist of two solid yellow lines on the taxiway side, and two dashed yellow lines on the runway side. These markings ensure that aircraft hold at a safe distance from runway centerlines when the runway is in use. As observed during the on-site visit, the markings on the taxiways appeared to be in fair condition; however, markings at taxiway intersections appeared to be faded. An analysis of pavement marking condition will be included in the Facility Requirements chapter of this master plan to identify deficiencies.

2.6.1.6 Airfield Electrical Vault

Proper airfield lighting is required at all airports, especially for night-time operations. The existing lighting systems at the Airport allow aircraft night operations and are supported by equipment in the airfield electrical vaults. DAY has two airfield electrical vaults. The first electrical vault is located below the commercial passenger terminal building, and is the main electrical vault for the Airport. The second vault is adjacent to Runway 6L. The secondary vault can be accessed by a tunnel underneath the airfield that connects to the commercial passenger terminal building. There are several back-up generators around the Airport that turn on in the event that the airfield electrical vaults lose power. Although the vaults are adequately serving DAY's electrical demand, much of the equipment is dated.

Figure 2-14: Airfield Electrical Vault
Source: Passero, Associates; DAY

2.6.1.7 Airfield Lighting

Airfield lighting equipment at DAY is identified and described in the following sections.

Lighted Airport Rotating Beacon

DAY has a rotating airport beacon that indicates the location of the Airport by projecting beams of light into the sky rotating 360 degrees. The lights are alternating white/green flashes and are 180 degrees apart. Per the AC 150/5300-13A *Airport Design*, Airport beacons are required for any airport with runway edge lights.

The active airport rotating beacon at DAY is located above the commercial passenger terminal.

Runway Lighting

Runway lights allow pilots to identify the edges of the runway and assist them in determining the length remaining during periods of darkness or otherwise restricted visibility. These lighting systems are classified by their intensity or brightness. At DAY, Runway 6L-24R, 6R-24L and 18-36 all have High Intensity Runway Lights (HIRL). Because these three runways have precision instrument approach procedures, it is appropriate that these runways be equipped with HIRL, especially during times of low visibility.

Taxiway Lighting

As mentioned in this chapter, all of the taxiways at DAY are equipped with Medium Intensity Taxiway Lighting (MITLs) along the taxiway edges. Taxiway edge lights are blue in color and provide guidance for taxi operations at night, and during times of low visibility.

2.6.1.8 Airfield Signage

Several internally illuminated airfield signs are connected to the existing electrical vault system at DAY. These signs can indicate the location, direction and designation on the airfield. The runway hold-position signs identify the limits of the runway environment to pilots. Runway hold-position signs are white text on a red background. These signs are located in between the taxiways and runways. ILS critical hold position signs are also white text on a red background and are located between taxiways and runways. These signs hold pilots at a position on a taxiway to ensure no interference to the ILS system (i.e., glide slope and localizer) signal during approach operations. Directional Exit signs have black text on a yellow background. These signs provide pilots directions to designated taxiways. Taxiway signs have yellow text on a black background and are located along the edges of taxiways. The Airport maintains a marking and signage plan.

All airfield signage at DAY are functional.

2.6.1.9 Navigational Aids (NAVAIDS)

NAVAIDs at DAY range from visual to electronic aids. These NAVAIDs are identified in the following sections.

Windsock

Perhaps the most basic takeoff and landing aid is the windsock which informs pilots of wind direction. There is a windsock adjacent to every Runway end at DAY. The windsocks appear to be in good working condition and meets design recommendation.

Precision Approach Path Indicators (PAPIs)

There are two types of visual glide slope indicators: Visual Approach Slope Indicators (VASI) and Precision Approach Path Indicators (PAPI). Runways 6L, 24R, 6R, 24L, and 36 have 4-light PAPIs. The purpose of PAPIs is to provide visual light clues to pilots during landing operations. **Table 2-5** provides a summary of the type of equipment, threshold crossing height and the approach angle for each runway with a PAPI.

Table 2-5 Precision Approach Path Indicator

Runway	Type (Direction of centerline)	Angle	Threshold Crossing Height
6L	4-light PAPI (left)	3.00^{o}	67’ AGL
24R	4-light PAPI (left)	3.00^{o}	56’ AGL
6R	4-light PAPI (left)	3.00^{o}	50’ AGL
24L	4-light PAPI (left)	3.00^{o}	54’ AGL
36	4-light PAPI (left)	3.00^{o}	60’ AGL

Source: FAA NFDC

2.6.1.10 Instrument Approaches and Equipment

During times of inclement weather, instrument approaches enable pilots to safely descend into the airport environment for landing. There are several different instrument approaches that can be established, each with specific limitations. As the height of clouds and visibility deteriorates, the necessity for instrument approach procedures increases. When the cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is greater than three statute miles, the conditions are considered visual and pilots can operate under visual flight rules (VFR). In VFR conditions, no published approaches are required for an aircraft to safely land at an airport. However, once the cloud ceiling is less than 1,000 feet AGL and/or the visibility is less than three statute miles, pilots must operate under instrument flight rules (IFR). Additional air traffic control services are provided to pilots during IFR conditions. During the arrival phase, instrument approaches are what allow a pilot to safely navigate to and land on a runway using on-board instrumentation.

Published Approaches for DAY

Presently, DAY has six published straight-in, Non-Precision Instrument (NPI) approach procedures for the ends of Runways 6L-24R, 6R-24L and 18-36. The instruments used to establish the NPI approaches are area navigation (RNAV) procedures that are based on global positioning satellites (GPS). In tandem with GPS operations, Runways 6L and 24R also have published Required Navigation Performance (RNP) approach procedures. RNP approach procedures are similar to RNAV approach procedures; however, RNP requires on-board navigation performance monitoring and alerting capability to ensure that the aircraft stays within a specific area.

Precision Instrument (PIR) approaches provide pilots with vertical and horizontal guidance during approach operations. DAY has five published PIR procedures for the ends of Runway 6L, 18, 24L and 24R. Furthermore, Runway 6L has an added Category (CAT) II/III procedures. CAT I, II and III conditions are determined based on weather and visibility. The FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, describes each Category as follows:

- ***Category I (CAT I):*** *An instrument approach or approach and landing with a Height Above Threshold (HaTh) or minimum descent altitude not lower than 200 feet and with either a visibility not less than ½ mile, or a runway visual range not less than 1800 feet.*
- ***Category II (CAT II):*** *An instrument approach or approach and landing with a HaTh lower than 200 feet but not lower than 100 feet and a Runway Visual Range (RVR) not less than 1200 feet.*
- ***Category III (CAT III):*** *An instrument approach or approach and landing with a HaTH lower than 100 feet, or no HaTh, or an RVR less than 1200 feet.*

Being that Runway 6L has CAT II/III conditions means that pilots can perform a precision instrument approach when the RVR is between 0 and 1200 feet.

Table 2-6 lists the approach minima for the types of approaches to Runways 6L, 6R, 24R, 24L, 18 and 36. The Approach minima consist of either a decision height (DA) or a minimum descent altitude (MDA) and a visibility condition. The DA and MDA essentially provide a pilot with a floor in the airspace he/she must remain above until making visual confirmation of the runway end. The visibility condition expresses the forward visibility distance beyond which a pilot may not land at that airport without an approach procedures. **Appendix E** contains the FAA instrument approach charts for DAY.

Approach Lighting System

The Approach Lighting System (ALS) is a configuration of lights positioned symmetrically along the extended runway centerline. Starting from the runway threshold, these lights extend out from the runway at pre-determined distances towards the approach area. The ALS is usually controlled by the Air Traffic Control Tower (ATCT), but can also be controlled by pilots via Very High Frequency (VHF) radio. The ALS provides guidance to pilots during landing operations with Decision Bar feature, where it is located 1,000 feet from the threshold and serves as a transition from instrument flight to visual flight.

At DAY, Runways 6L, 24R, 18, and 24L have an ALS. Below is a breakdown of each system.

Runway 6L

Runway 6L is equipped with an ALS with Sequenced Flashers II (ALSF-II) system which is appropriate for this runway due to the published CAT II/III ILS approach. Per the AC 150/5300-13A, ALSF systems are required for runways with CAT II/III precision approaches. The light stations in this lighting system span 2,400 feet from the runway threshold to the last arrangement of lights. Each lighting station is positioned 100 feet apart.

<u>Runway 18, 24L, 24R</u>
Runway 24R is equipped with a Medium Intensity ALS (MALSR) system. This system includes sequenced flashing runway alignment indicator lights (RAILS). Runways 18 and 24L are also equipped with MALSR systems. The lighting stations in this lighting system also span 2,400 feet from the runway threshold to the last light. Each lighting station is typically positioned 200 feet apart.

Table 2-6. Instrument Approach Minima

		Runway 6L		Runway 24R		Runway 6R		Runway 24L		Runway 18		Runway 36	
	Category	DA/MDA	VIS.	DA/MDA	VIS.	DA/MDA	VIS.	DA/MDA	VIS.	DA/MDA	VIS.	DA/MDA	VIS.
GPS Based	LPV	200	1/2 Mile	200	1/2 Mile	300	3/4 Mile	200	1/2 Mile	200	1/2 Mile	-	-
	LNAV/VNAV	400	3/4 Mile	300	1/2 Mile	500	1 3/4 Mile	400	1/2 Mile	300	1/2 Mile	500	1 1/2 Mile
	LNAV	500	1/2 Mile	500	1/2 Mile	600	1 Mile	500	1/2 Mile	500	1/2 Mile	500	1 Mile
	Circling	600	1 Mile	600	1 Mile	600	1 Mile	600	1 Mile	600	1 Mile	600	1 Mile
ILS Based	S-ILS	200[1]	1/2 Mile	200	1/2 Mile	-	-	200	1/2 Mile	200	1/2 Mile	-	-
	S-LOC	400[2]	1/2 Mile	400	1/2 Mile	-	-	500	1/2 Mile	400	1/2 Mile	-	-
	Circling	600[2]	1 Mile	600	1 Mile	-	-	600	1 Mile	600	1 Mile	-	-

Source: FAA published instrument approach charts; Passero Associates
1/: Category I/II/III Conditions allowable with required special aircrew & aircraft certification
2/: LEBNE Fix minimums (Dual VOR Receivers Required)

2.6.2 Airspace and Obstructions

This section presents the airspace and published/surveyed obstructions at DAY.

2.6.2.1 Airspace

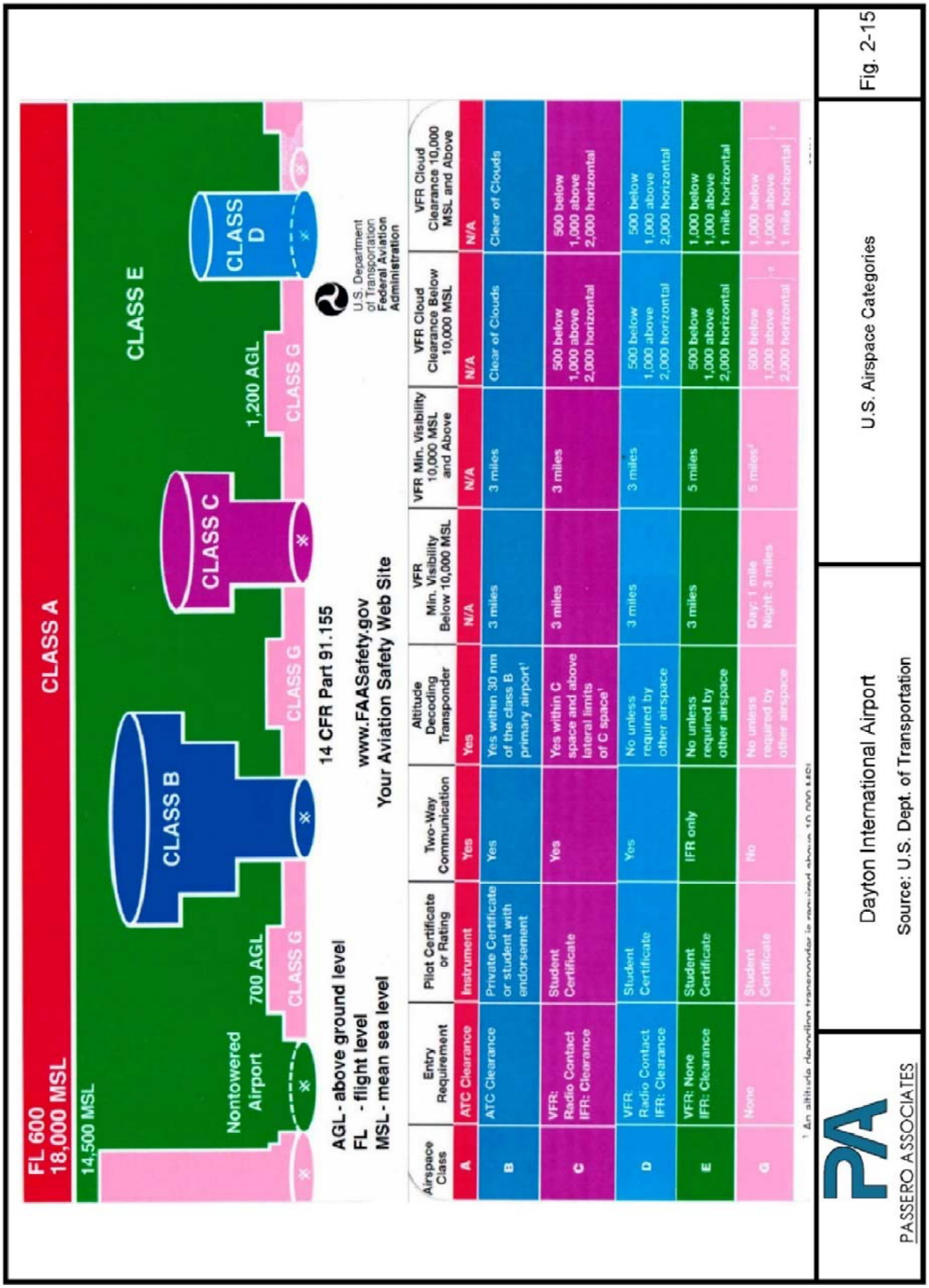
The International Civil Aviation Organization (ICAO) airspace classes were adopted by the U.S. in 1993. The airspaces are identified as controlled airspace: Class A, B, C, D or E, and uncontrolled airspace: Class G. See **Figure 2-15** for a graphic presentation of classes of airspace. Each airspace is described in greater detail in the following sections.

Class A: All airspace above 18,000 feet mean sea level (MSL) and up to 60,000 feet MSL (Flight Level 600). Class A airspace contains high altitude airways, known as jet routes.

Class B and C: The airspace surrounding major commercial airports. Within Class B and C airspace. Aircraft are required to communicate with air traffic control (ATC). To enter this airspace, communication and/or clearances must be received from the Air Traffic Control Tower (ATCT). Class B and C airspace is denoted on a sectional map with solid blue or purple lines. **DAY is included within the Class C airspace** inner ring surface to 5,000' and outer ring 2,400' to 5,000' (MSL).

Class D: Identified on a sectional map by a blue dashed line. The terminal airspace surrounding towered and military airports with a radius of five statute miles.

Figure 2-15: U.S. Airspace Categories



Airspace Class	Entry Requirement	Pilot Certificate or Rating	Two-Way Communication	Altitude Decoding Transponder	VFR Min. Visibility Below 10,000 MSL	VFR Min. Visibility 10,000 MSL and Above	VFR Cloud Clearance Below 10,000 MSL	VFR Cloud Clearance 10,000 MSL and Above
A	ATC Clearance	Instrument	Yes	Yes	N/A	N/A	N/A	N/A
B	ATC Clearance	Private Certificate or student with endorsement	Yes	Yes within 30 nm of the class B primary airport[1]	3 miles	3 miles	Clear of Clouds	Clear of Clouds
C	VFR: Radio Contact IFR: Clearance	Student Certificate	Yes	Yes within C space and above lateral limits of C space[1]	3 miles	3 miles	500 below 1,000 above 2,000 horizontal	500 below 1,000 above 2,000 horizontal
D	VFR: Radio Contact IFR: Clearance	Student Certificate	Yes	No unless required by other airspace	3 miles	3 miles	500 below 1,000 above 2,000 horizontal	500 below 1,000 above 2,000 horizontal
E	VFR: None IFR: Clearance	Student Certificate	IFR only	No unless required by other airspace	3 miles	5 miles	500 below 1,000 above 2,000 horizontal	1,000 below 1,000 above 1 mile horizontal
G	None	Student Certificate	No	No unless required by other airspace	Day: 1 mile Night: 3 miles	5 miles[2]	500 below 1,000 above 2,000 horizontal	1,000 below 1,000 above 1 mile horizontal

[1] An altitude decoding transponder is required above 10,000 MSL

Class E: General controlled airspace that includes most of the remaining airspace. This airspace contains low altitude airways. Aircraft operating in Class E must follow the general regulations for controlled airspace. Class E airspace extends upwards from Class G airspace to the overlying Class A airspace.

Class G: all airspace that has not been designated as controlled or special use, and within which ATC has neither the authority nor the responsibility to control. This airspace typically extends beyond the limits of Class C airspace, from the ground up to 700 feet or 1,200 feet.

Airports in the Region

When conducting an ALP and narrative report update, it is necessary to consider the proximity of other public airports and services provided within the region. Not only is air traffic directly affected by regional activity, but airports in near proximity to each other often compete for market share of based aircraft, fuel sales, and other services. Furthermore, there is a potential for airspace conflict with nearby airports. Often airspace interaction requires adjustments to operating procedures to ensure the safe and efficient flow of traffic at all facilities. **Table 2-7** lists public use airports within 20 nautical miles of the DAY**. Figure 2-16** depicts the sectional map of nearby airports within 20 nautical miles (NM) of DAY.

Table 2-7. Nearby Airports in the Region

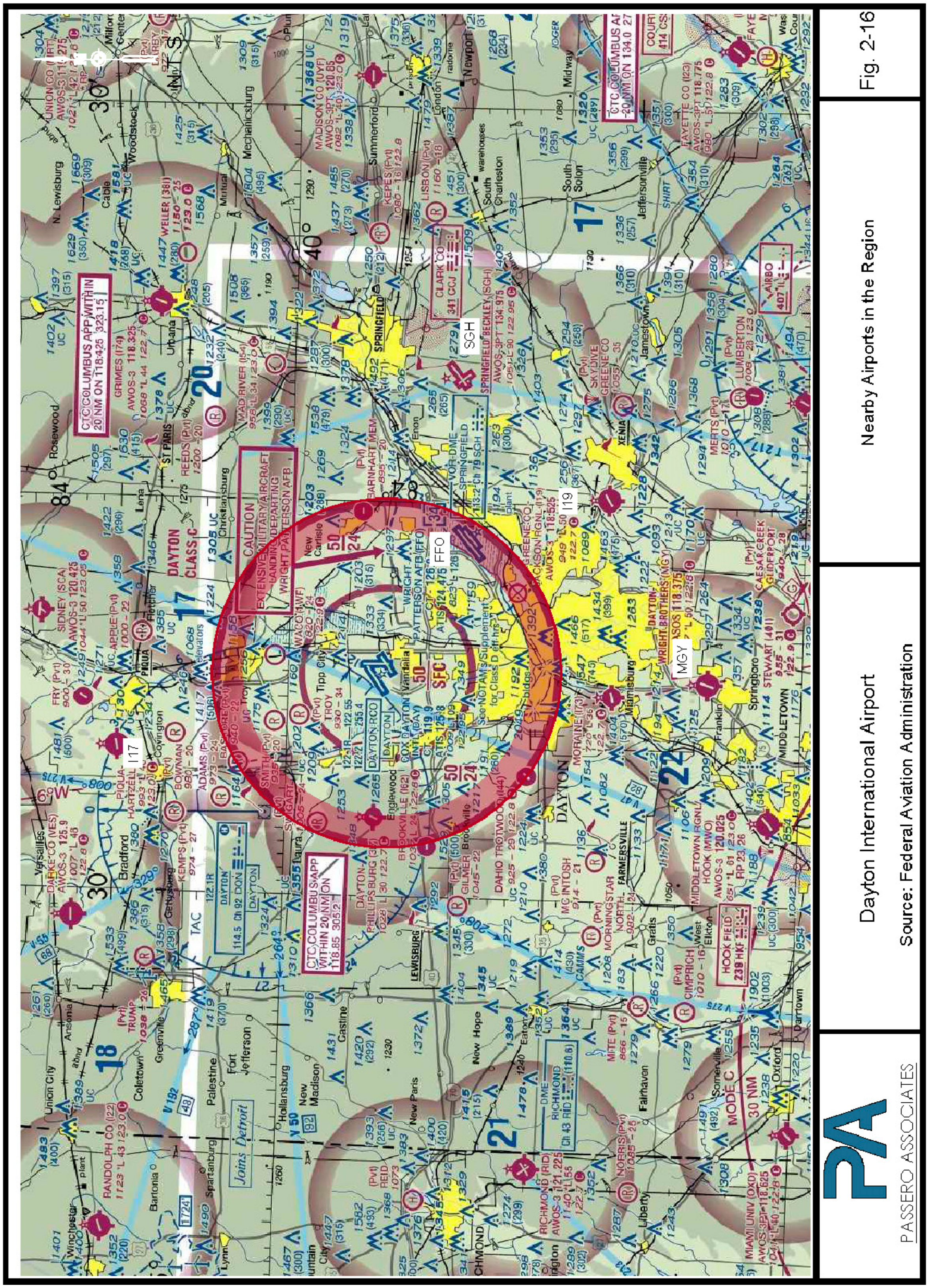
LOCATION ID	NAME	AIRPORT CATEGORY	HEADING FROM DAY	DISTANCE
FFO	WRIGHT PATTERSON AFB	MILITARY	SOUTHEAST	9.4 NM
I17	HARTZELL FIELD	GENERAL AVIATION	NORTHWEST	16.2 NM
I19	GREENE COUNTY – LEWIS A. JACKSON	GENERAL AVIATION	SOUTHEAST	16.5 NM
SGH	SPRINGFIELD-BECKLEY MUNICIPAL	GENERAL AVIATION	SOUTHEAST	17.9 NM
MGY	DAYTON WRIGHT BROTHERS	RELIEVER	SOUTH	18.6 NM

Source: FAA published Sectional Chart; Passero Associates

2.6.2.2 Published Obstructions

The Cincinnati sectional chart and the FAA 5010 Airport Master Record identify published obstructions around DAY. In addition, the survey completed by Woolpert as part of this master plan, also identifies obstructions around the airfield. The surveyed obstructions are explained at a high level in the following sections, and are identified in more detail within the ALP drawing set.

Figure 2-16: Nearby Airports in the Region



Published Obstructions: FAA Sectional Chart

Obstructions near DAY that cannot be removed must be marked or lighted to alert pilots of their location with respect to the Airport. The obstructions are identified on approach charts and the Cincinnati Sectional Chart, published by the FAA National Aeronautical Charting Office. Per these charts, several objects (i.e., towers) of height exist in the immediate vicinity of DAY. With the DAY's elevation being approximately 1,009 feet above Mean Sea Level (MSL), most of these towers only stand 200 to 300 feet above the Airport elevation. However, there are a grouping of towers directly south of the DAY that stand approximately 1,000 feet higher than the Airport elevation and these towers are lit with high intensity lights.

The obstructions at DAY listed on the FAA 5010 include trees off the end of Runways 24R, 6R, 18 and 36. There is a pole off the end of Runway 24L. These obstructions will be analyzed in future sections of this master plan.

Surveyed Obstructions

In the winter of 2019/2020, Woolpert performed a thorough survey to capture areas of height near the Airport. Woolpert provided the following from this survey:

- Hi-resolution, orthorectified aerial;
- Obstacle data that included top elevations for trees, poles and structures; and,
- Potential obstructions within 5,000 feet of each runway end.

Although the FAA provides obstruction data online within the Digital Obstacle File (DOF) database, that data is updated every 56 days and is contingent on projects entered into the FAA system by users; therefore, data from Woolpert's 2019/2020 comprehensive survey will supersede existing obstruction data provided by the FAA for this report. Woolpert's data will also be compared with the FAA 5010 identified obstructions and noted within the ALP drawing set.

2.6.3 Landside Facilities

This section presents the existing landside components at DAY, which generally consist of landside facilities include terminal buildings, General Aviation (GA) hangars, automobile parking areas, ground access, maintenance facilities, utilities, and security facilities and procedures.

Inventory assessment will be carried out for the following:

- Airspace and Land Use Protections
- Commercial Passenger Terminal Facilities
- General Aviation Facilities
- Cargo Facilities
- Support Facilities
- Ground Access, Circulation and Vehicle Parking
- Utilities
- Other Airport Lands (Land Use/Zoning)

2.6.3.1 Airspace and Land Use Protection

Airspace protection is required to preserve and protect public airports, as well as the navigable airspace adjacent to airports. *Federal Aviation Regulation, Part 77, Safe, Efficient Use, and preservation of the Navigable Airspace*, along with Chapter 5501:01-10 *Ohio Airport Protection Act* provides guidelines to help control the loss of navigable airspace to non-aviation uses, through regulating the height of man-made objects. By preventing objects from becoming obstructions to airspace, the operational safety of the airport facility can be preserved.

More specific to the locale around DAY, Chapter 37 Department of Aviation of the Dayton, Ohio Code of Ordinances specifically includes rules and regulations for DAY. More specifically for the City of Dayton, Section 150.343 Airport District within the City of Dayton Zoning Code (passed December 28, 2005), an area around DAY is zoned as restricted for an Airport District (AP). For the sake of this Master Plan, and section, only the lot, setback and height restrictions will be detailed below. To that regard, Section 150.343.3 states the following:

> *"All development in the AP District shall be in accordance with the approved Dayton International Airport Master Plan and shall also be in compliance with the applicable Federal Aviation Administration regulations. (Ord. 30515-05, passed 12-28-05)"*

Based on this regulation, all facilities within the AP district must comply to all height and development standards enforced by the FAA.

2.6.3.2 Commercial Passenger Terminal

As stated earlier in this chapter, commercial airline services terminal area is accessed by Taxiways U, M, A, B and D. DAY's layout consist of a main terminal building, Concourses A (14 gates) and B (9 gates), and automobile parking. Starting with the main terminal building, this area of the facility includes a baggage claim area, airline ticketing counters, concessions/services, USO and security checkpoint. The ground level is divided between the arrivals and check-in (departure) areas. Although food and retail concessions is spread out throughout the terminal past security, the upper levels include TSA and Airport offices. Airline gates are spread out throughout Concourses A and B.

Prior to starting this Master Plan, there was a Terminal Master Plan at DAY already underway. The Terminal Master Plan is broken up into six phases. Phase 1 (completed) includes the following:

- Constructed new terminal drive canopy;
- Rehabilitated entry roads;
- Rehabilitated existing terminal restrooms;
- Replaced terminal doors with ADA compliant doors;
- Replaced sanitary sewer line;
- Replaced sanitary pump station;
- Repaired natural gas lines;
- Relocated restrooms;
- Relocated administration to second floor;
- Relocated security to first and second floor;
- Widened connector at baggage claim tunnel; and,
- Relocated Data Center.

Phases two through six include plans to consolidate all food and retail concessions in the rehabilitated terminal second floor, including a public viewing deck. Furthermore, the concourse connectors will be widened and provide a more direct path to existing gates. Last but not least, renovations to Concourses A & B will include rehabilitating the HVAC systems, electrical and finishes (flooring, wall covering, and ceiling).

2.6.3.3 General Aviation Facilities

Support buildings and structures typically accessible to the airfield, that were not discussed under the airside facilities section can include general aviation buildings, including aircraft storage or offices, both aviation and non-aviation facilities.

Although DAY is a commercial service airport, there are general aviation operations that occur at the Airport. According to the FAA 5010, there are approximately 34 based aircraft at DAY, with 12,288 total operations and 419 military operations. The general aviation facilities are split between the three FBOs.

2.6.3.4 Air Cargo Facilities

In the past, Emery Worldwide operated at DAY on the large apron northwest of Runway 6L-24R. They operated heavy cargo out of DAY. However, in 2006 Emery Worldwide shut down their operations at DAY. Although the logistics center is still present today, no cargo operations occurs at this facility.

Today, over 60 million pounds (annually) of the cargo has passed through DAY. This includes belly cargo (i.e., Cargo included within the undercarriage of commercial aircraft) and cargo companies such as FedEx. For FedEx, approximately 52 million pounds of cargo passed through DAY in 2019.

2.6.3.5 Support Facilities

Support facilities include Air Traffic Control Towers (ATCT), maintenance facilities, U.S. Customs, fueling facilities, Aircraft Rescue and Fire Fighting Facilities (ARFF), and deicing services. This section will provide narrative for each of these support facilities.

Air Traffic Control Tower (ATCT)

Figure 2-17: DAY ATCT
Source: Passero, Associates; DAY

The ATCT was constructed in 2009 and is operated by the Federal Aviation Administration (FAA). The air traffic controllers are FAA employees, who work the tower 24 hours a day, seven days a week. They provide positive control over the intensive flight environment at the airport, and control all aviation activity at the airport. The cab height of the ATCT stands at 254 feet.

There is currently a line-of-sight concern of the base of the tower and the non-movement area adjacent to Taxiway U. Although the FAA is not in control of non-movement areas, it is still good to have minimal line of sight issues on an airfield.

Airport Maintenance Facilities

Stevens Aerospace and Defense Systems not only provides fueling, like the other two FBOs, but also provides maintenance and MRO capabilities, such as avionics, painting and interior operations. Although the FBOs provide fueling services for the airlines, the other maintenance operations are only performed for the general aviation aircraft within the FBOs.

For the commercial service airlines, only two airlines provide MRO services. PSA provides full-service maintenance operations for American Airlines, which is appropriate because they are a subsidiary to American. United Airlines performs maintenance operations for their aircraft; however, these maintenance operations will discontinue at DAY in 2021. Delta and Allegiant Airlines receive MRO services at a different location off-airport property.

U.S. Customs

The U.S. Customs facility is located on the east side of the Airport. This roughly 10,000 SF facility is typically open 8:00 am to 4:30 pm Monday through Friday. The U.S. Customs building is directly accessed by Wright Drive, and there is an apron area outside the Customs building for use by Customs when processing aircraft.

Aviation Fuel and Aircraft Servicing Systems

Each of the three FBOs at DAY have fueling operations. Each FBO maintains, through lease agreement with the Sponsor, a fueling system that is both self-serve and not self-serve. Each FBO offers 100LL, and Jet A fuel. Although each of the three FBOs provide fuel, only Wright Brothers Aero, Inc. provide fuel to the air carriers via fuel truck. The fuel farm is located adjacent to the FedEx Ramp.

Aircraft Rescue and Fire Fighting Facilities (ARFF)

The roughly 14,000 SF ARFF facility (i.e., Dayton International Airport – Fire Department) is located north of Taxiways A and N, and just east of the commercial services terminal. This ARFF is open 24/7 where there are three shifts of five or six firefighters each, with an administrative staff of five. Required minimum staffing for each shift consists of three firefighters to one supervisor/chief. The ARFF has seven bays, where the vehicles include three ARFF vehicles, one rescue/engine, mass casualty trailer, and three staff vehicles. There is an ambulance/ medic unit at the station as well. **Table 2-8** provides more detail on the ARFF equipment.

Table 2-8. ARFF Equipment and their Capabilities

YEAR	MAKE/MODEL	WATER CAPACITY (GALLONS)	FOAM CAPACITY (GL)	TURRET CAPACITY (GPM)	OTHER AGENT
2013	OSHKOSH STRIKER 1500	1,500	210	1200	500 LBS DRY CHEM
2003	OSHKOSH STRIKER 3000	3,000	420	1,200	500 LBS DRY CHEM
1998	OSHKOSH T-3000	3,000	420	1,200	460 LBS HALOTRON

Source: DAY Airport Emergency Plan

Per FAA Part 139 regulations, commercial service airports must have dedicated ARFF equipment, and staff to combat a fire with the scheduled air service provider. DAY is compliant to both of these regulations. Based on the commercial service aircraft that use the airport, the designated ARFF Index is C.

Snow Removal

With DAY being located in the Midwest, snow is guaranteed for several months each year. As such, snow removal is crucial for maintaining safe operations at DAY. To minimize impacts to all aircraft enplanements and operations, the operations staff at DAY use different types of Snow Removal Equipment (SRE) to minimize snow build-up on runways, taxiways, and in the FBO and in the terminal core. **Table 2-9** provides the type of SRE that is used on each area of the Airport.

Table 2-9. Snow Removal Equipment (SRE) Type and Use

Quantity	Type of Equipment	Equipment Application	Primary Use
4	6x6 69,000 GVW Dump Truck	Front Plow – Sand	Ramps
5	4x4 46,000 GVW Truck	Rollover Plow – Sand	Runways/Taxiways
1	4x4 40,000 GVW Truck	Rollover Plow – Sand	Runways/Taxiways
2	Tandem Dump Truck	Front Plow – Sand	Runways/Taxiways
2	Rubber Tire Loader	Snow Basket – Snow Pushing Blade	Where Needed
2	3,500 gallon Sprayer	Anti/De-ice	Where Needed
4	Broom/Plow/Blower Combo	Broom-Plow-Blower	Runways
2	Broom/Blower Combo	Broom-Blower	Runways
4	Snow Blower	Blower	Where Needed
1	36,000 GVW Dump Truck	Front Plow-Spreader	Landside
4	¾-ton Pick-up Truck	Front Plow	Where Needed
2	1-ton Dump Truck	Front Plow	1 Where Need/ 1 at DWBA

1	4x4 Pick-up Truck	Front Plow	Where Needed
1	Bobcat	Snow Pusher Blade	Parking Lots
1	6x6 Dump Truck	Front Plow – Sander	DWBA

Source: City of Dayton

Deicing Services

Per the AC 150-5300-14C *Design of Aircraft Deicing Facilities*, deicing services are described as the removal of frost, ice, slush or snow from an aircraft in order to provide clean surfaces, and/or protection against the formation of frost or ice (i.e., anti-icing). As mentioned earlier in this chapter, aircraft deicing operations occur at two different deicing pads adjacent to the commercial services terminal. Wright Bros. Aero provides these services for air carrier operations. Referring to **Figure 2-7**, Deicing Pad 1 can allow for six aircraft to be deiced simultaneously. Deicing Pad 1 can accommodate up to ADG V aircraft. Deicing Pad 2 can allow up to three aircraft for simultaneous deicing operations. Deicing Pad 2 can accommodate up to ADG IV aircraft.

RON Apron

At commercial service airports, such as DAY, a separate parking apron may be needed for aircraft to keep the gate positions available for scheduled flights. These aprons are typically referred to as "Remain Over Night (RON)" aprons. RON aprons can also accommodate temporary parking for aircraft during events that may hinder air travel, such as aircraft diversion during inclement weather.

At DAY, they're two RON aprons (see Figure 2-5) that can accommodate up to six aircraft. These aircraft include the CRJ-7 and CRJ-9 (American) and the Airbus A319 aircraft, which is the largest aircraft that can be accommodated on the RON apron.

2.6.3.6 Ground Access and Circulation – Landside

Starting with the Terminal Core, passengers can directly access the commercial services terminal via Terminal Drive. This road connects to US 40, which is a main thoroughfare for accessing I-75. Moving onto the GA Areas A and B, these areas can be directly accessed via McCauley Drive, Wright and Hangar Drive. These streets branch off of North Dixie Drive, which is the main thoroughfare that connects to US 40. Last, GA Area C can be directly accessed off of North Dixie Drive.

With the rehabilitation of Terminal Drive, there are currently an adequate number of lanes for passenger pick-up and drop-off. Furthermore, with separating shuttle traffic from passenger pick-up/drop-off traffic, circulation on Terminal Drive within the commercial service terminal areas is fluid with little to no congestion.

It should be noted that there are no transit stops (e.g., bus stops) on Terminal Drive. The closest bus stops are located on National Road. Passengers who rely on public transportation will need to use ride-sharing and taxicab services.

2.6.3.7 Ground Access and Circulation – Airside

Regarding airside circulation for operations vehicles and other authorized vehicles, the following roads are used to access various parts of the airport. These roads are:

- Perimeter Road East;
- Hangar Drive
- Wright Drive;
- Maintenance Road;
- Perimeter Road N;
- Dog Leg Road;
- Perimeter Road West; and,
- Concorde Drive.

It is recommended that automobiles use these roads when accessing various parts of the airport. In cases where automobiles need to drive on taxiways and runways, communication and clearance from the ATCT must occur. Should fire engines need access various parts of the airport in case of emergencies, the engines directly use the runways and taxiways.

2.6.3.8 Vehicle Parking

Regarding parking at DAY, there are several options for passengers. These options include, parking in an economy lot; long term parking; parking in the garage that is across from the main commercial services terminal; valet parking; short-term park & walk; and, overflow parking in a two-story parking garage southwest of the commercial services terminal.

Each of these parking options, and their costs are described in more detail below:

Economy Lot

Located off of Boeing Drive, the economy lot is designed for travelers planning to leave their vehicles parked for a week or longer. There is a courtesy shuttle (i.e., *DAYrider*) that circulates between the economy lot and the commercial passenger terminal. This lot has a flat rate fee of $4.95.

Long Term Lot

Located southwest of the parking garage, and directly off of Terminal Drive, this is an uncovered parking lot that is designed for travelers who will be away for a long period of time, but like the convenience of being within walking distance of the commercial passenger terminal. Parking at this lot for at least one hour costs $2.00 for the first hour, and $2.00 for each additional hour. The daily maximum cost for this lot is $14.00.

Parking Garage

Much like the long-term parking lot, the parking garage is located across from the commercial services terminal, directly off of Terminal Drive. This garage has a clearance height of 8 ft., 2 in when entering and exiting. This is a two-story garage where Levels 2 and 3 (Roof) are designated for public parking. Level two has reserved parking, where spots can be reserved at www.flydayton.com. Parking in this garage for at least one half hour costs $3.00. The daily maximum cost for this lot is $20.00.

Valet Parking

When in a hurry, DAY offers valet parking services. The valet booth is located directly in front of the commercial passenger terminal. The costs for valet for up to 4 hours costs $10.00, with each additional hour costing $2.00. The daily maximum cost is $20.00.

Short-Term Park and Walk

This parking lot is designated for those who will be at the Airport for a short period of time. With the lot being located just south of the commercial services terminal, this lot provides a lot of convenience. Furthermore, for those who stay 30 minutes or less, parking is free. Each additional hour costs $3.00. For those who stay a day or longer, the cost of parking jumps up to $24.00 per day.

Overflow Parking Lot

This parking lot is only open during peak travel periods to relieve the other lots. The overflow lot is located just off of Cargo Road, approximately 1 mile from the commercial services terminal. The cost of this lot has a daily flat rate of $4.95.

Cell Phone Lot

This lot is designated for those who are picking up passengers from DAY. There is free Wi-Fi at this site, and parking is free; however, vehicles may not be left unattended. The Cell Phone lot is located in between Hotel Drive, Valet Drive, Boeing Drive and Terminal Drive.

Figure 2-18 depicts a parking diagram at DAY.

Rental Cars

Figure 2-18 also illustrates the rental car counters and ready/return vehicles are located on the first floor of the parking garage, directly across from the commercial passenger terminal. The following rental car companies operate at DAY:

- Alamo
- Avis
- Budget
- Dollar/Thrifty
- Enterprise
- Hertz
- National

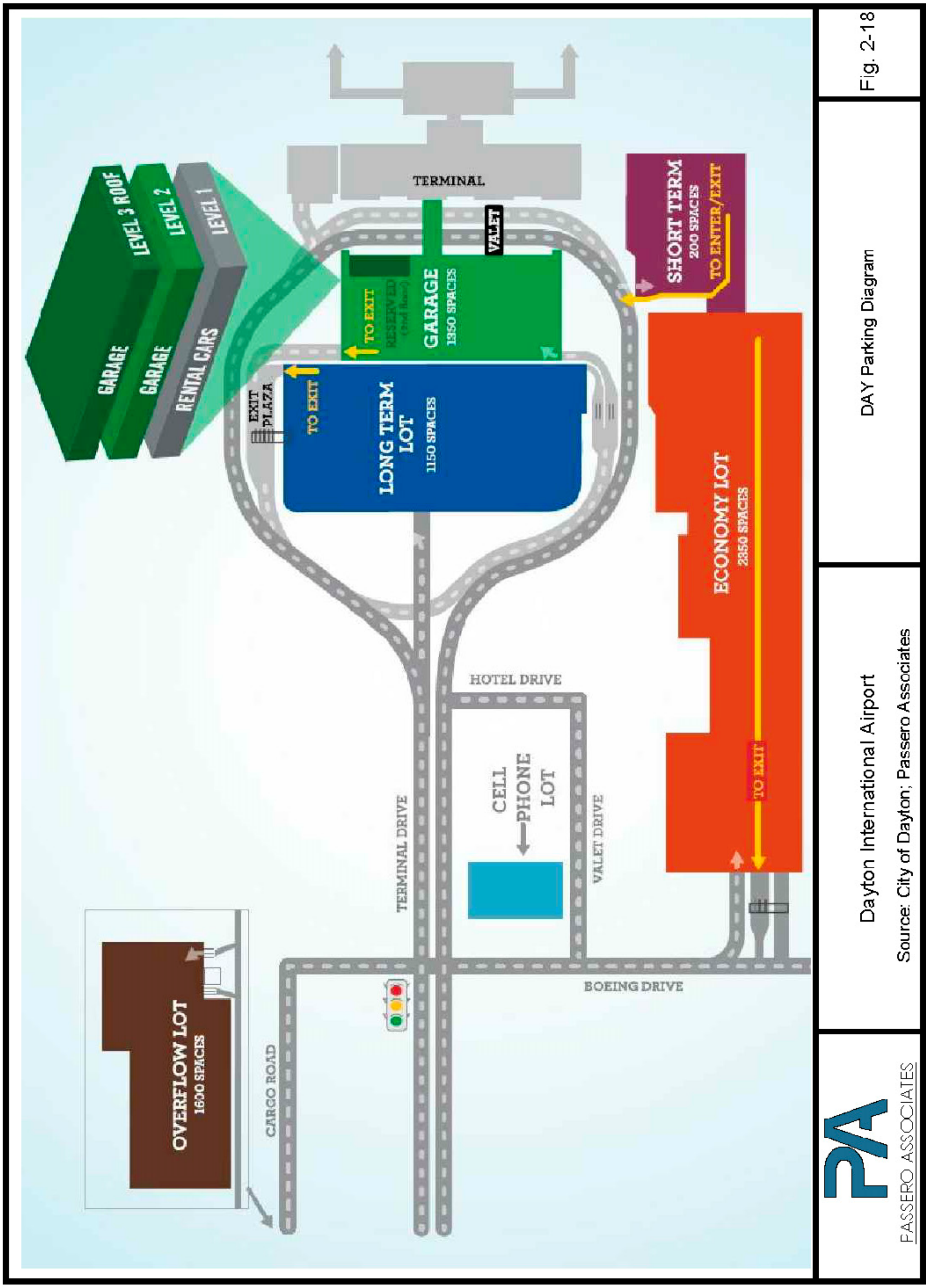
It should be noted that only vehicles are picked up and dropped off in the garage, and that quick-turnaround for the rental cars (i.e. fueling, vacuuming, washing) occurs at an off-site location. These off-site locations are located off of Valet Circle and Valet Drive.

2.6.3.9 Utilities

The existing utility infrastructure serving the airport includes electric power, sanitary sewer, water and gas.

Existing utility providers on the airfield are identified in **Table 2-10**.

Figure 2-18: DAY Parking Diagram



2.6.3.10 Other Airport Lands (Land Use/Zoning)

It is important to identify land uses adjacent to airports to determine any potential existing or future impacts for on/off airport developments. Because the City of Vandalia is adjacent to DAY, there is a zoning ordinance that establishes an overlay district around the Airport.

Section 1220.02 *Airport Environs Overlay (AEO)* of the Vandalia zoning code is setup to protect the public health, safety and welfare of people by restricting development within this overlay district.

The AEO is broken into three subdistricts based on the dNL noise range/contours at DAY (i.e., 75, 70 and 65 dNL). Furthermore, the Vandalia ordinance also regulates land use compatibilities of developments within the three subdistricts. For more details please see **Appendix F** for the full Section 1220.02 of the Vandalia zoning code.

2.7 Inventory of Noise and Other Environmental Data

As a part of this Master Plan, a National Environmental Protection Act (NEPA) document was prepared for DAY. The purpose of this effort was to update the 2008 environmental inventory and provide Geographic Information System (GIS) information to a database of existing environmental conditions. This database will aid DAY personnel with understanding potential impacts for proposed projects in the future.

Due to this size of this document, key information for each environmental category is summarized in **Table 2-11**. Although this NEPA document will not be included with this master plan, it was submitted separately to the DAY staff and the FAA for their uses.

Table 2-10. DAY Environmental Inventory Summary Table

Environmental Category	Potential Impact
Air Quality	No – Permits issued for operation of equipment that may affect air quality. DAY is located within an attainment area and is not increasing greenhouse gasses. DAY's current operations are at or below de minimis thresholds.
Biological Resources	Yes – Northern Long- Eared Bat, Indiana Bat, Rayed Bean, Snuffbox Mussel (Endangered). Migratory Birds (Threatened and Endangered). Prior to future development, an assessment to determine the exact location should occur prior to development.
Climate	No – At this time there are no GHG impacts at DAY with existing operations. However, should airfield operations increase an additional GHG assessment is recommended.
Department of Transportation Section 4(f)	No – At this time there are no existing impacts to public parks and facilities. However, Englewood Reserve, Aullwood Garden MetroPark and Morton Middle School are located southwest and southeast of the Airport. Therefore, prior to future development, an assessment on potential impacts to these facilities may need to be undertaken.
Farmlands	Yes – Although the soils map revealed land within the AOA as Prime Farmland, the City of Dayton Zoning Map currently designates DAY within its own zoning district for airport operations. An assessment on potential impacts to the prime farmland, outside of the AOA, may need to be undertaken prior to future development.

Geologic Information	Yes – 27 soil types were identified. These soils include Brookston Silty Clay Loam, Miami Silt Loam, and Shoals Silt Loam to name a few. Disturbed soils present on site, such as the Crosby-Urban land complex, Brookston Urban Land Complex, and Miamian-Urban land complex may be possible filled land or highly disturbed areas created by development. Most of these soils have been disturbed or buried by earthmoving or fill operations that natural soil characteristics have been erased (USDA, 1976). Urban development now makes up about 70-80% of the generalized study area.

Hazardous Waste Materials, Pollution Prevention and Hazardous Waste	Yes • ATA Trapshooting Property (vacant)– Lead shot has contaminated the upper 1 foot of soil during its use. Although remediation has occurred, the lead contamination levels remain above residential and industrial standards under the Ohio Voluntary Action Program (OVAP). • Existing Buildings at DAY will need to be evaluated for lead and asbestos. • There were approximately 53 spill locations reported within the Airport property boundary. • Perfluorooctanoic Acid (PFOA) is used for several industrial operations, such as firefighting foam. An assessment should be done to determine if the ARFF has used or use PFOA. • There were 25 spill locations reported within the boundaries of the former Emery Worldwide property. • The former McCauley Propeller South, 3535 McCauley Drive, manufactured and retrofitted aircraft propellers and associated parts. • Underground Storage Tanks have been located at the Rental Car facilities, Cargo and Back-Up Generator Fuel Storage areas, and the former Emery Worldwide property.
Solid Waste	No – Based on Ohio EPA, none of the disposal facilities are located within the runway search radii (i.e., 1,500 to 3,000 meters from runway).
Historical, Architectural and Archeological Resources	Yes – Five historical properties located within 1.0 miles of the Airport. Furthermore, the Ohio Historic Preservation Office (OHPO) online GIS database identified two locations adjacent to the AOA, one of which was the foundations for an old farmhouse located at the end of Runway 18. A future assessment may need to be undertaken prior to future development.
Land Use	No – Airport is within its own zoning district.
Natural Resources and Energy Supply	No – Energy supply for DAY is currently supplied by Dayton Power and Light.
Noise and Noise-Compatible Land Use	No—There appears to be no compatible land use issues currently. Potential development alternatives for noise-land will be explored in the alternatives section of this master plan.

Socioeconomic Impacts, and Environmental Justice,	No – No existing impacts on Airport property. However, when development projects to occur at the Airport, there is a level of participation offered to minority or low-income groups through the City of Dayton Procurement Enhancement Plan (PEP), Ohio DBE program, and Encouraging Diversity, Growth and Equality (EDGE) Program.
Children's Environmental Health and Safety Risks	Yes – Within the 3-mile radius of DAY, 23% of the population consists of minors 17 years of age or younger, with approximately 6% of that total consisting of children 5 years of age or younger. Within the Study Area, a 150-acre former Amateur Trapshooting Association (ATA) range is located along Route 40 on the south side of the airfield. Lead shot was the predominant ammunition used at the range. Lead pellets were observed on the ATA site on the south side of DAY during the last site reconnaissance in 2008 (Gresham Smith and Partners). Although most of the contamination is within the AOA fence line, and being that the ATA site is zoned as "Institutional", the site will not be permitted for development as it relates to sensitive receptors (i.e. daycare, residential).
Visual Effects	Yes – DAY uses various types of lights for airport operations. If airport development increases, then lighting emissions on adjacent property will increase. This will need to be considered with future airport development. DAY is currently not causing any impacts to the aesthetic and visual resources adjacent to the Airport.
Water Resources: Surface Water	Yes – Wetlands and floodplains are present on DAY's property. Specifically around Poplar Creek, Brush Creek, Mill Creek, and Stillwater River. Potable water is supplied to DAY by the City of Dayton Water Department.
Wild and Scenic Rivers	No – None of Ohio's designated Wild and Scenic Rivers are located within the Airport area.

Source: Auxano Environmental LLC; Passero Associates

2.8 Sustainability and Recycling

This section provides a summary of the sustainability and recycling practices at DAY, determined from prior studies.

DAY has been engaged in sustainable and environmentally friendly practices for years. As such, a sustainability plan was completed for DAY in 2014. The purpose of the Sustainability Plan (Plan) was to provide a summary of the operational performance, goals and recommended sustainable initiatives and implementation at DAY. The following tasks were evaluated:

- Sustainability Baseline Assessment
- Goals & Objectives
- Identify and Evaluate Candidate Initiatives
- Develop Implementation and Monitoring Program

With these tasks in mind, the Plan outlined four different categories for assessing sustainability initiatives, which are consistent with the Airports Council International – North America's (ACI-NA) definition of

Airport Sustainability. These four categories are, **E**conomic Viability, **O**perational Efficiency, **N**atural Resource Conservation, and **S**ocial Responsibility (EONS).

Regarding recycling, the Sponsor is working with RUMPKE Recycling where a single day's worth of trash at commercial passenger terminal was audited to get an understanding of the recyclables, solid waste and compost generated daily at DAY. This audit provided the necessary information to improve the existing recycling plan, which in turn improves the sustainability initiatives at DAY.

The following sections will provide a brief narrative on each of the tasks mentioned above.

2.8.1 Sustainability Baseline Assessment

As part of the baseline assessment, the Plan obtained and analyzed existing energy usage data at DAY from the City of Dayton between 2006-2011. Although energy usage was consistent between 2006-2011, energy usage and electricity, in general, are significant contributors to greenhouse gas emissions. DAY conducted an energy audit for the entire Airport and came up with the different initiatives. These initiatives and applicable sustainability categories (i.e., EONS) are summarized in **Table 2-12**.

Table 2-11. Existing Energy Initiatives

ENERGY INITIATIVES	SUSTAINABILITY BENEFIT(S)	APPLICABLE SUSTAINABILITY CATEGORIES (EONS)
Airfield Lighting – Airfield Lighting has been Upgraded to Light Emitting Diodes (LEDs)	Reduces overall amount of purchased electricity used, which also reduces GHG emissions.	**E, O, N**
Metered Pre-Conditioned (PC) Air – PC air units are individually Metered so that energy can be billed directly to the airlines.	Encourages energy Reductions.	**E, N**
Unified Electrical Metering – DAY was previously billed for its electricity at three different rates depending on the location of meter at the Airport. DAY negotiated a unified billing structure during recent negotiations with the utility.	Significant cost savings (approximately $35,000 Annually).	**E**

Source: DAY Sustainability Plan

2.8.2 Baseline Goals and Objectives

The goal outlined in the Plan is for DAY to utilize design and operational techniques to maximize energy efficiency and use clean and renewable energy sources. To meet this goal, three objectives were identified. They are as follows:

1. Reduce consumption of fossil fuel-based energy throughout Airport buildings.
2. Reduce consumption of fossil fuel-based energy throughout Airport vehicles and mobile equipment.

3. Increase capacity for and use of renewable energy sources for Airport operations.

To meet these objectives, high-priority and additional opportunities were identified, which included everything from installing tankless hot water heaters to provide hot water more efficiently, to converting airfield lighting, terminal and concourse lighting, and garage lighting to LED lights.

2.8.3 Identify and Evaluate Candidate Initiatives

Besides the baseline energy initiatives identified previously, additional candidate initiatives were also identified in the Plan. These initiatives summarized individually in **Tables 2-13** though **Table 2-16**. Like the energy initiatives, these candidate initiatives also have goals an objectives. These goals and objectives are summarized after each corresponding table.

Table 2-12. Existing People Initiatives

PEOPLE INITIATIVES	SUSTAINABILITY BENEFIT(S)	APPLICABLE SUSTAINABILITY CATEGORIES (EONS)
Passenger Experience and Satisfaction – Passenger experience and satisfaction initiatives include: • Operation of the DAYrider courtesy shuttle. • The RTA resumed bus service (#43) to the Airport starting in August 2013. • Hydration stations allow passengers to refill water bottles at no cost. • The Airport currently holds a Passenger Appreciation Day quarterly, which includes free blood pressure checkups for passengers. • Wi-Fi internet access is available throughout the terminal and in the cell phone lot. • DAY is conducting an airport Passenger Satisfaction Study to better understand further opportunities to improve the passenger experience. • Airport is pursuing new concessions to the terminal, renovating the existing Max & Erma's restaurant, and Chick-Fill-a was added in 2013.	Improves passenger satisfaction!	**O, N, S**
Employee Wellness – Employee wellness initiatives include: • In conjunction with the City of Dayton, Airport employees are eligible to participate in the Premier Health EmployeeCARE program at Miami Valley Hospital. This program provides counseling, other mental health services and other assistance to employees and their families. • Airport employees also have access to the WellVibe employee engagement tool, which helps employees track and implement their personal health goals.	Improves Employee Health!	**O, S**

Source: DAY Sustainability Plan

Existing People Goals and Objectives

DAY's goal for the existing people initiative is to implement actions to enhance the passenger experience and promote the well-being of Airport employees. To meet this goal, four objectives were identified. They are as follows:

1. Create and maintain a comfortable, pleasant environment throughout the Airport.
2. Provide amenities throughout the airport to enhance passenger experience.
3. Ensure that health and well-being of all Airport users, including passengers, Airport employees, and tenant employees is a priority.
4. Engage employees and community stakeholders in sustainability activities of the Airport.

DAY will have numerous opportunities to improve the passenger experience and employee well-being. These opportunities include: improving the convenience features for passengers; using healthy cleaning products and maintenance procedures and attracting local business and marketing the Airport for increased investment.

Table 2-13. Existing Environmental Stewardship Initiatives

Environmental Stewardship Initiatives	Sustainability Benefit(s)	Applicable Sustainability Categories (EONS)
Water Quality		
Maintenance – DAY conducts routine maintenance of the existing waterways, storm conduit outfalls and oil/water separators.	Decreases likelihood of water quality impacts.	**O, N**
Wetlands		
Wetland Mitigation Plans	Preserves natural resources and wetlands	**O, N**
Air Quality and Greenhouse Gas		
Fixed Gate Infrastructure – All airport gates are equipped with 400 HZ power and preconditioned air to allow aircraft parked at the gate to be plugged in and operate their electrical and HVAC systems without running their engines.	Reduces criteria pollutants, GHG emissions, aircraft noise, and reduces fuel use.	**N**
Cell Phone Waiting Lot – DAY offers a parking lot with a flight notification board where patrons can wait for deplaning passengers to reduce driving and/or idling of vehicles.	This helps the Airport maintain low GHG emissions, criteria pollutants, and terminal curbside congestion.	**O, N, S**
Semi-Consolidated Rental Car Operations – Rental car tenants at DAY are housed on the bottom floor of the passenger parking garage.	This minimized passenger trips to more remote locations for rental pick-up and drop-off, thus reducing fuel combustion, GHG emissions, and criteria air pollutants on airport roadways.	**O, N**
DAYrider Shuttle Service – A regular shuttle service operates between the terminal area and remote passenger access locations.	This service provides higher vehicle occupancy, thus reducing single-occupancy vehicle operation on airport roadways, reducing fuel use, GHG emissions, criteria air pollution in the airport vicinity.	**O, N**
Bus Service – The Greater Dayton Regional Transit Authority (RTA)	This minimizes passenger trips to the Airport, thus reducing fuel combustion, GHG	**N, S**

resumed bus service (#43) to the Airport starting in August 2013.	emissions, and criteria air pollutants.	
Water Management and Recycling		
Recycling – DAY's recycling program began with a partnership between Rumpke Recycling and DAY, and was officially announced to the public on May 1, 2012. • Scrap metals, carpeting, fluorescent lamps/ballasts, wood pallets, batteries, tires and motor oil are collected for recycling. • Cardboard is collected and placed in a separate compactor for recycling. • **Carpeting removed from airport is properly recycled.** • **Plastic/glass bottles are collected in designated recycling bin. It is recommended that the tops to the plastic bottle be removed prior to recycling.**	Reduces waste disposed in landfills.	**O, N**
Hydration Stations – Hydration stations have been installed to reduce the use of plastic bottles. Additionally, portable "Liquid Collection Stations" were placed at the TSA Security Checkpoints to reduce contaminations and weight of the commingled recycling.	Reduces waste disposed in landfills and improves passenger satisfaction because passengers can refill their bottles after the security checkpoint.	**O, N, S**
Materials Reuse – Reduced paper use through e-faxing and double-sided printing. In addition, grinding asphalt and re-use on site **(Non-FAA projects only)**	Materials reuse and reduction decreases waste disposed in landfills. Reduces cost of construction projects through materials reuse.	**E, O, N**

Source: DAY Sustainability Plan
Note: Waste Management and Recycling Plan is included in ***Appendix G.***

Existing Environmental Stewardship Goals and Objectives

DAY's goal for the existing environmental stewardship initiative is to minimize the Airport's impacts to the natural environment and consumption of natural resources. To meet this goal, five objectives were identified. They are as follows:

1. Evaluate alternative uses of non-aeronautical Airport properties to determine best options for protecting natural resources.
2. Reduce water consumption throughout Airport operations.
3. Minimize negative impacts to local water quality.
4. Reduce emission of criteria air pollutants and greenhouse gases.

5. Reduce overall generation of waste and increase diversion of waste from landfills and incinerators.

DAY will have numerous opportunities to maintain environmental stewardship initiatives in the areas of wetlands, air quality and GHG emissions, and waste management and recycling. These opportunities include: using Best Management Practices (BMP) during the construction phase to minimize indirect impacts to wetland resources; reducing electricity use and improving energy efficiency throughout Airport buildings and operations; and, providing recycling bins in concession areas, kitchens, ticketing counters, and agent counters.

Table 2-14. Existing Environmental Stewardship Initiatives

Existing Sustainable Investment Initiatives	Sustainability Benefit(s)	Applicable Sustainability Categories (EONS)
Community Outreach – Community outreach initiatives include: • The Airport holds an Air Camp each year, which introduces students to the aviation facilities and resources in the region. The Camp is hosted by Wright State University. Students are introduced to, and have opportunities to explore, the Air Force Research Laboratory, the National Museum of the U.S. Air Force, Dayton History, and the Boonshoft Museum of Discovery. • Founded in 1975, the annual Dayton Vectren Airshow is one of the premier airshows in the U.S. The airshow showcases world class aerobatic champions, military jet demonstrations, and entertainment. Celebrating Dayton's Aviation heritage as home of the Wright Brothers, national museum of the US Air Force and Wright Patterson AFB. This is a family-oriented festival at the Airport with aircraft exhibits, flyovers, and local music and food. Local children's' artwork is prominently displayed in the parking garage and terminal entryways.	Provides positive exposure for the Airport in the community.	**S**

• Small Business Opportunity Forum		
Community Outreach – DAY has ongoing volunteer and donor relationships with the following charities: • Special Olympics • Aullwood Audubon Center and Farm Honey Creek Watershed Association Rotary Club of Dayton, OH • United Way • Children's Water Festival • Dayton Art Institute • Boys and Girls Club of Dayton March of Dimes • Girl Scouts of America • Premier Health • St Christopher Council • Honor Flight • USO of Central Ohio	Provides positive exposure for the Airport in the community.	**S**

Source: DAY Sustainability Plan

Existing Sustainable Investment Goals and Objectives

DAY's goal for the existing sustainable investment initiative is to engage in sustainable and responsible investment of its land, capital, and human resources to contribute to a thriving regional economy that attracts and retains business partners. To meet this goal, three objectives were identified. They are as follows:

- Incorporate life cycle analysis into all Airport planning and operations.
- Support the local and regional economy.
- Support community outreach and engagement activities that promote social, economic, and environmental sustainability throughout Southwest Ohio.

In order to meet these objectives, DAY will continue to provide connectivity and be an economic engine for the southwest Ohio region. Opportunities for DAY to improve sustainable investments and enhance community benefits include: use of locally-sourced materials and supplies; conducting life cycle cost/benefit analysis; and, identifying material reuse opportunities.

Table 2-15. Existing Resiliency Initiatives

CLIMATE IMPACTS INITIATIVES	SUSTAINABILITY BENEFIT(S)	APPLICABLE SUSTAINABILITY CATEGORIES (EONS)
Microgrid Study – The Center for Transportation and the Environment is pursuing funding for use of Microgrid Technology at DAY, an efficient and energy-secure operation which would be independent from the local, traditional utility power grid.	Increases energy efficiency and allows DAY to continue service during a utility system failure due to maintenance, natural disasters, or national security issues.	**E, O, N**
Education and Outreach: Climate Change – The City of Dayton has partnered with Wright State University to pursue a grant through GLAA-C to support education and outreach efforts around climate change. DAY is providing assistance to these efforts by conducting some public surveys at the Airport.	Increases awareness of climate change, local impacts, and efforts to mitigate and adapt	**E, O, N, S**

Source: DAY Sustainability Plan

Existing Resiliency Goals and Objectives

DAY's goal for the existing resiliency initiative is to embrace regional efforts to implement actions to enhance the Airport's resiliency to impacts associated with climate change. To meet this goal, three objectives were identified. They are as follows:

- Update infrastructure to withstand extreme weather events.
- Incorporate green infrastructure standards into Airport design, construction, and maintenance guidelines.
- Develop plans to ensure the Airport has the right people and equipment for disaster response.

In order to meet these objectives, DAY has identified areas where the Airport can increase their resiliency to climate change impact. These include: developing reliable energy sources on-site and upgrading outdated infrastructure; implementing green infrastructure projects and incorporating green infrastructure into design standards; coordinating with the City of Dayton and local/regional/state agencies in disaster response planning; and, using DAY's visibility for educational outreach on climate change and its impacts.

2.8.4 Develop Implementation and Monitoring Program

To provide a guide for implementing sustainability at DAY, a "Playbook" was created. It should be noted that this playbook only includes short-term initiatives and strategies. Mid- and long-term initiatives may require additional evaluation and future analysis may be warranted. The framework for the Playbook is as follows:

- Playbook introduction
- DAY "Green" Team Members/Organizational Chart
- Sustainability Initiatives and Strategies Matrix
- Prioritization Charts (per goal category)
- Highlight (Playbook) Sheets (Top initiatives for each goal category)
- Sustainability Decision Flow Chart

- Purchasing Requisition Flow Process
- Capital Improvement Projects – Planning/Design/Construction Process
- Performance Monitoring

The ultimate goal of the playbook is to act as a steering guide to implement sustainability initiatives at DAY. This playbook also helps the City of Dayton Department of Aviation determine which initiatives to prioritize and include within the Airport Capital Improvement Program (ACIP) to pursue Federal, State and Local grant funding.

An Annual Sustainability Report Card is used to track the progress of each sustainable initiative. **Table 2-17** summarizes the report card, and the scoreboard results from each initiative is included in **Appendix H.**

Table 2-16. Performance Metrics Included in Annual Sustainability Report Card (Scoreboard)

Performance Metrics	Tracking Frequency	Primary Data Source
	Energy	
Buildings		
Energy Use Intensity (kWh/sq ft) by building	Annually	Accounting Clerk
Energy Consumption (MMBtu) by building	Annually	Accounting Clerk
Vehicles & Equipment		
Total vehicles and equipment gas & diesel consumption	Annually	Field Maintenance
	People	
Number of customer appreciation events and other airport events	Annually	Marketing Manager
Number of health and wellness clinics	Annually	Marketing Manager
Facebook reach and likes/comments/shares per post	Annually	Marketing Manager
	Environmental Stewardship	
Sustainable Land Management		
Acreage of native warm season grasses	Annually	Environmental Scientist
Acreage of slow growth grasses	Annually	Environmental Scientist
Carbon emissions and fertilizer reductions resulting from sustainable land management practices	Annually	Calculated by Scoreboard from Acreage of native warm seasons grasses and Acreage of slow growth grasses
Waste Management and Recycling		
Percentage of Waste and Recycling (by weight)	Monthly + Annually (by weight)	Environmental Scientist
Number of disposable water bottles diverted from waste stream (readings from 5 water refilling stations)	Quarterly + Annually	Environmental Scientist
Liquid diverted from waste stream (through liquid collection stations)	Quarterly + Annually	Environmental Scientist
Performance Metrics		
Glycol recovery percentage	Annually (by winter season)	Environmental Scientist

Sustainable Investment		
Purchasing – tracking of local and DBE contract values (City of Dayton Human Relations Council, HRC)	Annually	City of Dayton HRC
Local and Regional economic development impact	Dependent on State Aviation System Planning updates	Ohio DOT Office of Aviation (Airports Focus Study)
Resiliency		
Number of NWS Storm-ready DAY staff	Annually	Environmental Scientist
Number/costs of severe weather events	Annually	NOAA NWS

Source: DAY Sustainability Plan

2.9 Economic Impact

As a part of the ODOT System Plan update, an inventory the economic impact of all 104 public-use airports in Ohio were studied.

The Economic Impact Study conducted in 2012 collectively found that the 104 airports supported:

- Supported nearly 123,500 jobs.
- Generated nearly $4.2 billion in annual payroll.
- Produced more than $13.3 billion in annual economic output.

These figures include expenditures by many airport businesses, government agencies and revenue from passenger travel.

In 2012, as a part of the Economic Impact Study, ODOT assessed each of the 104 airports individually to understand how each airport contributed to the overall economic impact from aviation in Ohio. DAY is the third busiest airport in Ohio. With over 30 on-airport businesses (e.g.., three FBOs, airport administration, airlines, parking, car rental, retail and restaurant, aircraft charters and air cargo) the economic impact from jobs resulted in, 1,616 jobs. This results in approximately $84.9 million in payroll and $272.7 million in output. Because there is a link between air travel and tourism, there are collateral economic impacts from airport economic output. Construction of hotels, convention centers and retail for example, had an economic impact of approximately 4,646 jobs in 2012. This resulted in $105.4 million in payroll and $308.4 million in output. Including the multiplier impacts (i.e., material suppliers, visitor dependent businesses, and construction dependent businesses) DAY had a total economic impact of 11,111 jobs. Which resulted in a total payroll of $351.5 million and an output of $1 billion. Therefore, DAY's economic impact makes up approximately 30% of Ohio's total economic impact. DAY's economic impact results are included in **Appendix I**.

2.10 Conclusion

This chapter serves as an overview of the existing conditions at DAY. The data in this chapter is pivotal to understanding aviation demand. Studies have shown direct correlation between population trends and the number of based aircraft owners in areas adjacent to airports. In that regard, the data presented in this chapter will be considered for the completion of the aviation demand forecast in Chapter 3 of this Master Plan.

Chapter 3:

Aeronautical Forecasts and Air Service (Passenger Demand) Evaluation

3.1 Introduction

Aviation forecasts are the driving factor behind future development decisions at an airport. In this chapter, projected aviation demand at DAY over the next 20 years is presented. These projections impact future facility needs, both airside and landside.

Forecast development requires an understanding of current and historical airport operations, industry trends, and economic conditions within DAY's primary catchment area (i.e., market). These variables are factored into a forecast scenario that provides the airport with an expected plan of future passenger enplanements and aircraft operations. During the writing of this chapter, the airline industry was recovering from the significant impacts of the Novel Coronavirus (COVID-19) pandemic, which significantly impacted passenger enplanements within the US and throughout the world. DAY was no exception. At the start of the pandemic, from March 2020 to April 2020, DAY experienced a 95% reduction in passenger enplanements. Since then, enplanements have been increasing. Since Fiscal Year (FY) 2021 (October 2020 – September 2021) is the most recent full fiscal year of available data, this chapter now uses FY 2021 as the base year.

The assumptions, methodologies, and data used to create the various airport activity projections are presented and analyzed in the following sections:

- Enplaned Passengers
    - 5-, 10- and 20-year forecast
    - Load Factors
- Air Carrier Activity
    - Operations
    - Fleet Mix
- Air Cargo Activity
    - Volume
    - Operations
- General Aviation, including Military Activity
    - Based Aircraft
    - Operations
- Peak Activity
    - Passengers
    - Operations

3.1.1 Forecast Data Sources

The main sources used create DAY's forecast are listed below.

- Airport Management – Airport management representatives typically provide the most accurate historical data and future operational assumptions at the Airport. This data includes passenger and operational activity, fleet mix transitions, and upcoming service changes. DAY's statistical data was obtained from the Dayton website and airport staff, then analyzed for historic and future trends.

- FAA Terminal Area Forecast (TAF) – TAF activity estimates are derived by the FAA from national estimates of aviation activity. These estimates are then assigned to individual airports based on multiple market and forecast factors. The FAA factors in local and national economic conditions and trends within the aviation industry to develop each forecast. In May 2021, the FAA issued its latest TAF which forecasted the enplanements for airports given the impact of COVID-19.

- FAA Aerospace Forecast (FY 2021-2041) – This forecast provides an overview of aviation industry trends and expected growth for the commercial air carrier passenger and operational activity. National growth rates in enplanements and operations, as well as growth and mix for commercial fleets, are provided over a 20-year forecast horizon. For the purposes of the DAY forecast, the FAA Aerospace Forecasts are used to determine potential activity growth at DAY. FAA Aerospace Forecasts also provide insight into future air cargo growth trends on a national and international level.

- Boeing Commercial Market Outlook (2020-2039) – This market outlook provides information detailing future fleet mix transitions, such as new aircraft entering the market and future equipment retirements, for commercial and air cargo carriers.

- Airbus Global Market Forecast (FY 2019-2038) and Boeing World Air Cargo Forecast (2020-2039) – These forecasts provide insight into future cargo fleet growth and anticipated fleet mix of both domestic and foreign air cargo carriers. These insights were used to assist in developing and confirming the validity of the future DAY cargo carrier fleet mix and projected cargo volume.

- US Census Bureau – The Census Bureau provides historic and projected demographic and socioeconomic data.

3.1.2 DAY Catchment Area Process of Determination

A commercial service airport, like DAY, provides service to residents and businesses within a vast area surrounding the airport. The surrounding municipalities around an airport make up what can be referred to as a catchment area. It is essential to know that many approaches are used to define an airport's catchment area; for example, some methods are aggressive, others include primary and secondary areas, and some are conservative, focusing on identifying the "home airport" of a region. This master plan used a traditional approach (identifying the "home airport") for DAY in developing the True Market Estimate (e.g., leakage study). The True Market Estimate quantifies the number, by destination, of air travelers in the market. This includes those who drive to an airport other than the "home airport" (i.e., DAY) to originate the air travel portion of their trip.

Passenger diversion estimates are based on market and destination data developed from airline ticketed information from Airline Reporting Corporation (ARC) mathematically combined with U.S. Department of Transportation (DOT) reported airline information; thus, creating the best possible estimate for the catchment area.

3.1.3 DAY Catchment Area

The catchment area for DAY consists of the following counties: Montgomery County, Clark County, Greene County, Preble County, Darke County, Miami County, Shelby County, Mercer County, Allen County, Highland County, Auglaize County, Logan County, Champaign County, Randolph County IN, Wayne County IN, Warren County, and Butler County, as shown in **Figure 3-1**[1].

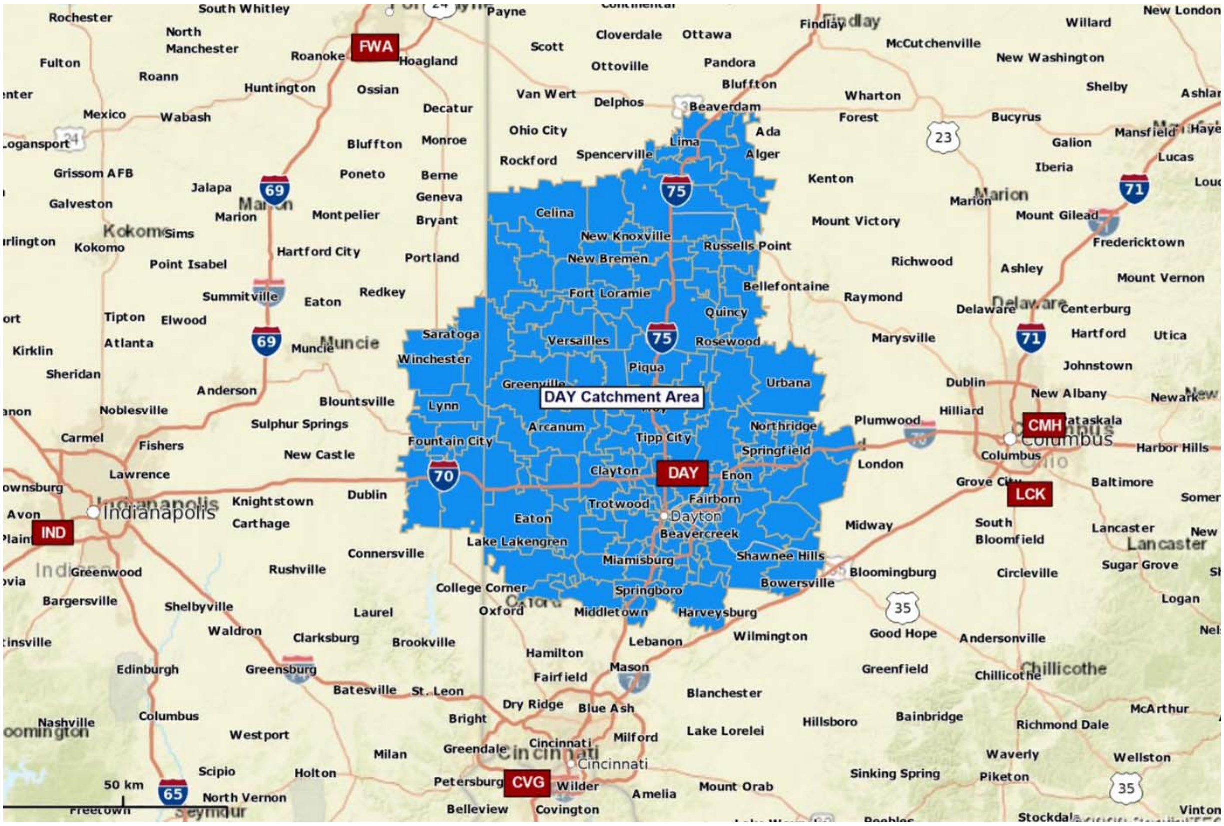
Socioeconomic data from these 17 counties were analyzed and compiled together to determine compound average growth rates (CAGRs).[2] The socioeconomic data for each county will be explained further in the sections below.

The catchment areas for John Glenn Columbus International Airport and Cincinnati/Northern Kentucky International Airport overlap with the catchment area for DAY. Therefore, for planning purposes and current marketing efforts, socioeconomic data from the entire county was used, even for those counties located further from DAY.

[1] Mead and Hunt, 2020

[2] Socioeconomic data was obtained from the U.S. Census Bureau – 2015-2019 American Community Survey 5-Year Estimates dataset.

Figure 3-1: DAY Catchment Area



Source: Mead & Hunt; Passero Associates

3.1.4 Socioeconomic Data

Socioeconomic factors influence a community's need for airport services, specifically **population, per capita income, and employment status**. Population can influence the demand for air travel within the area. Per capita income can be a strong driver of aviation demand, as it reflects a community's level of discretionary income and ability to afford air travel. Employment levels are often directly associated with both per capita income and population. Preliminary socioeconomic data is presented as a basis for forecasting efforts.

3.1.4.1 Population

Table 3-1 lists the historic population trends for the catchment area.

Table 3-1: Historic Population Trends

Year	Montgomery County	Clark County	Greene County	Preble County	Darke County	Miami County	Shelby County	Mercer County	Allen County	Highland County	Auglaize County	Logan County	Champaign County	Randolph County (IN)	Wayne County (IN)	Warren County	Butler County	Catchment Area
2010	538,461	139,374	159,940	42,502	52,945	102,315	49,350	40,958	106,586	43,648	46,023	46,006	40,140	26,262	69,187	207,790	363,465	2,074,952
2011	537,409	138,782	160,940	42,394	52,907	102,487	49,389	40,918	106,468	43,631	45,986	45,964	40,092	26,205	68,990	210,662	366,167	2,079,391
2012	535,626	138,278	161,936	42,240	52,776	102,657	49,359	40,866	106,079	43,454	45,934	45,816	39,982	26,101	68,797	213,146	368,029	2,081,076
2013	536,433	137,763	162,588	42,050	52,666	102,867	49,317	40,811	105,895	43,395	45,906	45,678	39,855	25,975	68,557	215,274	369,650	2,084,680
2014	534,801	137,303	163,313	41,887	52,537	103,145	49,165	40,789	105,562	43,266	45,867	45,564	39,628	25,801	68,360	217,623	371,154	2,085,765
2015	533,763	136,827	164,192	41,682	52,356	103,517	49,067	40,863	105,196	43,170	45,873	45,484	39,393	25,596	67,866	219,916	372,538	2,087,299
2016	532,761	136,175	164,325	41,561	52,185	103,864	48,949	40,886	104,664	43,109	45,871	45,388	39,175	25,403	67,423	222,184	373,638	2,087,561
2017	531,987	135,520	164,825	41,328	51,919	104,081	48,902	40,723	104,157	43,031	45,778	45,323	39,005	25,203	66,972	223,868	375,702	2,088,324
2018	532,034	135,198	165,811	41,207	51,734	104,800	48,797	40,806	103,642	43,007	45,784	45,307	38,864	25,076	66,613	226,564	378,294	2,093,538
2019	531,670	134,726	166,502	41,093	51,513	105,371	48,749	40,884	103,175	43,016	45,729	45,316	38,845	24,926	66,342	229,132	380,019	2,097,008
CAGR 2010-2019	-0.14%	-0.38%	0.45%	-0.37%	-0.30%	0.33%	-0.14%	-0.02%	-0.36%	-0.16%	-0.07%	-0.17%	-0.36%	-0.58%	-0.47%	1.09%	0.50%	0.12%

Source: U.S. Census Bureau, 2010-2019 American Community Survey

3.1.4.2 Total Employment

Table 3-2 lists historic employment status of people employed (within a 12-month period) trends for the catchment area.

Table 3-2: Historic Total Employment

Year	Montgomery County	Clark County	Greene County	Preble County	Darke County	Miami County	Shelby County	Mercer County	Allen County	Highland County	Auglaize County	Logan County	Champaign County	Randolph County (IN)	Wayne County (IN)	Warren County	Butler County	Catchment Area
2010	428,040	109,967	128,976	33,307	41,302	80,529	37,317	31,453	83,862	33,852	35,813	35,632	31,172	11,282	55,183	156,241	281,701	1,615,629
2011	427,922	109,823	130,239	33,351	41,207	80,702	37,564	31,527	84,103	33,692	35,743	35,676	31,250	11,467	55,007	158,983	284,286	1,622,542
2012	426,621	109,758	131,416	33,230	41,172	81,000	37,664	31,560	83,842	33,689	35,767	35,631	31,306	11,142	54,984	161,420	286,314	1,626,516
2013	428,036	109,660	131,994	33,193	41,029	81,280	37,728	31,676	83,868	33,715	35,767	35,678	31,397	11,054	54,808	163,601	287,971	1,632,455
2014	426,693	109,322	132,889	33,097	41,025	81,578	37,691	31,642	83,535	33,641	35,836	35,791	31,364	11,129	54,649	166,056	289,638	1,635,576
2015	426,467	109,187	133,798	33,060	41,033	82,033	37,801	31,707	83,408	33,695	35,816	35,766	31,325	11,078	54,492	168,617	291,832	1,641,115
2016	426,445	108,746	134,129	33,117	40,966	82,668	37,782	31,861	83,065	33,870	36,012	35,914	31,329	11,142	54,236	170,933	293,547	1,645,762
2017	426,873	108,254	134,721	33,117	40,829	82,775	37,889	31,636	82,706	33,872	35,900	36,053	31,287	11,201	53,898	173,155	295,554	1,649,720
2018	427,626	108,163	135,710	33,008	40,806	83,552	38,005	31,625	82,330	33,872	35,997	36,068	31,328	11,030	53,623	176,062	298,718	1,657,523
2019	427,551	108,131	136,388	33,028	40,635	84,088	37,941	31,612	82,102	34,122	36,050	36,144	31,345	11,186	53,448	178,795	300,636	1,663,202
CAGR 2010-2019	-0.01%	-0.19%	0.62%	-0.09%	-0.18%	0.48%	0.18%	0.06%	-0.24%	0.09%	0.07%	0.16%	0.06%	-0.09%	-0.35%	1.51%	0.73%	0.32%

Source: U.S. Census Bureau, 2010-2019 American Community Survey

3.1.4.3 Per Capita Income

Table 3-3 lists the per capita income for residents within the catchment area. Per capita income is the measure of the average income in a certain area and is used to evaluate the living conditions and the quality of life. This number is calculated by dividing the gross domestic product in an area or country by the total number of people in that area or country.

Table 3-3: Historic Per Capita Income

Year	Montgomery County	Clark County	Greene County	Preble County	Darke County	Miami County	Shelby County	Mercer County	Allen County	Highland County	Auglaize County	Logan County	Champaign County	Randolph County (IN)	Wayne County (IN)	Warren County	Butler County	Catchment Area
2010	$24,828	$22,110	$28,328	$23,290	$21,483	$25,006	$21,948	$22,348	$21,713	$18,966	$23,383	$22,974	$23,438	$20,494	$55,183	$31,935	$25,892	$25,489
2011	$25,225	$22,434	$29,101	$22,896	$22,095	$25,079	$22,810	$22,689	$21,878	$19,202	$26,323	$22,898	$23,093	$20,477	$55,007	$32,114	$26,397	$25,866
2012	$24,909	$22,616	$29,755	$23,509	$22,714	$25,653	$22,919	$23,371	$22,187	$19,557	$25,901	$22,993	$23,699	$20,519	$54,984	$32,681	$26,492	$26,145
2013	$24,997	$22,780	$30,040	$23,374	$22,511	$25,369	$24,028	$24,157	$22,295	$19,348	$25,323	$22,878	$23,358	$20,453	$54,808	$33,172	$26,813	$26,218
2014	$25,171	$22,941	$30,629	$23,603	$22,582	$25,654	$25,603	$24,362	$22,585	$19,587	$25,033	$23,897	$23,573	$20,406	$54,649	$33,421	$27,394	$26,535
2015	$25,734	$23,445	$31,075	$23,414	$22,832	$26,320	$26,741	$24,978	$22,922	$20,240	$25,727	$25,428	$23,513	$20,273	$54,492	$34,271	$27,490	$26,994
2016	$26,392	$23,992	$31,877	$24,605	$23,589	$27,247	$27,330	$26,236	$23,600	$21,134	$26,690	$25,877	$24,715	$20,237	$54,236	$36,057	$28,556	$27,786
2017	$27,602	$25,270	$33,138	$25,374	$24,768	$28,051	$28,410	$27,540	$24,551	$22,079	$28,340	$26,525	$25,528	$20,076	$53,898	$37,479	$29,745	$28,728
2018	$28,807	$25,948	$34,682	$27,031	$26,262	$29,703	$29,008	$28,513	$25,662	$22,624	$29,908	$27,840	$26,515	$20,007	$53,623	$39,448	$30,777	$29,786
2019	$30,034	$27,066	$35,833	$28,890	$27,855	$31,254	$29,381	$29,765	$26,761	$23,543	$31,198	$29,424	$27,722	$19,945	$53,448	$41,792	$31,921	$30,931
CAGR 2010-2019	2.14%	2.27%	2.65%	2.42%	2.93%	2.51%	3.29%	3.24%	2.35%	2.43%	3.26%	2.79%	1.88%	-0.30%	-0.35%	3.03%	2.35%	2.17%

Source: U.S. Census Bureau, 2010-2019 American Community Survey

3.1.5 Socioeconomic Data Trend Summary

Like many American cities, counties and states during the Great Recession of 2008 played a pivotal role in the ebb and flow of socioeconomic trends. In many rust-belt states in the Midwest US, manufacturing and supply industries experienced a lot of job loss during the Great Recession. Several metropolitan areas in Ohio, including the Dayton metropolitan area, were hit hard during this time, which left many residents within the region, and within the airport's catchment area without jobs.

3.1.5.1 Total Population Summary

As shown by the data listed in **Table 3-1**, total population within the catchment area yielded a positive growth rate of 0.12% between 2010 and 2019. **Figure 3-2** depicts a chart summarizing the total population within the catchment area.

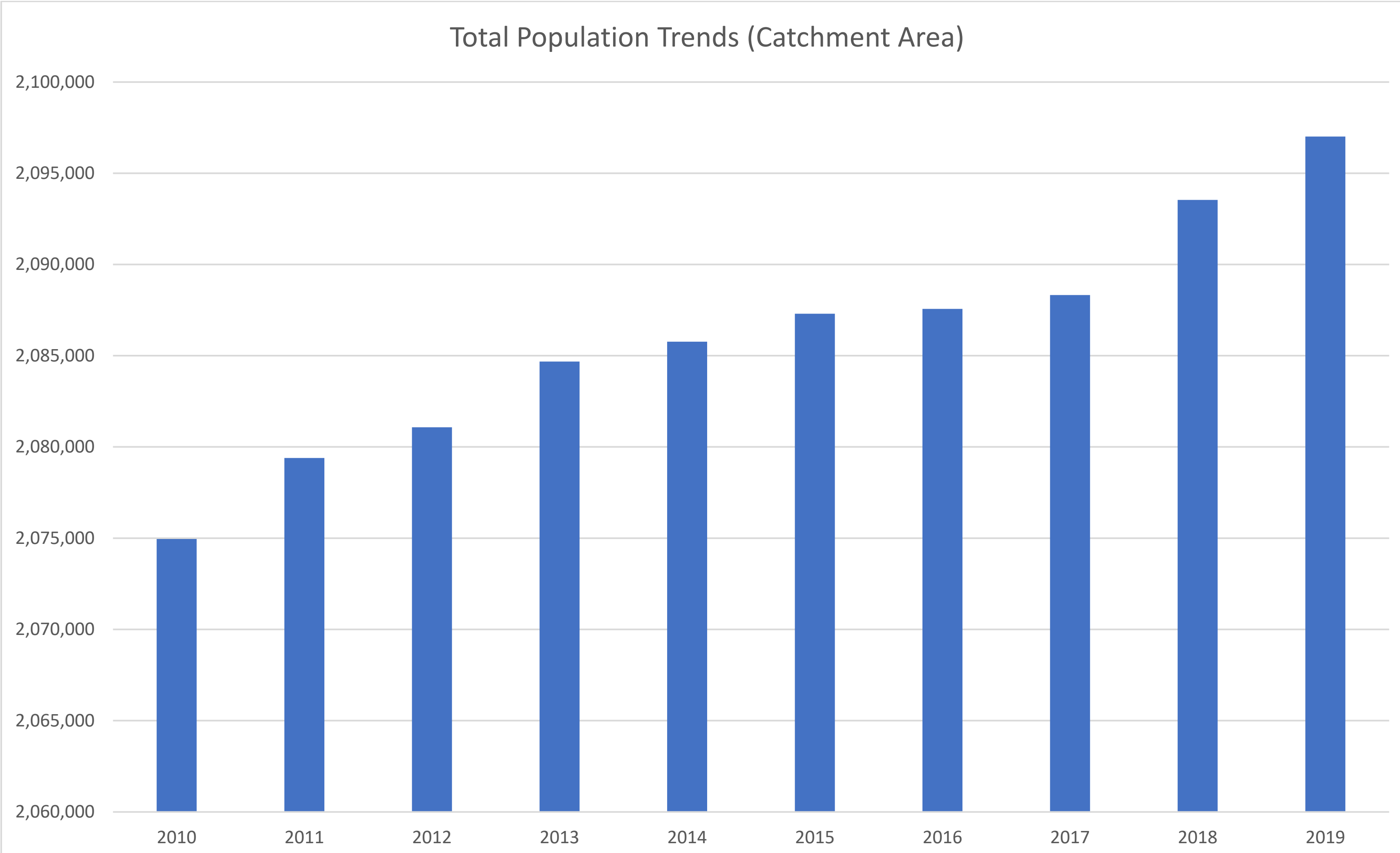
3.1.5.2 Total Employment Summary

Although the employment status of the residents within Montgomery County decreased by 0.01% between 2010 and 2019, rate of employment within the catchment area increased by 0.32% within that same time-period. **Table 3-2** and **Figure 3-3** illustrates the results.

3.1.5.3 Per Capita Income

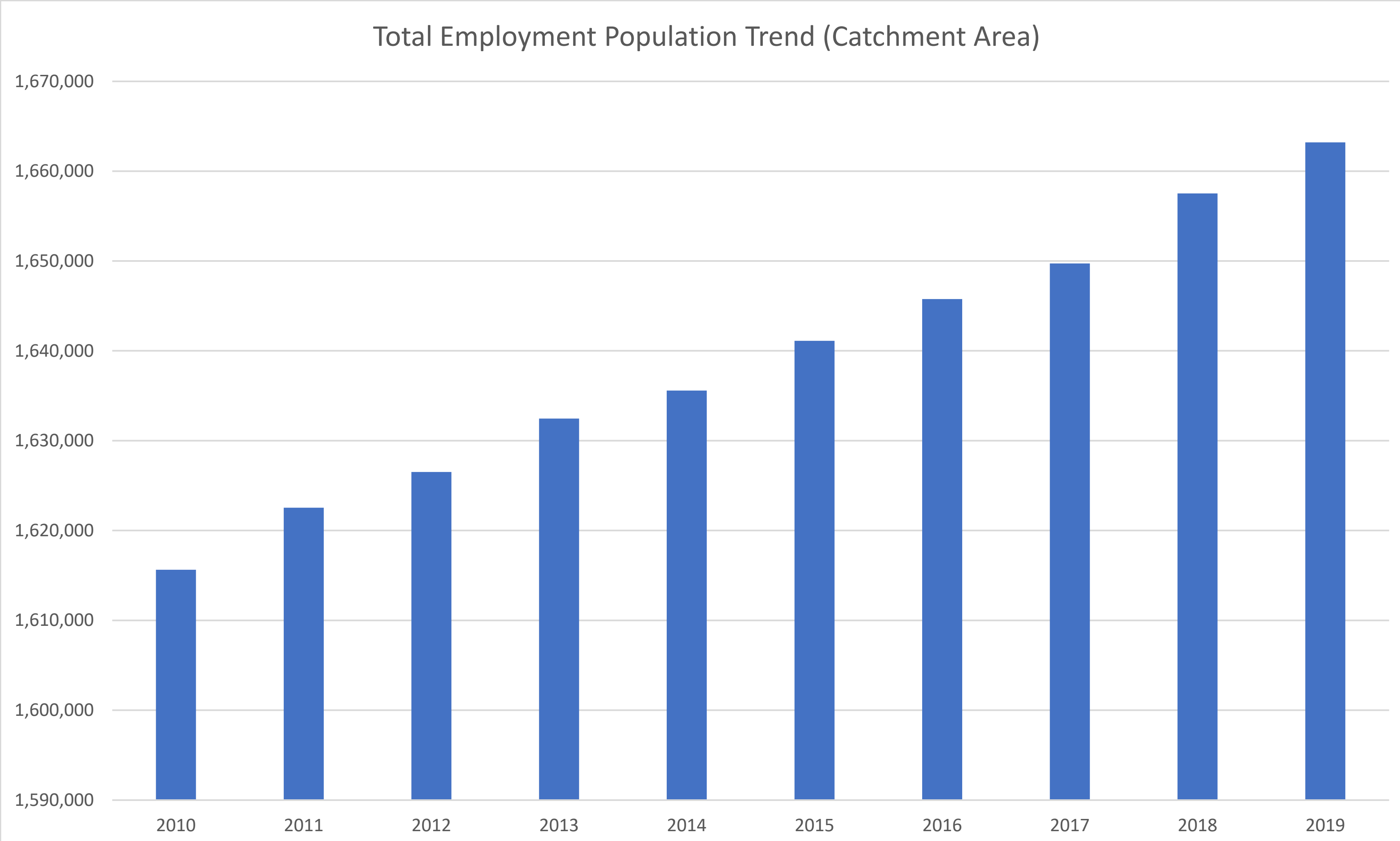
As shown in **Table 3-3**, the average per capita income in the catchment area grew at approximately 2.17% between 2010 and 2019. **Figure 3-4** illustrates the results.

Figure 3-2: Total Population Trends for the Catchment Area (CAGR – Historical)



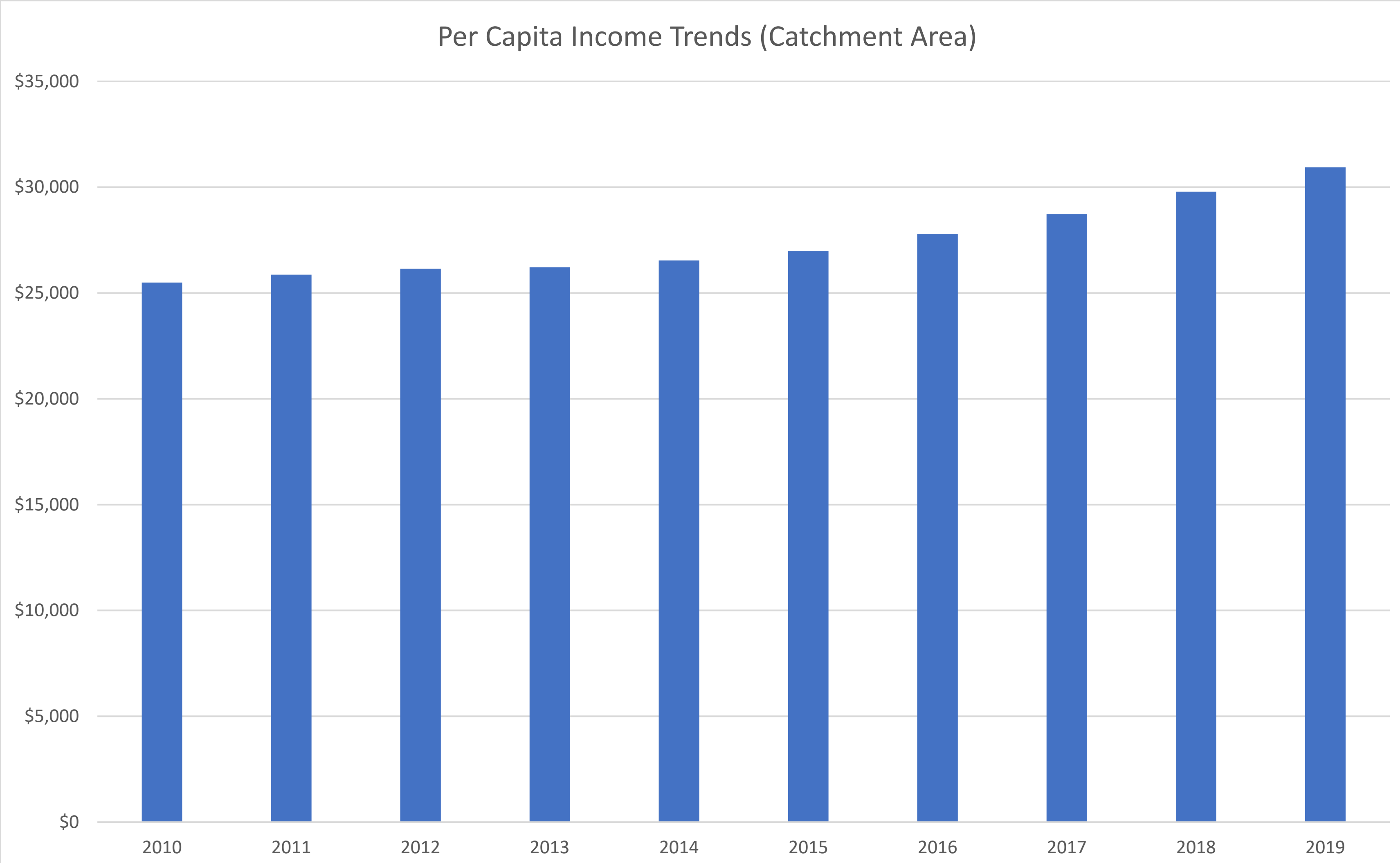
Source: Source: U.S. Census Bureau, 2010-2019 American Community Survey, Passero Associates

Figure 3-3:Total Employment Trends for the Catchment Area (CAGR – Historical)



Source: U.S. Census Bureau, 2010-2019 American Community Survey, Passero Associates

Figure 3-4: Per Capita Income Trends within the Catchment Area (CAGR – Historical)



Source: U.S. Census Bureau, 2010-2019 American Community Survey, Passero Associates

3.1.6 Gross Regional Product (GRP)

Gross Regional Product (GRP) measures the size or net wealth generated by a local and regional economy, opposed to Gross Domestic Product (GDP) which measures the total monetary or market value of goods and services produced within a country. Changes in the GRP represent changes in total employment, productivity, and related types of industries in a region.

The local Industry GRP shows the value of the local economy, which is generated by workers within a regional area, regardless of where they live. It is best thought of as GRP produced by local industries, within the region.

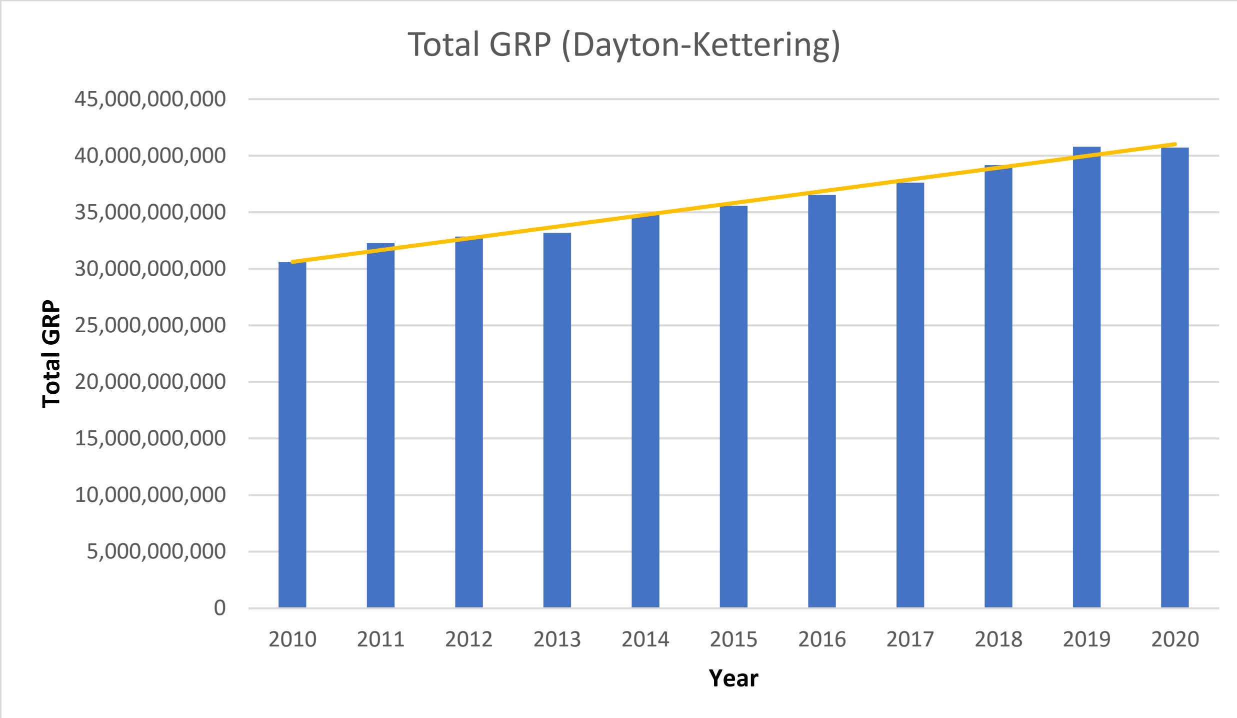
As shown in **Table 3-4** and **Figure 3-5**, the total GRP within the Dayton-Kettering area observed average annual growth of 2.9% between the period of 2010 to 2020.

Table 3-4: Total GRP (Dayton-Kettering)

Year	Total GRP (Dayton-Kettering)	Year-Over-Year % Change
2010	30,590,386,498	-
2011	32,268,115,537	5.48%
2012	32,859,359,907	1.83%
2013	33,173,783,164	0.96%
2014	34,762,166,210	4.79%
2015	35,570,092,242	2.32%
2016	36,534,006,301	2.71%
2017	37,626,649,110	2.99%
2018	39,161,479,036	4.08%
2019	40,802,803,179	4.19%
2020	40,730,831,695	-0.18%
CAGR 2010-2020		***2.90%***

Source: Dayton Development Coalition; Passero Associates

Figure 3-5: Total GRP (Dayton-Kettering)



Source: Dayton Development Coalition; Passero Associates

Industries that contribute to the GRP include:

- Agriculture, Forestry, Fishing and Hunting;
- Mining, Quarrying, and Oil and Gas Extraction;
- Utilities;
- Construction;
- Manufacturing;
- Wholesale Trade;
- Retail Trade;
- Transportation and Warehousing;
- Information;
- Finance and Insurance;
- Real Estate and Rental and Leasing;
- Professional, Scientific, and Technical Services;
- Management of Companies and Enterprises;
- Administrative and Support and Waste Management and Remediation Services;
- Educational Services;
- Health Care and Social Assistance;
- Arts, Entertainment, and Recreation;
- Accommodation and Food Services;
- Other Services (except Public Administration);
- Government; and
- Unclassified Industry.

3.1.6.1 Dayton as a Logistics and Manufacturing Hub

Since 2014, Dayton and the surrounding region have experienced a specific rebirth within the economy. The area has greatly been evolving into a logistics and manufacturing hub, not only because of its prime location at the crossroads of Interstates 70 and 75, but also because of the availability and affordability of land surrounding the airport that companies have been actively developing. Beginning in 2014, manufacturing, transportation, and warehousing businesses have opened on and around Dayton International Airport, on lands that were owned by the City and Airport. This has continued, and as of this writing there are new lands under contract for development.[3]

In 2015, Proctor and Gamble opened a 1.8 million square foot distribution center adjacent to the airport, which employs up to 1,400 people. This development sparked the recent historical growth in the immediate area. In 2016, Chewy opened a 700,000 square foot fulfillment center, creating 600 new jobs, and has since doubled its workforce.[4] Furthermore, in 2019, lands immediately adjacent to the airport were developed as well. Crocs entered the region with a new 550,000 square foot warehouse and distribution building. In 2020, they expanded into a second building and now employ 1,200 people in more than one million square feet of space. Other companies that moved into this development area include Spectrum Brands, Pratt Industries, ALPLA, Purina Mills, and General Pet Supply. Combined, these industries have already created at least 2,700 new jobs, with plans to add more.[5]

In 2021, the same developer that invested in most of the new warehouse facilities for the companies referenced above, purchased lands northeast of the airport to develop an additional 500,000 square foot facility that is expected to bring in 400 additional jobs.

Two other developers are building large industrial facilities near the airport. One building will be 1.2 million square feet with 700 employees. Another building is 55,000 square feet and is occupied by Fast Track It, an online auctioneer. In City of Union, located just west of the airport, Amazon will be constructing a new 630,000 square foot fulfillment center, which is expected to bring in 1,500 additional jobs.[6]

Finally, on the previous Emery Cargo apron and warehouse site, which is located on airport property, the Signet Real Estate Group is developing a major Maintenance-Repair-Overhaul (MRO) facility to support a national aerospace and defense contractor, in a new hangar complex that will be one of the largest hangars in the US. This development will create hundreds of new, on-airport aviation-related jobs.

3.1.6.2 Additional Regional Growth

Beyond the airport and its adjacent lands, additional economic development and job growth is underway within the region. The National Air and Space Intelligence Center is being expanded at Wright-Patterson Air Force Base (WPAFB), located 16 miles from Dayton International Airport. This project alone is anticipated to create 1,400 new jobs.[7] Additionally, in 2022 the WPAFB will be the home of the

[3] https://www.daytondailynews.com/local/2700-jobs-around-airport-area-and-growing-how-it-became-a-hub-for-distribution-jobs/OBCER7QUIBHIHN26WXGMQB77C4/

[4] https://www.bizjournals.com/dayton/news/2021/01/13/dayton-community-spotlight-airport-development.html

[5] https://www.daytondailynews.com/local/2700-jobs-around-airport-area-and-growing-how-it-became-a-hub-for-distribution-jobs/OBCER7QUIBHIHN26WXGMQB77C4/

[6] https://www.wkyc.com/article/news/local/ohio/ohio-taxpayers-footing-bill-grant-project-aiding-amazon/95-ef39e8ff-e8c7-4ab0-bae7-5a6cd3395774

[7] https://www.daytondailynews.com/news/ohio-leads-the-way-in-space-first-ever-forum-declares/NYVI6FQWCFHJRMZHTQORENL67Y/

relocated headquarters for the Hybrid Product Support Integrator Organization, which will bring an additional 440 new jobs.[8] Due to these developments at the air force base, defense contractors in the area are expected to follow, and result in additional new jobs.

Furthermore, from 2019-2021 other economic development noted by the Dayton Development Coalition and JobsOhio (not including the developments mentioned above) in Montgomery County have created over 1,000 jobs with combined payrolls in excess of $65 million.

Economic development on the airport, adjacent to the airport, and within the Dayton Region is actively growing, and plays a vital supporting role for the future of Dayton International Airport. Still, while the GRP within the Dayton-Kettering area has shown an average annual growth of 2.9% between 2010 and 2021, historical enplanement and operation data over that same period at DAY have decreased. However, due to the more recent development in the region, it is anticipated that the downward enplanement and operation trends will reverse. Aside from projecting an increase in aviation demand to some degree, the historical downward trends rule out the ability to use the GRP growth as a direct correlation to further project enplanements and aircraft operations.

3.1.7 Destinations and Nearby Airports

As shown earlier in this chapter on **Figure 3-1**, DAY is located within 85 miles and a 1 ½ hour drive time of the following major airports:

- John Glenn Columbus International Airport (CMH) – 77.9 miles; 1-hour 15-minute drive; east of DAY
- Cincinnati-North Kentucky International Airport (CVG) – 78.4 miles; 1-hour 21-minute drive; southwest of DAY
- Rickenbacker International Airport (LCK) – 82.5 miles; 1-hour 21-minute drive; southwest of DAY

DAY is a small-hub airport. Prior to the pandemic, it offered non-stop service to 16 destinations[9] via four air carriers: American Airlines, Delta Air Lines, United Airlines, and Allegiant Airlines.

CMH, a medium hub airport, offers flights to 40 destinations, while CVG, another medium hub airport, offers flights to over 63 destinations, and is the fastest growing cargo hub airport in the region due to large-scale Amazon Air and DHL Aviation operations. LCK, a non- hub airport, offers commercial service to nine destinations, all on Allegiant Airlines, but mostly operates as a cargo hub airport.

3.2 Commercial Activity Historical Trends

This section provides an overview of the historical commercial aviation trends at DAY, such as enplanements and operations, as seats available, average aircraft size, fleet mix, and load factors. For all forecast methodologies presented in this chapter, the FAA Terminal Area Forecast (TAF), issued May 2021, will be referenced, and analyzed.

[8] https://www.airforce-technology.com/news/wright-patterson-afb-f-35/

[9] Hartsfield-Jackson Atlanta International Airport (ATL), Charlotte Douglas International Airport (CLT), Ronald Reagan Washington National Airport (DCA), Detroit Metropolitan Airport (DTW), Washington Dulles International Airport (IAD), LaGuardia Airport (LGA), O'Hare International Airport (ORD), Philadelphia International Airport (PHL), Minneapolis-St Paul International Airport (MSP), Dallas-Fort Worth International Airport (DFW), Denver International Airport (DEN), Orlando-Sanford International Airport SFB), St Pete-Clearwater International Airport (PIE), Destin-Fort Walton Beach Airport (VPS), Miami International Airport (MIA) and Punta Gorda Airport (PGD).

3.2.1 Enplanements

An enplanement is defined as a revenue-producing passenger boarding an aircraft at a given airport. Enplanements are the primary measure of a commercial airport's passenger activity and are key factors for terminal building and parking facility requirements. Enplanements are significant to show the volume of passengers using the airport and are used by the FAA to calculate Airport Improvement Program (AIP) passenger entitlement funding through its apportionment formula. For the purposes of this study, forecasted enplanements will serve as the basis for numerous facility requirements, as well as for financial projections.

3.2.1.1 Enplanement History at DAY

Prior to projecting the number of future passenger enplanements at DAY for the next 20 years, a review of the airport's historical enplanements, and how the airport has reached its current enplanement numbers is presented. Before the Great Recession in 2008, DAY's passenger enplanement numbers exceeded 1,000,000 per year. Following 2008, enplanement numbers declined, eventually dropping to below 1,000,000 in 2017, and to below 900,000 one year later.

During the Great Recession in 2008, Dayton's auto manufacturing industries declined in activity. As companies either reduced activity, closed or relocated, not only did people lose jobs and income related to travel, but business traveler demand also decreased at DAY. The effects of the Great Recession were felt not just in Dayton, but throughout the US and through many industries, including the aviation industry. This largely led to the ten airlines operating at the airport in 2008 to become only the four airlines that operate today, including airline mergers and consolidation.

In 2008, airlines operating at DAY included United Airlines, American Airlines, Delta Airlines, Northwest Airlines, AirTran, US Airways, Continental Airlines, Frontier, Midwest Airlines and Air Canada. In. In late 2009 the FAA granted a single operating certificate to Delta for the Delta-Northwest merger, and their operations were merged.

In 2011, Midwest Airlines and Air Canada ceased operations at DAY. In 2012, Continental merged with United Airlines and decreased operations at DAY, and Southwest began operating at DAY in the third quarter. In 2013, Frontier ceased operations at DAY. In 2014 AirTran and Southwest merged, reducing enplanements by 9% and leaving Dayton with five airlines at the end of 2014. Two years later, American Airlines and US Airways merged, and Allegiant Airlines began operating in the second quarter of the year. In 2017, Southwest left DAY, relocating to Cincinnati/Northern Kentucky International Airport (CVG) where the airline received special incentives to move there.[10] With Southwest's decision to leave the airport, there was an immediate loss of approximately 125,000 annual enplanements. Nonetheless, this single event, an airline decision only, caused annual enplanements to drop below 1,000,000, with no correlation and relationship to aviation and passenger demand at DAY or within the region.

Since 2017, the number of enplanements at DAY have been on a step-down decline. Today, American Airlines, Delta Airlines, United Airlines, and Allegiant Airlines are the only commercial airlines operating at DAY. While the three legacy carriers accounted for greater than 60% of the market in 2014, in 2019 they accounted for approximately 97% of the market. Allegiant accounts for the remaining 3%.

[10] https://www.daytondailynews.com/business/leaving-dayton-questions-answered-about-southwest-airlines/z7GRCnv7nmT0bfKKKAJwjN/

Together, the four airlines' combined passenger enplanements totaled 848,152 in 2019, the last year full year of enplanements available prior to the COVID-19 pandemic.

Starting in March 2020, global air passenger traffic fell by nearly 65%[11] due to the COVID-19 pandemic in which many states enacted lock downs and quarantines for travelers. Additionally, countries outside the US closed borders to travel, which led to a decline in international travel. In response, the airline industry reduced flights; furloughed pilots, flight attendants and ground crew; and grounded many aircraft nationwide. Operations at DAY were no exception. In April 2020, the airport experienced a reduction of nearly 95% of its enplanements, compared to April 2019 enplanement figures. Two key airline routes that were suspended in response to the pandemic included DAY to New York-LaGuardia Airport (LGA), a business focused route, and DAY to Minneapolis-St Paul International Airport (MSP) – an internationally focused route. At the end of Fiscal Year 2020 (FY20), the enplanement numbers decreased to 453,328.

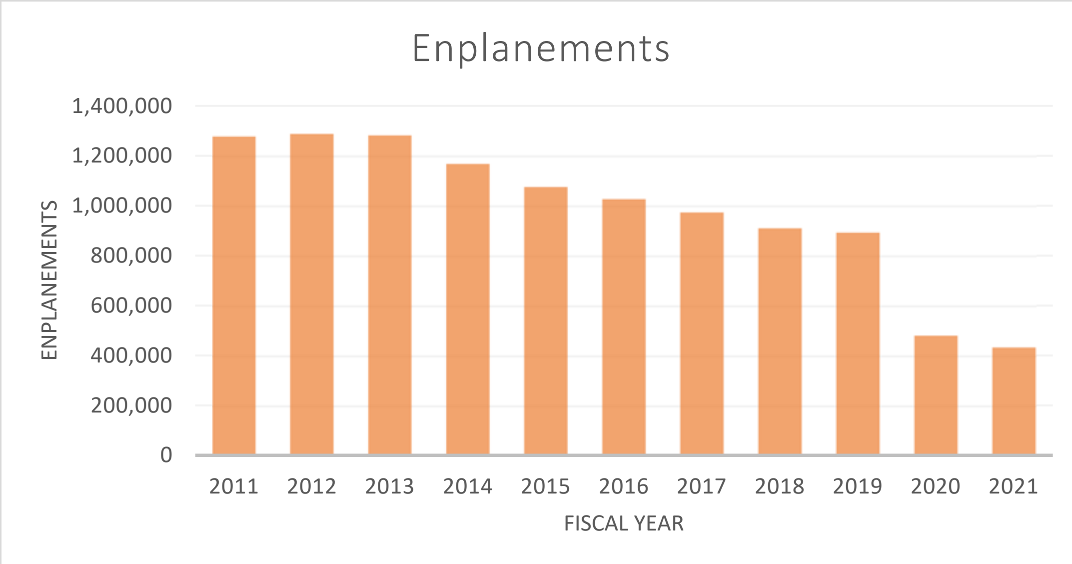
During 2021, routes continued to return, as vaccines became available for public distribution in the US. Public access to vaccinations has led to a greater sense of security, which in turn has led passengers to feel safe and comfortable to begin to travel again. Unsurprisingly, as vaccination rates grew, air travel demand has returned quickly. Therefore, airlines have been restoring flights, routes, and destinations throughout the US, and including DAY.

By the end of FY2021, DAY enplanements totaled 433,751. But the future at DAY seems to be hopeful, as enplanement recovery seems to be underway. While some routes are still suspended, namely DAY-MSP, enplanement numbers are increasing and anticipated to continue to increase as passengers experience a level of safety as more flights return.
The FAA TAF anticipates a continued increase in enplanements throughout the planning period, which is consistent with actual enplanement counts recorded for FY21 and beyond.

Figure 3-6 shows DAY enplanements from fiscal years 2011 - 2021.

[11] https://aci.aero/news/2021/04/22/aci-world-data-reveals-covid-19s-impact-on-worlds-busiest-airports/

Figure 3-6: Enplaned Passengers

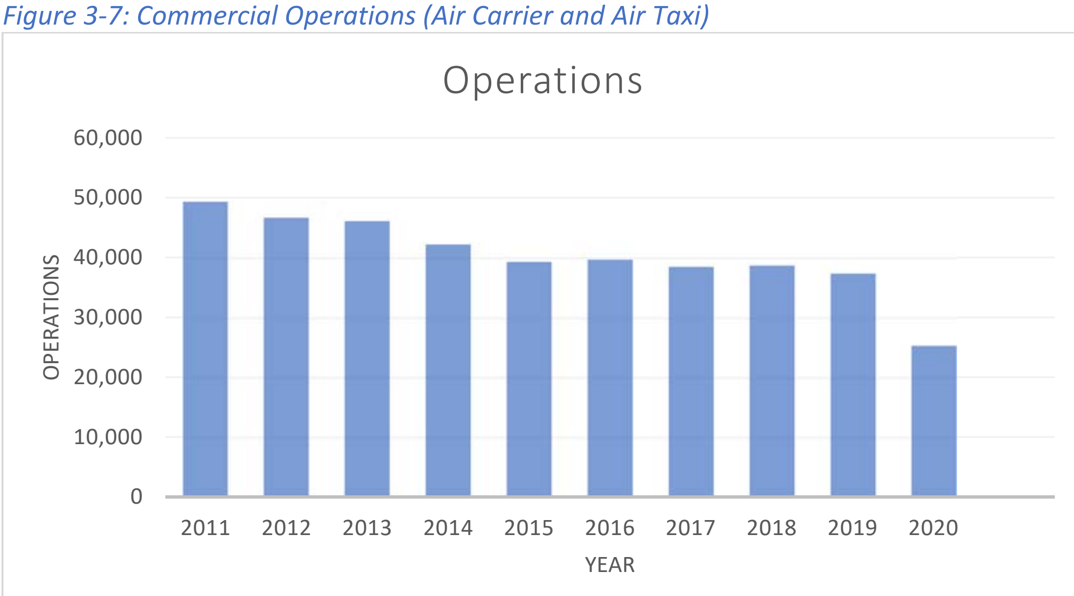


Source: Dayton International Airport (fiscal year: Oct-Sept), Passero Associates

3.2.2 Commercial Operations

Commercial aircraft operations include scheduled air carriers and air taxis. DAY experienced a 23% decrease in commercial aircraft operations from 2011-2015, as seen **Figure 3-7**, below. Airline bankruptcies, carrier consolidation, high fuel prices, and the economic recession were factors contributing to the decrease in commercial operations, as well as the retirement of certain aircraft and changes in fleet mixes. Since 2015, the rate of decline has slowed, until operations took a sharp hit from the COVID-19 Pandemic in 2020.

Figure 3-7: Commercial Operations (Air Carrier and Air Taxi)

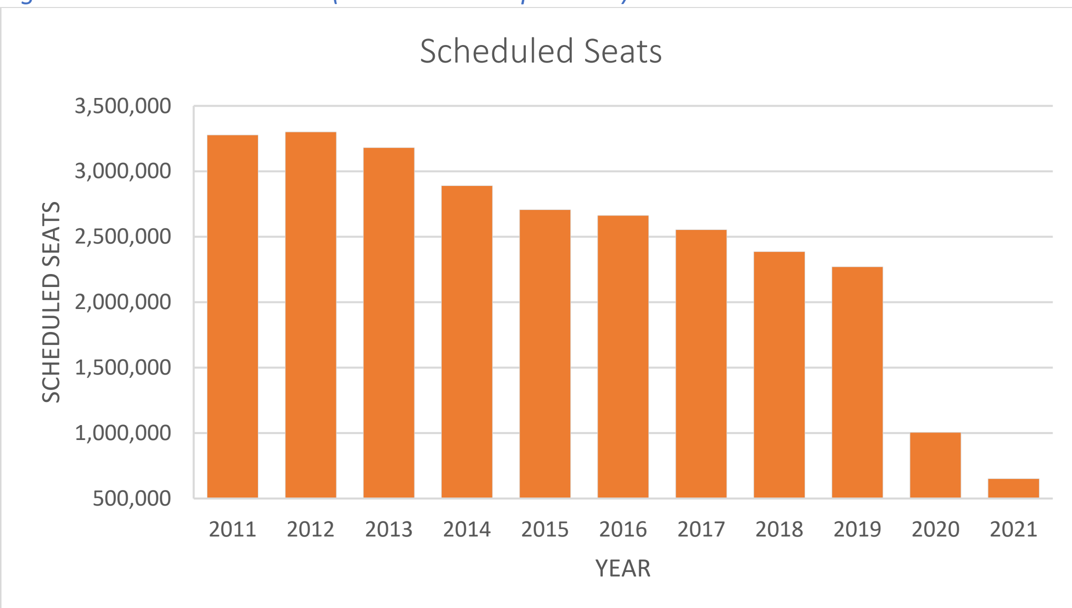


Source: FAA OPSNET

Commercial Seats and Average Aircraft Size

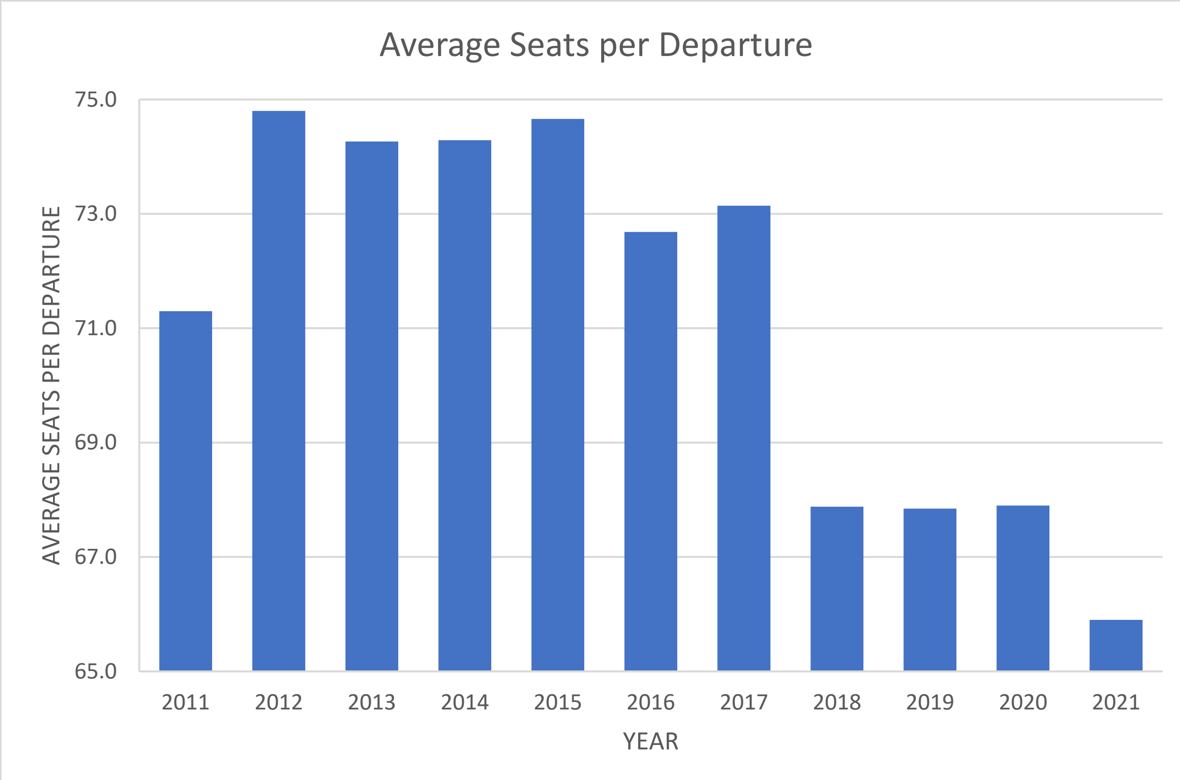
As shown in **Figure 3-8**, 2012 was the peak year, with approximately 3.3 million seats available. The number of seats has decreased with the departure of low-cost carrier Southwest's narrowbody aircraft. Plus, while the smaller 50 seat regional jets have been replaced with larger regional jets, these larger regional jets do not provide the same number of seats as the narrowbody aircraft that left. In 2019 the number of seats available was approximately 2.3 million seats. See **Figure 3-9** for average seats per departure, which shows the effect of fewer narrowbody aircraft.

Figure 3-8: Scheduled Seats (Arrivals and Departures)



Source: DOT T-100 Data, Dayton International Airport, Passero Associates

Figure 3-9: Average Seats per Departure



Source: DOT T-100 Data, Dayton International Airport, Passero Associates

Historical Commercial Fleet Mix

Table 3-5 shows the aircraft fleet that that served DAY during fiscal year 2021. This will be compared to the future fleet mix, which will be discussed later in the chapter. It is important to note that the MD-88 ceased operating at the airport in 2020 replaced by the Airbus 320.

Table 3-5: Commercial Aircraft Serving DAY (Operations)

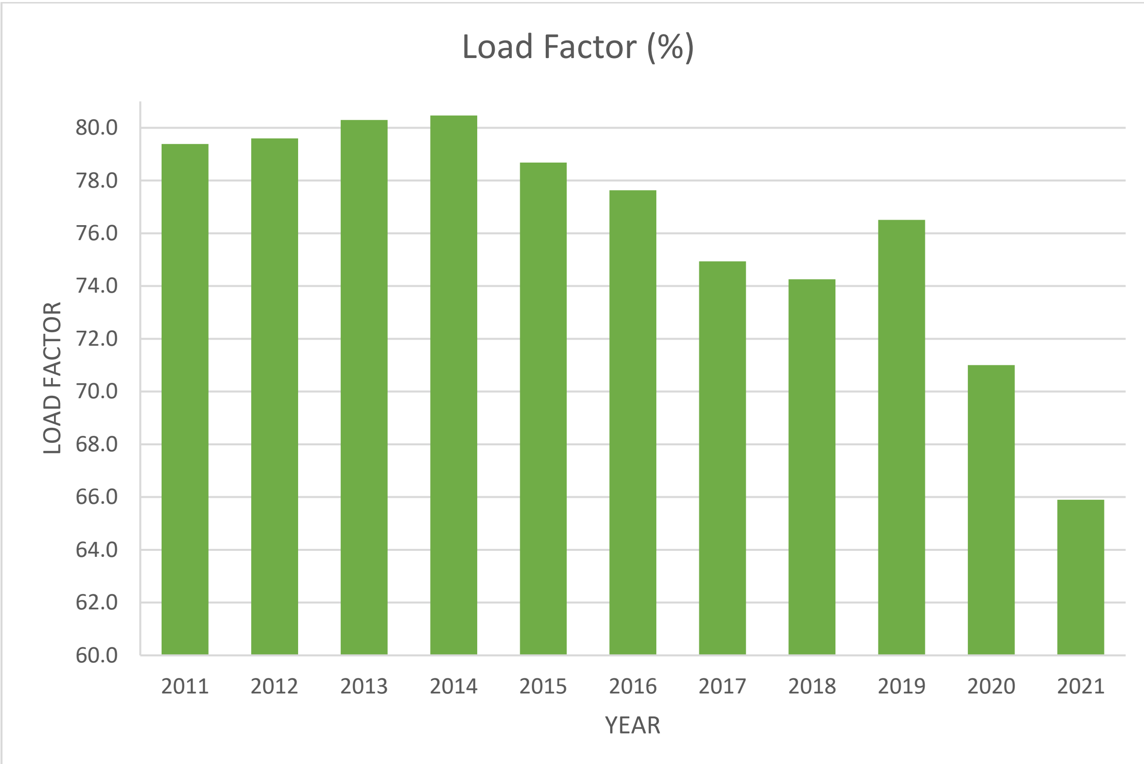
Aircraft Type	2021
Bombardier CRJ-200	7236
Bombardier CRJ-700	3216
Bombardier CRJ-900	5612
Embraer EMB-140/145	2366
Embraer EMB-170/175	1156
Airbus A319	88
Airbus A320/321	430
Boeing B717-200	586
McDonnell Douglas MD-88	-

Source: Dayton International Airport TFMSC 10/2020-9/2021 adjusted, Passero Associates

Load Factor

Load factor (LF) measures the capacity utilization and is used to measure efficiency in filling air carrier seats and in generating revenue. LF is calculated by dividing revenue passenger miles by available seat miles. The LF at DAY, as depicted in **Figure 3-10**, increased from 77.9 percent in 2011 to 80.5 percent in 2014, and then fell to 74.3 percent in 2018, increasing again to 76.5 percent in 2019. This is a result of aircraft fleet changes that have been occurring within the industry, and Allegiant's increase in load factors. In 2020 the load factor decreased to 71% and then again in 2021 it continued to decrease to its lowest level of 65.9%.

Figure 3-10: Commercial Load Factors (Departures)



Source: DOT T-100 Data, Dayton International Airport, Passero Associates

3.3 Commercial Activity Demand Forecasts

This section provides the methodology for the development of the forecasts of commercial passenger enplanements and aircraft operations at DAY. It details the final recommendation for commercial passengers and aircraft operations through 2041 at DAY, in addition to each of the methodologies considered, but perhaps not used for developing the preferred forecast.

A forecast of annual enplaned passengers and of annual commercial aircraft operations were developed to determine the facility sizing requirements necessary to adequately accommodate the current and future activity demand levels. The most basic indicator of activity demand for a commercial service airport is the number of annual enplaned passengers, which helps to determine passenger terminal sizing requirements, commercial carrier operations and fleet mix. Commercial aircraft also operations influence the requirements for passenger terminal gates and airside infrastructure.

3.3.1 Enplanements Forecast

Enplanement data is one of the most important indicators of aviation demand at commercial service airports. Historical and forecasted enplanement data can provide relevant evidence that improvements and/or expansions to an airport may be necessary. Forecasted data is presented based on a fiscal year, which runs from October of one year to September of the next year (e.g., Oct. 2020 – Sept. 2021) to coincide with the FAA TAF.

Before reviewing projected passenger enplanements and the current and recent economic trends within the DAY service area today which support passenger enplanements, this forecast report considered an additional level of complexity due to the COVID-19 pandemic of 2020-2021. As stated above in Section 3.2.1, the enplanements at DAY decreased substantially during the COVID-19 pandemic.

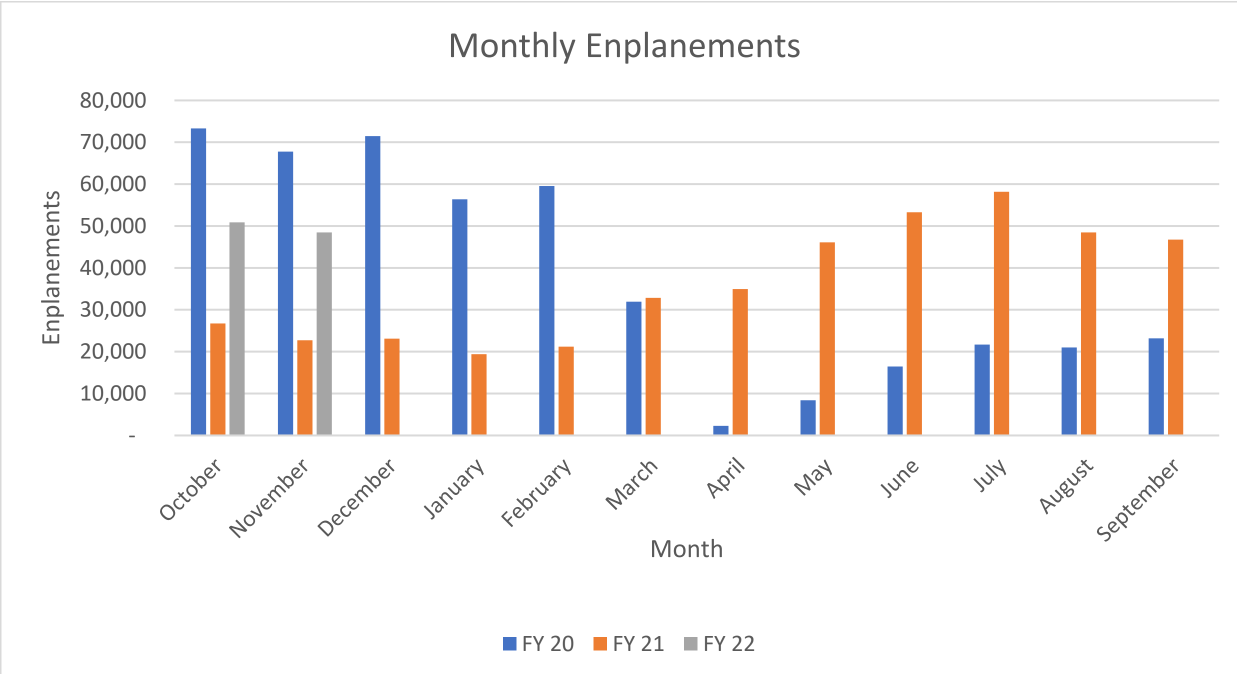
During the initial stages of COVID, planners consider many variables to determine when a recovery could be realized. Examining historical records for the airport, the term "Recovery" at Dayton International Airport can be considered as a return to pre-pandemic aviation activity levels. As stated earlier, 2019 was the last full year of "regular" passenger enplanements, and DAY recorded 848,152 enplanements. This equates to an average of approximately 70,000 passenger enplanements per month. Therefore, for the purposes of COVID recovery and passenger forecasting, if DAY reaches approximately 840,000 enplanements over a 12-month period, and/or reaches 70,000 enplanements in a specific month, and sustains that level of enplanements, mirroring historic trends, it will be assumed that DAY has recovered to a pre-pandemic level of passenger demand.

At the end of FY 2021, the airport had not reached the 70,000 monthly enplanements, yet the number of enplanements was increasing and starting to follow the more historical and cyclical nature of monthly enplanements. While the DAY-LGA route is again active, the DAY-MSP route is still suspended, with anticipated return in May 2022 based on future seat availability.[12] With the anticipated seat availability increase underway, along with the return of the DAY-MSP route, it is anticipated enplanements will continue to increase. When compared with 2019 available seats, most of the legacy carriers are anticipating increasing their available seats starting in spring of 2022.

In FY 2021, DAY registered 433,751 actual passenger enplanements, provided by the most recent airport records. When compared to the FAA TAF forecast of 406,175 for FY 2021, the actual enplanements for DAY have outpaced the FAA TAF by 6.79%. Monthly enplanements from October 2019 through September 2021 can be seen in **Figure 3-**11. The TAF anticipates a continued growth in enplanements at DAY throughout the entire planning period, from 2021 through 2041. The airport accepts the percentage growth rates as reasonable. However, since the true enplanement numbers outpaced the growth in 2021, each of the TAF annual figures will be increased by 6.79% in this Master Plan, which results in the preferred forecast of passenger enplanements.

[12] Mead and Hunt weekly report, December 20, 2021 (see Appendix for comparison of 2019 to 2022 seat availability)

Figure 3-11: Monthly Enplanements from October 2019 through September 2021



3.3.1.1 Impacts of COVID on Enplanements

Review of Past Similar Events

This section is intended to compare previous public events that may have led to a decline in enplanements. While COVID enplanement decline is unique, the recovery is similar to the events of 9/11/2001. Similar to how people needed to feel safe and secure to fly like after the events of 9/11/2001, people need to feel confident and safe flying again in 2021-2022, in the post-COVID recovery period.

The 9/11/2001 terrorist attacks caused enplanements from DAY to drop 12% in the year following that event. Passenger demand recovered in approximately one year. While a terrorist attack differs from a pandemic, in both instances people are concerned for their safety, and corresponding air travel demand decreases. Once people felt safe again after the events of 9/11/2001, air travel demand returned. Similarly, with national and international access to a COVID-19 vaccine, people are feeling safe, and air travel demand is logically increasing.

Recovery in 2022

When FY 2021 ended, the enplanement numbers at DAY were already outpacing the FAA's TAF. Comparing the enplanement numbers for the first month of FY 2022, October 2021, to those of the first month of FY 2021, October 2020, it is 50,874 versus 26,748 respectively. This, coupled with the anticipated increase in seat availability by the airlines into 2022, is a positive sign that the airlines see a recovery ahead, and are offering more available seats at DAY.

Furthermore, additional vacation industries, such as the cruise line industry, are starting to operate from the United States again. As such, more leisure flights and passenger demand are expected to operate to address the increased demand for this type of travel.

Nonetheless, as passengers continue to feel more comfortable traveling and aircraft and airline crews become more available, the airlines will make changes to their business models to accommodate the demand.
While the leisure market has been returning both domestically and internationally, the business market is expected to provide a slower travel recovery.

3.3.1.2 Post-COVID-19 Forecast

As part of the Master Plan, enplaned passengers are forecasted 20 years into the future. Determining when the airport would recover from the drop in enplanements due to COVID-19 was step one. As we noted above, Dayton has reached its lowest level of operation and is starting to recover. Step two is determining how passenger enplanements will grow post-pandemic. This projection is based on projected industry trends, socioeconomic information, and economic development efforts and successes in the Dayton region.

From the list of FAA-approved forecast methodologies and statistical analyses that can be used to provide a range of potential passenger activity levels, two methodologies were considered and analyzed in the development of the recommended DAY passenger enplanements forecast. Both methodologies are described in the sections below, but each one contained flaws and inconsistencies that lead to unreasonable and improbable forecasts.

Methodology 1: Historical Trend Analysis

A historical trend forecast is a simple time-series model that relies on extrapolating historical enplanement growth, specific to an airport, into the future. Trend analysis assumes that the local market area and the state of the commercial passenger airline industry reflect past trends throughout the forecast period. The historical decline of enplanements at DAY, since 2008, results in a negative trend over the planning period. Forecasted forward, the historic trend results in a significant continued decrease in enplanements. Therefore, historical trend forecasts for DAY were dismissed from further consideration. (See Appendix for quantities)

Methodology 2: Regression Analysis

Regression-based forecasts examine aviation and passenger activity through examining the enplanement levels as they relate to socioeconomic conditions. Correlated relationships between population, employment, and income are examined to determine if there is a statistically valid relationship that may assist in projecting future activity. Similarly, to projecting enplanements as part of the COVID-19 recovery, the regression analysis looks at the R^2 value to determine the strength of the relationship. Again, the R^2 value, which ranges from 0% to 100%, indicates the percentage of the variance in the dependent variable that the independent variable (or variables) explains. A high R^2 value means that the model explains a high amount of the variance while a low R^2 value means that the model explains a low amount of variance. R^2 values that are considered high or low are subjective, and a high R^2 value is not always good and a low R^2 value is not always bad; statistics always depends on the situation at hand.[13]

After conducting a simple linear regression and multiple regression analysis, the results showed that within the catchment area, while population, employment rates, and per capita income individually increase, enplanements decrease. This relationship yielded an R^2 value above 0.9. However, while this R^2

[13] https://blog.minitab.com/en/adventures-in-statistics-2/regression-analysis-how-do-i-interpret-r-squared-and-assess-the-goodness-of-fit

value is high, it is unlikely that the increasing population, employment rates, and per capita income are directly correlated with the decline in enplanements. Generally, as population increases in a region, so do enplanements. This is the same for the relationship between enplanements and each of employment rates and income. Therefore, other factors other than the socioeconomic factors must have led to the decline in enplanements. Accordingly, this analysis was dismissed as a method to forecast enplanements. (See Appendix for quantities)

FAA TAF as a Benchmark

Considering all the data, trends and activities listed above, a passenger forecast can still be made. As a benchmark, this Master Plan considers the FAA's TAF, which is the FAA's enplanement projection for DAY (and every airport listed within the NPIAS). The current TAF for passenger enplanements at DAY shows the airport recovering from the pandemic in 2026 and stabilizing at an average annual growth rate of approximately 0.36% from 2028 through 2045. It should be noted that this growth rate represents the lowest growth rate the FAA has published in its TAF over the past 5 years.

Nevertheless, the Airport accepts the year over year growth rates that the TAF presents as reasonable and accurate. The recent economic growth in the region will not only put an end to the downward trend of enplanements, but also support a reversal to this negative trend. Also, since the airport is currently outpacing the TAF enplanements numbers by 6.79% in the most recent year, the preferred forecast will be represented by the TAF forecast plus a factor of 6.79% increase per year, not compounded.

Table 3-6 shows the post-COVID-19 recovery forecast for DAY. As shown, the enplanements are projected to increase from 691,175 in 2023 to 967,219 in 2040, the end of the planning period.

Table 3-6: Enplanement Forecast

Year	DAY Enplanements
2022	552,192
2023	691,175
2024	812,955
2025	880,651
2026	913,094
2027	922,149
2028	925,514
2029	928,939
2030	932,387
2031	936,142
2032	939,987
2033	943,787
2034	947,393
2035	950,845
2036	954,282
2037	957,660
2038	960,922
2039	964,094
2040	967,219
2041	970,401

Source: Passero Associates

3.3.2 Recommended Enplanement Forecasts

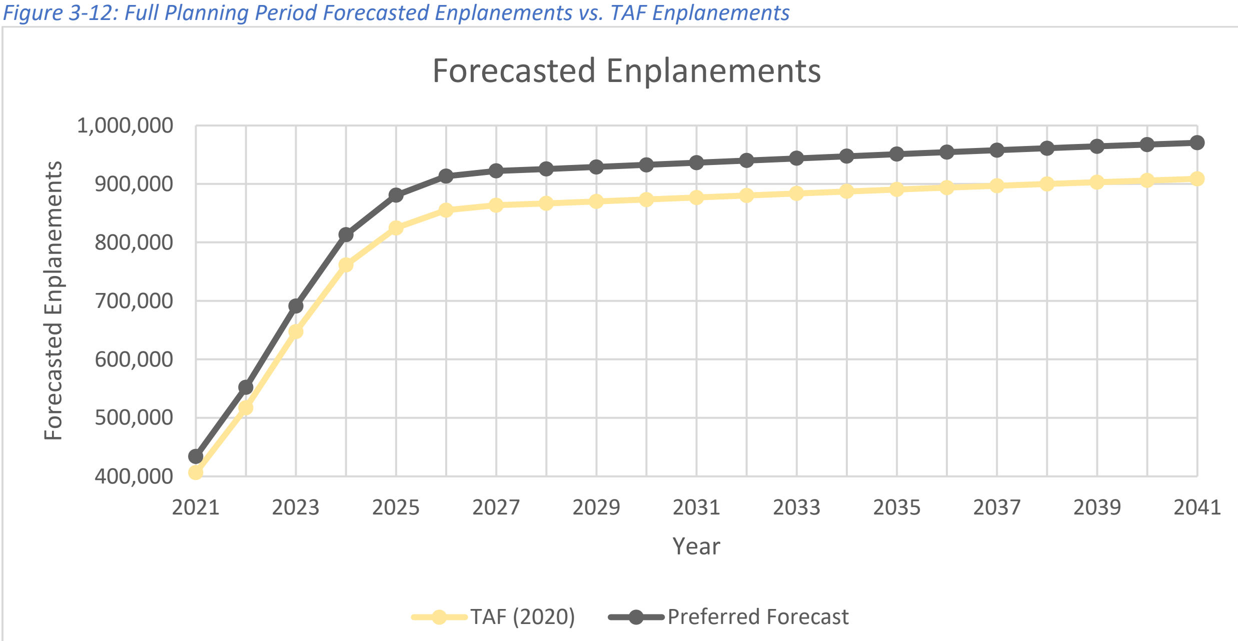
Table 3-7 shows the comparison of the recommended enplanements versus the TAF. It is important to note that based on the comparison with the FAA TAF, the recommended forecast scenario projections are within the FAA criteria for commercial forecasts as required by FAA AC 150/5070-6B, *Airport Master Plans*, which states enplanement and operational forecasts are considered consistent with the FAA TAF where forecasts differ by less than 10 percent in the short-term (five-year) period, and 15 percent within the 10-year period. This increase is a direct result of the economic development that is occurring around Dayton international Airport and the greater Dayton area. **Figure 3-12** graphically depicts the DAY forecast compared to the TAF forecast, from 2021 – 2040. This includes pre- and post-COVID forecasts.

Table 3-7: Recommended Enplanements Forecasts vs. TAF

Year	TAF	Recommended	Recommended vs. TAF
2021	406,175	433,751	6.8%
2026	***855,043***	***913,094***	***6.8%***
2031	***876,626***	***936,142***	***6.8%***
2031	893,613	954,282	6.8%
2041	908,707	970,401	6.8%

Source: FAA TAF issued May 21, 2020, actual data, Dayton International Airport, Passero Associates

Figure 3-12: Full Planning Period Forecasted Enplanements vs. TAF Enplanements



Source: FAA TAF, Passero Associates

3.3.3 Commercial Operations Forecast

Commercial aircraft operations are either scheduled or unscheduled flights typically operated by a certificated air carrier or are conducted by a charter or air taxi operator. This section summarizes the forecasts that were prepared for commercial aircraft operations. An aircraft operation is defined as a take-off or a landing. Therefore, one flight consists of two operations.

There is a direct relationship between enplanements and air carrier operations. The number of seats per departure is examined, along with the number of seats filled per departure, known as the load factor. When an air carrier has load factors above 80 percent, the airline will either choose to add more flights or use a larger aircraft to accommodate the increased demand for the route.

Commercial operations are shown in **Table 3-8**, determined using the following methodology:

- Determine the average seats/departure based on historic data
- Determine average load factor based on historic data
- Project load factors into the future
- Divided the enplanements by the ratio of average seats per departure multiplied by load factor to determine annual departures
- Multiply annual departures by two to calculate the total operations

Table 3-8: Forecast of Annual Commercial Operations

Year	Enplaned Passengers	Average Seats/Departure	Average Load Factor	Annual Departures	Annual Operations
2021	433,751	65	72.4%	10,345	20,690
2026	***913,094***	68	74.2%	13,869	27,739
2031	***936,142***	69	76.1%	14,357	28,715
2036	954,282	72	78.0%	15,144	30,289
2041	970,401	72	80.0%	15,563	31,127

Source: Average Seats/Departure and Load factors based on average of 2011-2020 DOT T-100 data for DAY; 2020 enplanements and Operations are actual (operations from OPSNET Tower Counts Air Carrier and Air Taxi), Passero Associates

Commercial Carrier Fleet Mix

The commercial aircraft fleet mix projections are a function of the scheduled commercial passenger air carriers that operate (or are expected to operate) at the Airport during the forecast period. Each carrier's anticipated future fleet mix (i.e., aircraft acquisitions, aircraft phase-outs, retirements, route demand, etc.) and forecast enplanement levels influence a carrier's aircraft type and level of operations. This data is then coupled with the forecasted commercial air carrier operations to determine the number of annual departures by aircraft type to the greatest extent practical. The operational fleet mix forecast provided within this section will serve as practical planning activity levels for the purposes of developing airside and terminal development initiatives.

The first step in determining DAY's future commercial carrier fleet mix was to identify the overall market trends that will drive future airline fleets, as well as aircraft fleet mix decisions specific to each airline operating at the Airport and its demand associated with individual routes. With the increase in the number of short to medium haul, low-cost air carriers, and the replacement of larger older aircraft, such as the MD-88, the demand for smaller single-aisle aircraft has grown within the past two decades, trending the industry toward aircraft with fewer seats, peaking in 2007. In general, this has translated to a higher passenger load factor per flight; however, per the Boeing Commercial Market Outlook (2020-2039), domestic air carriers have begun trending away from regional jet aircraft and retiring smaller 50-seat aircraft at an accelerated rate. As such, the trend towards smaller aircraft has now reversed.

These 50-seat aircraft are being replaced with larger 70- and 90-plus seat regional jets, as well as larger narrow-body aircraft; however, replacements will not keep pace with retirements. Boeing predicts that in 2039, the fleet of regional jets will consist of 1,640 aircraft, down from 1,890 in 2019. Single-aisle mainline aircraft will continue to comprise much of the domestic fleet and will increase market share from 54 percent in 2019 to 65 percent in 2039.

As with the predicted national fleet shift toward newer, larger, and more efficient aircraft, DAY-specific fleet mix characteristics and trends were identified and applied directly to the preferred passenger carrier forecasts through 2040. To provide a detailed picture of future DAY operations, the following assumptions are based upon airline-specific fleet plans and aircraft orders, as well as overall industry trends:

- With the recent major acquisition and merger announcements of Boeing/Embraer and Airbus/Bombardier, an influx of 100+ seat aircraft will be joining the market. This will have an impact specifically on small hub and small non-hub airports. These new 100+ seat aircraft (Airbus 220-200/300 and Embraer E175/190/195 E2s) will provide the necessary sized aircraft for smaller markets that may not have the demand to transition to narrowbody Boeing 737s and A320s on a daily operational basis. These aircraft are expected to enter the market in the short-term period and increase in operations throughout the forecast period.
- CRJ200 operations on short stage length flights (i.e., DAY to ORD/DTW/DCA) via smaller regional feeder airlines are expected to remain a large part of service at smaller hub with shorter stage length operations and are expected to transition out of service in the medium-term time periods. This transition is assumed to take place over the next 10-15 years.
- Delta Air Lines is currently overhauling their small-plane fleet both through the mainline carrier and Delta Connection carriers. According to Delta.com, the MD-88 and MD-90 will be replaced in late 2020 and 2022 respectively. The MD-88 at DAY has been replaced with the A320 for domestic flights at DAY.
- As announced in May 2020 (Forbes.com), amid the pandemic, Delta Air Lines now plans on moving away from the Boeing 717 fleet by 40-67% over the next two years. For DAY this aircraft is operated on the DAY-ATL (Atlanta) flight. A replacement likely would be the Airbus 220 or 320. This aircraft is still flying from the airport, so replacement will be planned for the short-term.
- Delta Air Lines regional jet aircraft with a passenger capacity of 50-seats or under (CRJ200, ERJ145, ERJ140, etc.) will be gradually phased out of service and replaced with larger 70-seat plus regional jet aircraft (CRJ700/900). The CRJ is still actively flying from DAY. This replacement will be planned for the short-term.
- Endeavor Air, a Delta Connection operator) is retiring their CRJ200 aircraft with the Airbus 220. Currently operating the CRJ900 at DAY, these aircraft are likely to continue operations on the existing routes.
- American Airlines is upsizing its single class regional jets. To support this move, PSA replaced the 50 seat CRJ200 with the 76 seat CRJ900's by end of 2020.
    - Envoy, a wholly owned subsidiary of American Airlines, currently flies the Embraer 140 and 175 from Dayton. One-half of the Embraer 140 fleet is going to retired. Envoy has orders for additional E175 aircraft. The ERJ-140 is not operating from DAY in 2021.
    - Skywest Airlines, a privately owned regional carrier provider for American Airlines, at Dayton, is transitioning to flying dual-class aircraft on its CRJ operations. Currently flying the CRJ 700, it has additional scheduled deliveries of CRJ700 into its fleet to support American Airlines operations.
        - United Airlines operations at DAY are conducted through associated partners (Air Wisconsin, ExpressJet, Mesa Airlines and Republic Airways).
        - Air Wisconsin, a privately owned subsidy, operated CRJ200 aircraft in their fleet. There are no defined plans to change the fleet.

- ExpressJet, affiliate of United Airlines, operated the ERJ145 from DAY. In December 2018 Skywest transferred its CRJ200 to ExpressJet. The airline is in the process of upgrading to Embraer 175. They have acquired 25 E175, with deliveries starting in 2020.
- Mesa Airlines, a privately owned subsidiary, operated Embraer 175 for United Express. There are no defined plans to change the fleet.
- Republic Airways, a privately-owned subsidiary, operated Embraer 170 and 175 aircraft for United Express. They are in the process of acquiring additional E175 fleet with deliveries starting in second half of 2020. Currently they operate the E175 at DAY.

o Allegiant Airlines is a low-cost carrier that provides service between DAY and Florida. Their fleet has changed over the years, and now is comprised of Airbus 319 and 320 aircraft exclusively, which has allowed Allegiant Airlines to benefit from lower fuel and maintenance costs. Currently they operate Airbus 319/320 between DAY and Florida.

Using DAY's commercial air carrier schedule data provided by the Airport the commercial air carrier fleet mix forecast considers the assumptions listed above, as well as the projected annual departures for the Airport associated with the enplanement projections listed in the recommended forecast. A departure is considered a single operation, while an arrival is another. Simply put, departures equal one-half of total operations.

For future facility planning purposes, annual commercial operations are converted to operations by aircraft type for select years. The 2021 fleet mix was taken as the baseline, with adjustments for retiring fleet types (e.g., MD88, E145 and CRJ200) and reasonable replacement aircraft types through the forecast period. As stated above the CRJ200 for PSA has been retired. **Table 3-9** below shows the fleet mix and operations for the planning periods.

Table 3-9: Commercial Fleet Mix

Aircraft Series	Aircraft Seats	Operations				
		2021	2026	2031	2036	2041
B717-200	110	586	-	-	-	-
A319	128	88	111	115	121	125
A320/321	185	430	1360	1407	1484	1525
CRJ200	50	7,236	8322	7179	4543	4669
CRJ700	63	3,216	5603	7236	7633	7844
CRJ900	76	5,612	7517	7782	11237	11548
E140/145	50	2,366	1775	976	0	0
E170/175	63	1,156	3051	4020	5270	5416
MD88	155	-	-	-	-	-
Total		20,690	27,739	28,715	30,289	31,127

Source: 2020 based on CY data, Fleet change based on airline information and variable forecast elements, Passero Associates

3.3.4 Commercial Service Peak Activity Forecasts

Commercial service airports experience peaks in enplanements, commercial air carrier operations, and total airport operations that drive demand for various areas of airport infrastructure. To properly plan, size, and design passenger terminal facilities, an understanding of peak month-average day (PMAD) and peak hour demand is necessary.

The peak month is the calendar month of the year when the highest level of enplanements and commercial aircraft operations typically occur. Steps for determining the peak month involve (1) looking at annual historical information (enplanements and operations) and determining in which month the peak occurs; (2) dividing that month's number by the annual for that year to obtain the peak month % of total annual, and (3) averaging the peak month percentage to apply to the future projections. **Appendix A** contains the historical information. When developing the forecast, May was determined to be DAY's peak month for enplanements, based on historical monthly enplanements from 2016, 2017 and 2019, with June being the peak month in 2018. Peak month-average day is simply the total commercial operations, or total enplanements, divided by the number of days in the peak month (31). To provide the necessary metrics for the demand/capacity analysis, PMAD is forecast for the following: enplanements and commercial air carrier operations.

Peak enplanements, deplanements, and peak total passengers have direct impacts on the terminal (e.g., ticketing and baggage claim) and landside (e.g., access roads and parking) facilities. Terminal facilities are generally designed to accommodate enplanements on the average day during the peak month, rather than the absolute peak level of activity. Peak commercial air carrier operations define the demand for airside facilities (e.g., gates and ramp).

Peak Passengers

When conducting the analyses for peak passengers, the data set for enplanements is compiled. The results of the peak passenger analyses are presented in **Table 3-10**.

Table 3-10: Peak Passengers

Year	Annual	Peak Month % of Total Annual	Peak Month	PMAD % of Peak Month	PMAD
2021	433,751	9.1%	39,471	3.2%	1,274
2026	913,094	9.1%	83,092	3.2%	2,681
2031	936,142	9.1%	85,189	3.2%	2,749
2036	950,845	9.1%	86,527	3.2%	2,792
2041	970,401	9.1%	88,306	3.2%	2,849

Source: Dayton International Airport, Passero Associates

Peak Operations

Air carrier operations, and air taxi operations, as depicted in **Table 3-11**, account for all take offs and landings performed by the airlines serving DAY. Examining the historic operations from FAA OPSNET for 2016 to 2019 the peak month varies, with August and October having the most operations. Averaging the peak month per year over these years provides the peak month % of annual average.

Table 3-11: Peak Commercial Operations

Year	Annual	Peak Month % of Annual	Peak Month	PMAD % of Peak Month	PMAD
2021	20,690	8.8%	1,821	3.2%	59
2026	27,739	8.8%	2,441	3.2%	79
2031	28,715	8.8%	2,527	3.2%	82
2036	30,289	8.8%	2,665	3.2%	86
2041	31,127	8.8%	2,739	3.2%	88

Source: Dayton International Airport, Passero Associates

3.4 Air Cargo Forecast

Air cargo traffic is comprised of freight, express, and airmail operations. Air cargo is typically transported via 1) commercial air carrier "belly cargo", 2) dedicated all-cargo aircraft (integrators), or 3) charter service cargo. Air cargo activity and demand is cyclical in nature and fluctuates based on national and global economic trends. Factors that affect air cargo growth are fuel price volatility, movement of real yields, and globalization.

This section develops forecasts for cargo volume and cargo operations. The majority of DAY's cargo is carried by FedEx and supplemented by some smaller carriers and airline belly freight. The future growth of cargo activity at DAY will primarily depend on growth in e-commerce activity. Traffic carried on other all-cargo operations and passenger aircraft will likely continue to contribute a minor amount of volume and traffic.

3.4.1 Cargo Volume

DAY cargo activity over the last 10 years has recorded more than 25,000 tons of landed weight. In 2019, the United States' domestic cargo industry revenue ton miles (RTMs) was 16.2 billion[14] [FAA Aerospace Forecast (Fiscal Years 2020-2040)], 29,768 tons of which were at DAY[15]. The forecasts of cargo volume are based on the following assumptions:

- The FAA and TSA security regulations and restrictions on air cargo transportation will remain in place and continue to be enforced.
- The shift from air to ground transportation has occurred.
- Long-term cargo activity will correspond to economic growth.

The cargo forecasts will be based on research and findings by industry experts, such as those found in the FAA Aerospace Forecast (FY 2020-2040), Boeing World Air Cargo Forecast (2020-2039), and the Airbus Global Market Forecast (FY 2019-2038). The findings are as follows:

- *FAA Aerospace Forecast (FY 2020-2040)* – Domestic cargo RTMs are forecasted to grow 1.9% between 2020 and 2040.
- *Boeing World Air Cargo Forecast (2020-2039)* – The domestic economy is forecasted to grow 2.7% between 2020 to 2039.
- *Airbus Global Market Forecast (FY 2018-2038)* – The domestic economy is forecasted to grow 2.0% between 2018 and 2038.

[14] FAA Aerospace Forecast (Fiscal Years 2020-2040)
[15] FAA ACAIS 2019 Landed Weight, converted to tons

Gross Domestic Product (GDP) is the main driver in air cargo activity and is used as the basis for the FAA, Boeing, and Airbus forecasts. When developing this cargo volume forecast 2020 actual data for from ACAIS will be used for future projections, based on national trends in aviation and projected throughout the forecast period. The resulting volume levels for the traffic forecasts are shown in **Table 3-12**. The Boeing forecast produces the highest growth rate while the FAA forecast produces the lowest growth rate for total volume.

Table 3-12: DAY Air Cargo Volume Forecasts Summary

Year	FAA Aerospace	National Boeing	National Airbus
2019	59,535,806	59,535,806	59,535,806
2020	59,786,062	59,786,062	59,786,062
2025	65,685,705	68,304,948	66,008,643
2030	72,167,521	78,037,686	72,878,876
2035	79,288,958	89,157,237	80,464,168
2040	87,113,132	101,861,207	88,838,943
CAGR 2020-2040	**1.90%**	**2.70%**	**2.00%**

Note: volume is depicted in pounds (lbs.)
Source: FAA Aerospace Forecast (FY 2020-2040), Boeing World Air Cargo Forecast (2020-2039), Airbus Global Market Forecast (FY 2019-2038), Dayton International Airport, Passero Associates

Based on previous cargo trends at DAY and a conservative future projection, the recommended forecast is forecast based on the FAA Aerospace Forecast. The CAGR is 1.90% for the period of 2020-2040. The cargo volume forecast assumes that the average load for 2019 will apply for the entire forecast period. **Table 3-13** shows the forecasted totals in this scenario.

Table 3-13: Recommended Air Cargo Volume Forecast

Year	Volume (lb.)
2020	59,786,062
2021	60,921,997
2026	66,933,734
2031	73,538,704
2036	80,795,448
2041	88,768,282
CAGR 2020-2040	**1.90%**

Source: FAA Aerospace Forecast (FY 2020-2040), Boeing World Air Cargo Forecast (2020-2039), Airbus Global Market Forecast (FY 2019-2038), Dayton International Airport, Passero Associates

3.4.2 Cargo Operations

The cargo operations forecast is based on historical data and then is projected based on the forecasted cargo volume date. The historical data is used to determine how many tons of cargo on average were associated with one landing. **Table 3-14** shows the volume per landing numbers. Between 2010 and 2019.

Table 3-14: Historical Volume per Landing

Year	Volume (lb.)	Landings	Volume (lb.) / Landing
2010	43,166,000	289	149,363.32
2011	43,372,800	269	161,237.17
2012	44,414,000	270	164,496.30
2013	51,970,800	267	194,647.19
2014	52,086,800	294	177,165.99
2015	51,282,000	369	138,975.61
2016	51,480,000	347	148,357.35
2017	51,788,650	324	159,841.51
2018	62,995,518	281	224,183.34
2019	59,535,806	265	224,663.42
2020	59,786,062	270	221,429.86
CAGR	3.31%	-0.68%	4.02%

Source: FAA ACAIS, FAA TFMSC, Passero Associates

Examining landings from 2010 to 2020 we observe that the landings have increased to a high of 369 landings in 2015 and decreasing afterwards to the high 200's. When determining the future landing we examined historic information. Using the volume of cargo divided by the number of landings provides a volume per landing weight, as shown in Table 3-14. We then examined the average volume per landing for the last 10 years, divided the proposed volume by that number to get forecasted landings, which resulted in about 497 landings in 2041. We then examined the average volume per landing for the last 3 years and divided the proposed volume by that number to get forecasted landings, resulting in about 397 landings in 2041. We then examined the average volume per landing for the last 2 years and divided the proposed volume by that number to get forecasted landings, which resulted in about 396 landings. Given the increased volume per landing we felt that the two-year average is conservative, given that FedEx operates as a remain overnight operator coupled with the regional commercial growth that relies on cargo operations. This results in a 1.9% CAGR for landings. Operations consist of a landing and a takeoff, therefore operations are landings doubled, as shown in **Table 3-15**. Translated, in 2020 cargo operations account for about 10 per week, and by the end of the planning period account for about 15 per week.

Table 3-15: Recommended Air Cargo Operations Forecast

Year	Volume	10 – year average Lb/Landing (178,578 lb)	3 – year average Lb/Landing (223,425 lb)	2 – year average Lb/Landing (224,423 lb)	Preferred Cargo Operations
2021	60,921,997	341	273	271	542
2026	66,933,734	375	300	298	596
2031	73,538,704	412	329	328	656
2036	80,795,448	452	362	360	720
2041	88,768,282	497	397	396	792
CAGR 2021-2041		**1.9%**	**1.9%**	**1.9%**	**1.9%**

Note: 2020 (and 2019) Landing numbers are actual recorded numbers; Operations considers landings and departures
Source: FAA Aerospace Forecast (FY 2020-2040), FAA ACAIS, FAA TFMSC, Passero Associates

3.4.3 Cargo Fleet Mix

Air cargo fleet mix directly correlates to growth of air cargo traffic; therefore, as air cargo experiences growth, fleet mix expands to meet the projected needs. As identified earlier most of the cargo is handled by FedEx, which operates the Boeing 757-200PF. Other smaller model feeder cargo aircraft also contribute to the cargo fleet, but have minimal operations compared to FedEx (e.g., Embraer Brasilia EMB 120 and Swearingen Merlin 4/4A Metro2), are projected to remain unchanged throughout the forecast period.

Discussions with FedEx at Dayton indicate the Boeing 757-200PF is planning to be retired in the future, but they were not able to provide a replacement aircraft or a timetable for retirement. The other aircraft in their fleet include the Boeing 767-300F, A300-600RF, and Boeing 777F. For future planning purposes for this Master Plan the Boeing 767-300F is forecasted to be the replacement aircraft.

3.5 General Aviation and Military Forecast

For this master plan, General Aviation (GA) includes all segments of the aviation industry except commercial air carriers/regional/air taxi/commuter service, and scheduled cargo. Military operations will be included in this section of the forecasts since these operations are minimal in comparison to other operations at the airport. Typically, military based aircraft and military operations, for forecasting purposes, remain static at baseline year levels throughout the forecast period, unless more specific information is provided by the military.

General aviation represents the largest percentage of civil aircraft in the U.S. and accounts for most operations handled by towered and non-towered airports. General aviation aircraft encompass a broad range of types, from single-engine piston aircraft to large corporate jets, as well as helicopters, gliders, and amateur-built aircraft.

For this master plan, GA and military operations are further categorized as either itinerant or local operations. Local operations are those performed by aircraft that remain in the local traffic pattern or within a 20-mile radius of the tower. Local operations are commonly associated with training activity and flight instruction and include touch and go operations. Itinerant operations are arrivals or departures, other than local operations, performed by either based or transient aircraft that do not remain in the airport traffic pattern or within a 20-nautical mile radius.

3.5.1 GA Based Aircraft Forecasts

For the purposes of this master plan, Airport staff validated 36 based aircraft at DAY. Therefore, all forecasts presented for the GA based aircraft methodologies will show 36 based aircraft in the base year.

Like commercial operations forecasts, the FAA provides multiple methodologies to be used to forecast GA based aircraft. To determine the most reasonable scenario for DAY, it is necessary to compare and eliminate those forecasts that do not support the key factors and variables that comprise the specific direction of the Airport and its market.

This section describes all methodologies that were analyzed, for the development of the GA based aircraft forecasts at DAY. The following methodologies, and results therein, are described in the following sections.

3.5.1.1 FAA 2020 TAF Forecast Methodology

This scenario assesses the projected FAA 2020 TAF forecast from 2021 to 2041 to determine the Compound Average Growth Rate (CAGR) during this period, as shown in **Table 3-16**. Based on this analysis, the FAA projected no growth for based aircraft between 2021 to 2041.

Table 3-16: FAA TAF Based Aircraft Forecast

Year	TAF Trend Based Aircraft
2021	34
2022	34
2026	34
2031	34
2041	34
CAGR 2021-2041	0.00%

Source: FAA TAF, Passero Associates

Applying this CAGR to the validated 36 based aircraft and projecting through 2041, 36 based aircraft are the resultant, as shown in **Table 3-17**.

Table 3-17: Based Aircraft Forecast (FAA TAF CAGR Methodology)

Year	TAF Trend Based Aircraft
2021	36
2022	36
2026	36
2031	36
2041	36
CAGR 2021-2041	0.00%

Source: FAA TAF, Passero Associates

3.5.1.2 Market Share Methodology

Market share based aircraft analysis is determined by calculating the percentage of an airport's based aircraft counts against the airport region, state, and U.S. For performing market share analysis, 2020 FAA TAF data for DAY, the State of Ohio, and the FAA's Great Lakes Region were reviewed for based aircraft and total operations to determine the average market share for the time-period of 2020-2040.

Each based aircraft count was examined for the previous 10-year averages. **Table 3-18** lists the results.

Table 3-18: Market Share percentages for Based Aircraft

Year	DAY	Ohio	% Ohio	Midwest Region	% Region
2012	31	4,132	0.75%	26,624	0.12%
2017	31	4,376	0.71%	28,367	0.11%
2021	34	4,307	0.79%	27,337	0.12%
Average 10-year Market Share			0.76%		0.12%

Source: FAA TAF data; Passero Associates
Note: 2021 based aircraft counts from the 2020 FAA TAF is a forecasted number.

For planning purposes, the historical 10-year state market share average was applied to the forecasted 2020 FAA TAF numbers from 2021 to 2040. Compound Average Growth Rates (CAGRs) were determined from the resulting numbers, resulting in the 20-year CAGR of 0.61%. This CAGR was then applied to the Sponsor validated 2021 based aircraft count of 36 aircraft and projected through 2041.

Table 3-19 presents the market share forecast for based aircraft.

Table 3-19: Based Aircraft Forecast (Market Share Methodology)

Year	TAF Market Share Based Aircraft
2021	36
2022	36
2026	37
2031	38
2041	41
CAGR 2021-2041	0.61%

Source: Passero Associates

3.5.1.3 Ohio Department of Transportation (ODOT) Forecast Methodologies

In 2014 the ODOT System Plan followed a thorough process for analyzing existing airport data for each of Ohio's airports, and prepared long-term forecasts for each airport within the system. Their analysis separated GA operations from commercial services operations. ODOT used a top-down and bottom-up methodology for both the based aircraft and total operations forecast. These methodologies will be used in this section.

Based Aircraft Forecast *(ODOT Bottom-Up Method)*

The bottom-up method in ODOT's System Plan for based aircraft considered the population projection from the U.S. Census for the municipalities surrounding Ohio airports. Planning studies have shown that there is a direct correlation between based aircraft and populations for the municipalities surrounding an airport.

Under this method, the ODOT system plan used 2012 as the base year with 31 based aircraft. Similar to the FAA TAF based aircraft forecast, ODOT is projecting no growth through 2032. **Table 3-20** lists these results.

Table 3-20: ODOT Bottom-Up Based Aircraft Forecast for DAY

Year	Based Aircraft
2012	31
DAY Area Population CAGR 2012-2032	0.00%
2017	31
2022	31
2032	31

Source: Ohio Department of Transportation 2014 System Plan

ODOT's forecast was based on historical population trends prior to 2012, which showed a decline. As stated in ODOT's system plan, airports located in counties projected to experience a decline were expected to experience no growth in based aircraft. This ended up not being the case for the catchment area of counties surrounding DAY. Based on the most recent U.S. Census American Community Survey (ACS) data, the total population within the catchment area grew by a CAGR of 0.12% between 2010 and 2019. Although the Miami Regional Valley region was hit hard by the Great Recession, industry and jobs are returning to the region. As such, based aircraft at DAY are expected to grow.

Applying DAY's catchment area total population CAGR of 0.12% to DAY's validated critical aircraft, and projecting to 2040 results in 37 aircraft. **Table 3-21** lists the results.

Table 3-21 Based Aircraft Forecast (ODOT Bottom-Up Methodology)

Year	Based Aircraft
2021	36
Catchment Area Population CAGR 2021-2041	0.12%
2022	36
2026	36
2031	36
2041	37

Source: Passero Associates; FAA 5010, U.S. Census, CAGR for Catchment Area (Montgomery, Clark, Greene, Preble, Darke, Miami, Shelby, Mercer, Allen, Highland, Auglaize, Logan, Champaign, and Warren Counties in Ohio. Randolph and Wayne Counties in Indiana).

Based Aircraft Forecast (ODOT Top-Down Method)

ODOT's top-down method applies growth rates from the FAA Aerospace Forecast to the current based aircraft counts at the Ohio airports. It should be noted that ODOT prepared their System Plan in 2014 and used the 2013-2033 FAA Aerospace Forecast. Being that the base year for this forecast is 2021, growth rates from the 2021-2041 FAA Aerospace Forecast were used with the Sponsor validated based aircraft counts.

Details of the FAA's projection of aircraft in the general aviation fleet are tabulated in **Table 3-22** (FAA Active General Aviation and Air Taxi Aircraft).

Table 3-22 FAA General Aviation and Air Taxi Aircraft Active Fleet

FAA General Aviation and Air Taxi Aircraft Active Fleet															
	Fixed Wing						Rotorcraft			Experimental	Sport Aircraft	Other	Total General Aviation Fleet	Total Pistons	Total Turbines
	Piston			Turbine											
	Single Engine	Multi-Engine	Total	Turbo Prop	Turbo Jet	Total	Piston	Turbine	Total						
Avg. Annual Growth															
2010-20	-0.9%	-2.5%	-1.0%	0.9%	2.9%	2.0%	-1.6%	0.9%	0.1%	-0.1%	-10.5%	-8.0%	-0.9%	-1.0%	1.7%
2020-21	-0.9%	-0.6%	-0.9%	-0.3%	2.5%	1.3%	0.2%	0.8%	0.6%	3.3%	14.9%	25.4%	0.4%	-0.9%	1.2%
2021-31	-1.0%	-0.5%	-0.9%	0.2%	2.5%	1.7%	0.7%	1.5%	1.3%	1.7%	5.4%	3.1%	0.1%	-0.9%	1.6%
2021-41	-0.9%	-0.4%	-0.9%	0.6%	2.3%	1.7%	0.9%	1.6%	1.4%	1.4%	4.0%	1.6%	0.07%	-0.8%	1.6%

Source: FAA 2021-2041 Aerospace Forecast.

As shown in **Table 3-23** and using ODOT's top-down method for the based aircraft forecast, the FAA Aerospace forecast General Aviation and Air Taxi Aircraft Active Fleet growth rate was applied to the actual based aircraft 2021 count and projected through 2041.

Table 3-23 Based Aircraft Forecast Using ODOT's Top-Down Method

Year	Based Aircraft
2021	36
CAGR 2021-2041	0.07%
2022	36
2026	36
2031	36
2041	37

Source: FAA 2021-2041 Aerospace Forecast.

Based Aircraft Forecast Comparison

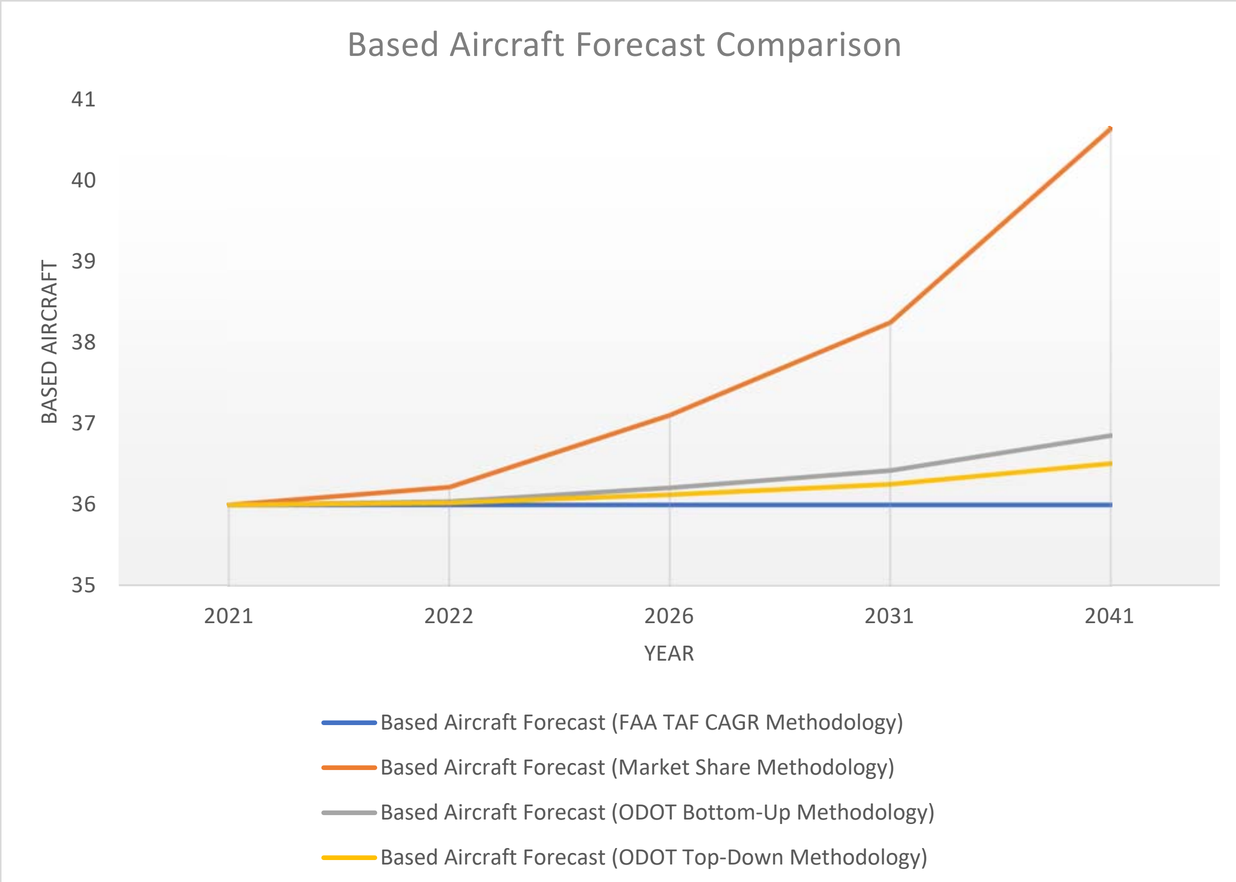
Several forecasting methods were explored above. **Table 3-24** and **Figure 3-13** depicts each of these forecasting methods for comparison purposes.

Table 3-24: Based Aircraft Forecast Summary

YEAR	Based Aircraft Forecast (FAA TAF CAGR Methodology)	Based Aircraft Forecast (Market Share Methodology)	Based Aircraft Forecast (ODOT Bottom-Up Methodology)	Based Aircraft Forecast (ODOT Top-Down Methodology)
2021	36	36	36	36
2022	36	36	36	36
2026	36	37	36	36
2031	36	38	36	36
2041	36	41	37	37

Source: FAA; ODOT; Passero Associates; U.S. Census

Figure 3-13: DAY Based Aircraft Forecast Comparison



Source: FAA; Passero Associates; U.S. Census

3.5.1.4 Preferred Based Aircraft Forecast

After analyzing each forecasting method in the previous sections, the market share methodology produced the most aggressive forecast for the based aircraft forecast, while the FAA TAF methodology produced the most conservative methodology.

The market share forecast methodology projected a growth from 36 based aircraft to 41 aircraft. Being that the FAA TAF projected no growth in based aircraft throughout the 20-year planning period, and the fact that most of DAY's operations are commercial service, the market share methodology is too aggressive. However, because DAY has a consistent general aviation operation at the Airport and the fact that there is population growth within the catchment area, no growth in general aviation operations at DAY is also unrealistic. Although, the bottom-up and top-down methodologies show similar growth within the 20-year planning period, the top-down methodology is based on the nationwide active aircraft fleet. **Therefore, being that the bottom-up methodology is based on population growth within DAY's catchment area, this methodology was recommended as the preferred based aircraft forecast for DAY where the 36 based aircraft are projected to grow to 37 in 2041.**

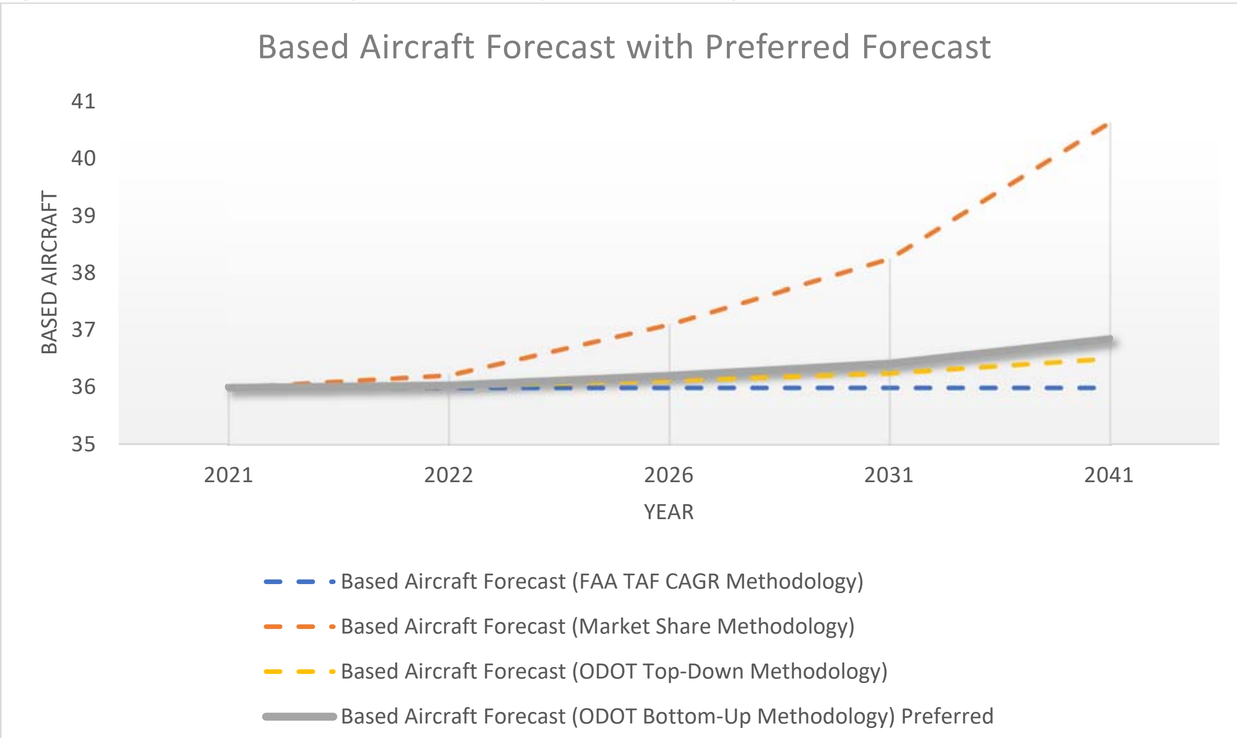
Table 3-25 and **Figure 3-14** provides the results of the preferred based aircraft forecast.

Table 3-25: DAY's Preferred Aviation Forecast (Based Aircraft)

Year	Based Aircraft
2021	36
2022	36
2026	36
2031	36
2041	37
CAGR 2021-2041	0.12%

Source: FAA; Passero Associates; DAY

Figure 3-14: DAY Based Aircraft Forecast Comparison with Preferred Forecast



Source: FAA; Passero Associates; U.S. Census

3.5.2 Military Operations Forecast

The actual military operations counts recorded on the FAA's Operations Network (OPSNET) for 2021 were 781 operations. Although the FAA TAF recorded both itinerant and local military operations at DAY, there are no military aircraft based at DAY; therefore, no military aircraft were included in the validated 36 based aircraft count. Over the past five years at DAY total military operations have increased from 316 operations in 2017, to 781 operations in 2021; thus, resulting in a CAGR of approximately 20%.

However, because total military operations make up approximately 5% of GA operations, and 2% of total operations at DAY, these operations will be factored into the base year 2021 total GA operations counts.

3.5.3 General Aviation Operations Forecast

Based on the FAA's OPSNET, and including total military operations, 15,220 total GA operations were reported in 2021. Therefore, all methodologies presented for the total operations forecasts will have base year data of 15,220 total operations for Fiscal Year (FY) 2021. It should be noted that the 2020 TAF has not been updated with the 2021 total GA operations counts; therefore, there will be a 12% difference between the actual 2021 counts and the FAA's 2021 counts in the base year.

Regarding the COVID-19 pandemic, DAY experienced a drop in total GA operations from 2019 to 2020, where operations dropped from 13,234 operations to 11,588 operations. As of the end of FY 2021, the 15,220 total GA operations counts exceed both the 2019 and 2020 counts, which indicate that total GA operations have recovered and exceeded pre-pandemic levels.

Like the GA based aircraft forecasts in the previous sections of this master plan, several methodologies were explored for the GA operations forecast. This section provides the methodologies that were analyzed for the development of the forecasts of total GA operations at DAY.

3.5.3.1 FAA 2020 TAF Methodology

Unlike the based aircraft FAA TAF forecast, the FAA is projecting growth in the total GA operations forecast. As shown in **Table 3-26**, total GA operations are projected to grow steadily by 0.10% between 2021 to 2041.

Table 3-26: FAA TAF GA Operations Forecast

Year	Trend GA Operations
2021	13,585
2022	13,599
2026	13,655
2031	13,723
2041	13,862
CAGR 2021-2041	0.10%

Source: FAA TAF data; Passero Associates

Applying this CAGR of 0.10% to the validated 15,220 total GA operations and projecting through 2041 resulted in approximately 15,530 total GA operations, as shown in **Table 3-27.**

Table 3-27: Total GA Operations Forecast (TAF CAGR Methodology)

Year	Trend GA Operations
2021	15,220
2022	15,235
2026	15,297
2031	15,374
2041	15,530
CAGR 2021-2041	0.10%

Source: FAA TAF data; Passero Associates

3.5.3.2 Market Share Scenario

For performing market share analysis for DAY, data relative to the State of Ohio, and the FAA's Great Lakes Region 2020 TAF were reviewed for total GA operations. Because military operations make up a small percentage of total operations, these operations were included with the historic TAF GA operations.

The market share examines the previous 10-year averages, and the results are included in **Table 3-28**.

Table 3-28: Market Share percentages for Total GA Operations

Year	DAY	Ohio	% Ohio	Midwest Region	% Region
2012	17,436	2,591,738	0.67%	11,833,993	0.15%
2017	11,777	2,429,904	0.48%	11,204,888	0.11%
2021	11,588	2,381,926	0.49%	10,917,791	0.11%
Average 10-year Market Share			0.53%		0.12%

Source: FAA TAF data; Passero Associates

Much like the market share based aircraft forecast, the 10-year averages were applied to the forecasted TAF GA operations from 2022 to 2041. Compound Average Growth Rates (CAGRs) were determined from the resulting numbers, and the 20-year CAGR of 0.30% was applied to the validated total GA operations count of 15,220 operations and projected through 2041.

Table 3-29 summarizes the results from the market share forecast where total GA operations are projected to grow to approximately 16,147 total GA operations in 2041.

Table 3-29: GA Operations Forecast (Market Share Methodology)

Year	Market Share Total GA Operations
2021	15,220
2022	15,265
2026	15,447
2031	15,676
2041	16,147
CAGR 2021-2041	0.30%

Source: Passero Associates; FAA TAF data

3.5.3.3 Ohio Department of Transportation (ODOT) Forecast

As analyzed earlier in this chapter, ODOT's forecasting methodologies will be explored for total GA operations counts in the sections below.

ODOT Bottom-Up Methodology

For the based aircraft bottom-up methodology, ODOT considered each airport's associated local population projection from the U.S. Census. Using this method, the total population CAGR was applied to the validated based aircraft counts and projected through 2041, resulting in 37 based aircraft.

ODOT's bottom-up methodology for total GA operations were determined in a two-step process. Step one used the base year Operations Per Based Aircraft (OPBA). Step two applied the OPBA to the forecasted based aircraft counts determined by the based aircraft bottom-up methodology.

OPBA is obtained from taking total operations divided by based aircraft. Referencing ODOT's system plan, approximately 41,626 general aviation operations were counted in 2012. It should be noted that this count is significantly higher than what the FAA TAF recorded in 2012 for total GA operations (i.e., 17,676 including military operations). Under ODOT's bottom-up methodology, they projected no growth in total GA operations from 2017 to 2032. Furthermore, an OPBA of 1,323 in a no-growth scenario was used for the forecast. **Table 3-30** lists the results of ODOT's forecast.

Table 3-30: Total Operations Forecast Using ODOT's Bottom-Up Method within the Catchment Area

Year	DAY OPBA (ODOT)	Total GA Operations
2012	1,323	41,626
2017		41,600
2022		41,600
2032		41,600

Source: Ohio Department of Transportation

Applying this methodology to DAY's validated 2021 total GA operations resulted in an OPBA of 423 (15,220 / 36) and approximately 15,582 total projected GA operations in 2041. **Table 3-31** lists the results. Please note that the OPBA was applied to the forecasted based aircraft counts determined in the based aircraft bottom-up methodology.

Table 3-31: GA Operations Forecast (Bottom-Up Methodology)

Year	DAY OPBA (Validated Counts)	Based Aircraft from Bottom-Up Methodology	Total GA Operations (Bottom-Up Methodology)
2021	**423**	36	15,220
2022		36	15,238
2026		36	15,310
2031		36	15,400
2041		37	15,582

Source: Passero Associates; FAA OPSNET; City of Dayton; U.S. Census, CAGR for Catchment Area (Montgomery, Clark, Greene, Preble, Darke, Miami, Shelby, Mercer, Allen, Highland, Auglaize, Logan, Champaign, and Warren Counties in Ohio. Randolph and Wayne Counties in Indiana).

ODOT Top-Down Methodology

Much like the top-down methodology explored for the based aircraft forecast, the FAA Aerospace forecast is used for the total GA operations top-down methodology. Growth rates from the FAA Aerospace Forecast "Hours Flown" chart were used for the total GA Operations forecast.

Details of the FAA's projection of GA and Air Taxi Aircraft Hours Flown are tabulated in **Table 3-32** (FAA Active General Aviation and Air Taxi Hours Flown).

Table 3-32 FAA Active General Aviation and Air Taxi Hours Flown

FAA General Aviation and Air Taxi Hours Flown															
	Fixed Wing						Rotorcraft			Experimental	Sport Aircraft	Other	Total General Aviation Fleet	Total Pistons	Total Turbines
	Piston			Turbine											
	Single Engine	Multi-Engine	Total	Turbo Prop	Turbo Jet	Total	Piston	Turbine	Total						
Avg. Annual Growth															
2010-20	-0.3%	-0.6%	-0.4%	1.2%	-0.7%	0.1%	-3.3%	-2.0%	-2.3%	-2.8%	-6.6%	-12.0%	-0.7%	-0.5%	-0.5%
2020-21	0.3%	-1.1%	0.1%	2.9%	21.6%	13.1%	6.7%	8.3%	8.0%	10.0%	17.3%	46.3%	4.9%	0.4%	11.8%
2021-31	-1.0%	-0.8%	-1.0%	1.0%	5.0%	3.5%	2.3%	2.3%	2.3%	3.8%	6.2%	6.7%	1.1%	-0.8%	3.2%
2021-41	-0.7%	-0.3%	-0.7%	1.0%	3.5%	2.6%	1.9%	2.1%	2.0%	2.7%	4.5%	3.4%	1.0%	-0.5%	2.5%

Source: FAA 2021-2041 Aerospace Forecast.

As shown in **Table 3-33** and using ODOT's top-down method for the total GA operations forecast, the FAA Aerospace forecast General Aviation and Air Taxi Hours Flown growth rate was applied to the actual 2021 GA operations count and projected through 2041.

Table 3-33 Based Aircraft Forecast Using ODOT's Top-Down Method

Year	Based Aircraft
2021	15,220
CAGR 2021-2041	1.0%
2022	15,367
2026	15,970
2031	16,757
2041	18,448

Source: FAA 2021-2041 Aerospace Forecast.

Total Operations Forecast Comparison

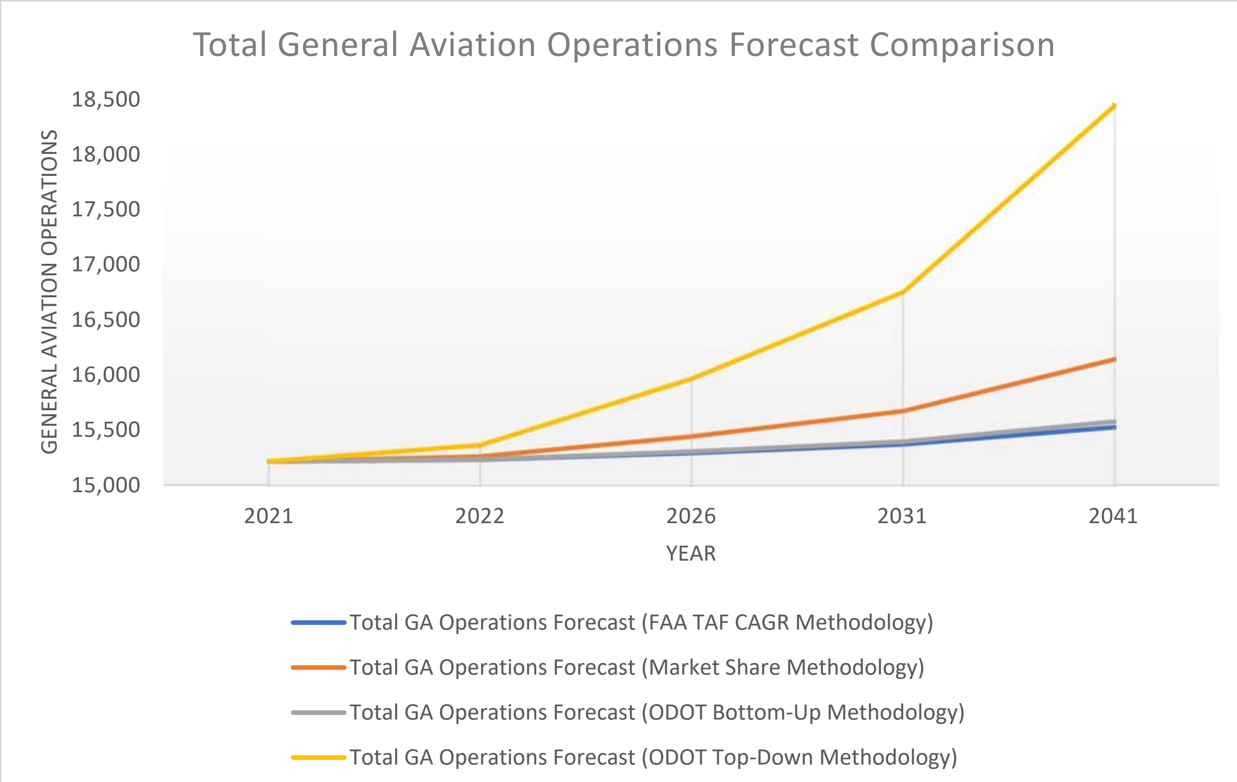
Several forecasting methods were explored above. **Table 3-34** and **Figure 3-15** provide a comparison for each forecasting method.

Table 3-34: Total GA Operations Forecast Summary

YEAR	Total GA Operations Forecast (FAA TAF CAGR Methodology)	Total GA Operations Forecast (Market Share Methodology)	Total GA Operations Forecast (ODOT Bottom-Up Methodology)	Total GA Operations Forecast (ODOT Top-Down Methodology)
2021	15,220	15,220	15,220	15,220
2022	15,235	15,265	15,238	15,367
2026	15,297	15,447	15,310	15,970
2031	15,374	15,676	15,400	16,757
2041	15,530	16,147	15,582	18,448

Source: FAA; Passero Associates; U.S. Census

Figure 3-15: DAY Total GA Operations Forecast Comparison



Source: FAA; Passero Associates; U.S. Census

3.5.3.4 Total General Aviation Preferred Forecast

Regarding the total GA Operations forecast, the ODOT Top-Down methodology was the most aggressive, and the FAA TAF CAGR methodology was the most conservative. The ODOT bottom-up methodology resulted in a forecast that was very similar to the TAF.

Being that the ODOT bottom-up methodology takes DAY's catchment area into consideration, and the market share methodology takes the comparison with other airports in the region into consideration, **the median between the ODOT bottom-up methodology and the market share methodology was determined and selected as the preferred total GA operations forecast.**

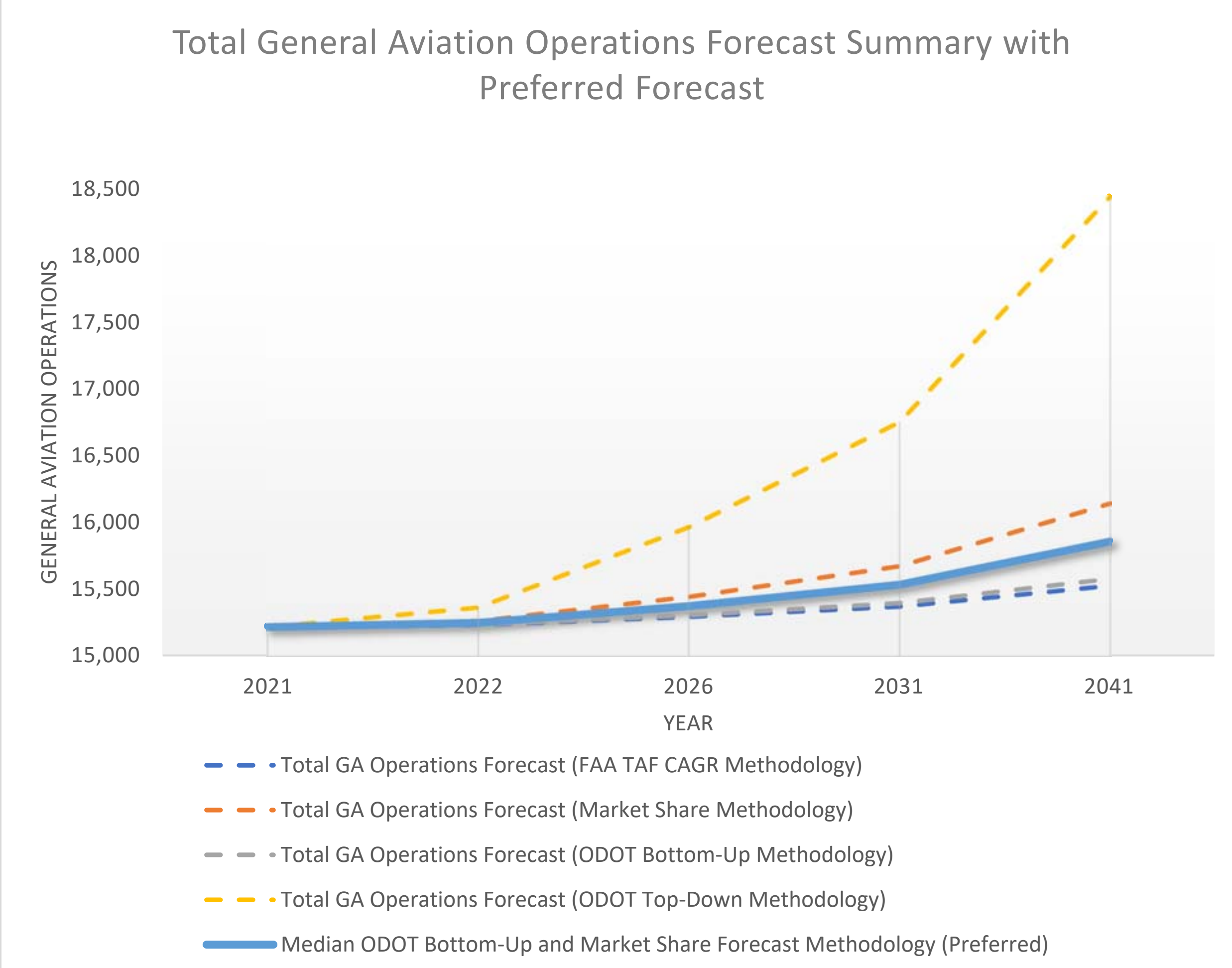
Table 3-35 and **Figure 3-16** provides the results of the preferred total GA operations forecast.

Table 3-35: DAY's Preferred Aviation Forecast (Total GA Operations)

Year	Total GA Operations
2021	15,220
2022	15,251
2026	15,378
2031	15,538
2041	15,862
CAGR 2021-2041	0.21%

Source: FAA; Passero Associates; DAY

Figure 3-16: DAY Total GA Operations Forecast Summary with Preferred Forecast



Source: FAA; Passero Associates; U.S. Census

3.5.3.5 Breakdown of Preferred Forecast

Airport Utilization Forecast – Local/Itinerant Split

The level of local and itinerant operations at an airport can influence a variety of facility recommendations, such as hangar and apron space considerations. As previously stated, a local operation is one that is conducted within the airport operations traffic pattern or stays within 20 miles of the takeoff airport without landing anywhere else, and itinerant are all others.

Utilizing information from OPSNET, the general aviation operations at DAY – including military operations – have a local and itinerant operational split of 20% and 80%, respectively. For planning purposes, this operational split was held constant throughout the planning period and applied to the preferred general aviation operations forecast. **Table 3-36** provides the local and itinerant operations split throughout the planning period.

Table 3-36: Utilization Forecast – Local vs. Itinerant by Type at DAY

Year	GA Local (20%)	GA Itinerant (80%)	Total
2021	3,004	12,216	15,220
2022	3,010	12,241	15,251
2026	3,035	12,343	15,378
2031	3,067	12,471	15,538
2041	3,131	12,731	15,862

Sources: DAY; Passero Associates

Airport Utilization Forecast – Based Aircraft and Operations Breakdown by Type

Based on data from the Sponsor, there are three types of aircraft included in the GA based aircraft fleet. These aircraft categories are Single Engine (SE), Multi-Engine (ME), and Jet. Based on the breakdown, there are 13 SE aircraft and 13 Jet aircraft (i.e., each aircraft type makes up 36% of the based aircraft) and 10 ME aircraft, which make up 28% of the based aircraft. For planning purposes, the existing breakdown of the based aircraft will be held constant and applied to the preferred based aircraft forecast.

Table 3-37 provides a breakdown of based aircraft, by type, throughout the planning period. **Table 3-38** provides the projected general aviation operations, by aircraft type, throughout the planning period.

Table 3-37: Forecasted Fleet Mix at DAY

Year	SE	% Total	ME	% Total	Jet	% Total	Heli	% Total	Glider	% Total	Mil	% Total	UL	% Total	Total Based Aircraft
2021	13	36%	10	28%	13	36%	0	0%	0	0%	0	0%	0	0%	36
2022	13	36%	10	28%	13	36%	0	0%	0	0%	0	0%	0	0%	36
2026	13	36%	10	28%	13	36%	0	0%	0	0%	0	0%	0	0%	36
2031	13	36%	10	28%	13	36%	0	0%	0	0%	0	0%	0	0%	36
2041[1]	13	36%	10	28%	13	36%	0	0%	0	0%	0	0%	0	0%	37

Sources: SE = single engine; ME = multi-engine, Heli = helicopter, Mil = military, UL = ultralights
DAY; Passero Associates
1/: Due to rounding the forecasted aircraft to the nearest whole number, the fleet mix breakdown does not add up unless decimal places are shown.

Table 3-38: Forecasted Total GA Operations by Fleet Mix at LCQ

Year	SE	% Total	ME	% Total	Jet	% Total	Heli	% Total	Glid.	% Total	Mil	% Total	UL	% Total	Total GA Ops.
2021	5,496	36%	4,228	28%	5,496	36%	0.00	0%	0.00	0%	0.00	0%	0.00	0%	15,220
2022	5,507	36%	4,237	28%	5,507	36%	0.00	0%	0.00	0%	0.00	0%	0.00	0%	15,251
2026	5,553	36%	4,272	28%	5,553	36%	0.00	0%	0.00	0%	0.00	0%	0.00	0%	15,378
2031	5,611	36%	4,316	28%	5,611	36%	0.00	0%	0.00	0%	0.00	0%	0.00	0%	15,538
2041	5,728	36%	4,406	28%	5,728	36%	0.00	0%	0.00	0%	0.00	0%	0.00	0%	15,862

Sources: SE = single engine; ME = multi-engine, Heli = helicopter, Mil = military, UL = ultralights
DAY; Passero Associates

3.5.4 General Aviation Peak Activity Forecasts

Annual projections provide a good overview of activity at an airport but fail to reflect the operational characteristics of the facility. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during times of peak operational activity. Therefore, forecasts are developed for the peak month, the average day in the peak month, and the peak hour of the peak day. The values for these metrics were calculated using the methodology in FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities, and* ACRP 113*, Guidebook on General Aviation Facility Planning.*

For DAY, peak month calculations are based on total general aviation operations obtained from the Sponsor. Peak hour operations, depicted in **Table 3-39**, were calculated using the following assumptions:

- **Peak Month Operation:** This level of activity is defined as the calendar month when peak aircraft operations occur. Assume a 10% increase of total annual operations within that month.

- **Average Day/Peak Month:** This level of operation is defined as the average day within the peak month determined by dividing peak month operations by the number of days within the peak month (in this case 31).
- **Peak Hour Operation:** This level of operation is defined as the peak hour within the design day, assuming 15% of daily operations in the design hour.
- **Peak Hour Passengers:** Using 2.5 people, for pilots and passengers, per design hour operation for general aviation to develop an understanding of the demand on facilities such as passenger terminals, auto parking, restrooms, meeting space, etc.[16]

Table 3-39: Peak Hour General Aviation Operations for DAY

Year	Annual Operations	Peak Month	Peak Day	Design Hour			Peak Hour Passengers
				Local	Itinerant	Design Hour Total	
2021	15,220	1395	45	1.3	5.4	6.8	17
2022	15,251	1,398	45	1.3	5.4	6.8	17
2026	15,378	1,410	45	1.3	5.5	6.8	17
2031	15,538	1,424	46	1.4	5.5	6.9	17
2041	15,862	1,454	47	1.4	5.6	7.0	18

Source: Passero Associates; DAY

[16] Per the ACRP 113, Guidebook on General Aviation Facility Planning, a factor of 2.5 people (pilots and passengers) per peak-hour operation was assumed for planning purposes.

3.5.5 General Aviation Preferred Forecast Summary

Table 3-40 presents a summary of aviation activity forecasts for DAY throughout the 20-year planning period.

Table 3-40: Summary of General Aviation Preferred Forecasts

Element	Forecast year				
Based aircraft	2021	2022	2026	2031	2041
Single engine[1]	13	13	13	13	13
Multi engine[1]	10	10	10	10	10
Jet[1]	13	13	13	13	13
Helicopter	0	0	0	0	0
Glider	0	0	0	0	0
Military	0	0	0	0	0
Ultra-Light	0	0	0	0	0
Total Based Aircraft	36	36	36	36	37
Total Operations	15,220	15,251	15,378	15,538	15,862
Local Split	3,004	3,010	3,035	3,067	3,131
Itinerant Split	12,216	12,241	12,343	12,471	12,731
GA Design Hour Total	6.8	6.8	6.8	6.9	7.0
Peak Hour Passengers/Pilots	17	17	17	17	18

Source: Passero Associates; DAY
1/: Due to rounding the forecasted aircraft to the nearest whole number, the fleet mix breakdown does not add up unless decimal places are shown.

3.5.6 Comparison to FAA Terminal Area Forecast

Much like the commercial service forecast, and based on FAA AC 150/5070-6B, *Airport Master Plans*, general aviation operations and based aircraft forecasts are considered consistent with the FAA TAF where forecasts differ by less than 10 percent in the short-term (five-year) period, and 15 percent within the 10-year period.

Table 3-41 lists the results of the comparison between the FAA TAF and the preferred forecast.

Table 3-41: FAA TAF Forecast Comparison with General Aviation Preferred Forecast

FAA Comparison Forecast						
Year	Based Aircraft			GA Operations		Airport Operations
	AMPU Forecast	TAF Forecast	% Difference (TAF)	AMPU Forecast	TAF Forecast	% Difference
2021	36	34	5.9%	15,220	13,585	12.0%
2022	36	34	6.0%	15,251	13,599	12.2%
2026	***36***	***34***	***6.5%***	***15,378***	***13,655***	***12.6%***
2031	***36***	***34***	***7.1%***	***15,538***	***13,723***	***13.2%***
2041	37	34	8.4%	15,862	13,862	14.4%

Source: Passero Associates; FAA TAF

As shown in the table above, the preferred based aircraft forecast comparison to the 2020 FAA TAF is within the 10-15 percent benchmark within the first 10 years of the planning period. Total GA Operations, however, is outside the 10 percent benchmark within the first five years. This is due to the actual fiscal year total GA operations count being used as the based year in the preferred forecast, whereas the 2021 GA operations count in the TAF is a projected number. As such, being that the 10 year forecast comparison with the FAA TAF is within the 15 percent benchmark, this forecast should be validated and approved by the FAA

3.6 Overall Recommended Forecast Summary

The following tables present a summary of the preferred aviation activity forecasts for air carrier activity (operations and enplanements), GA activity (based aircraft and operations), and cargo operations as detailed in the previous sections. Additionally, direct comparisons to the FAA's TAF for DAY are provided for evaluation purposes. The recommended forecasts are the preferred projections on which future planning for the Airport will be based. **Table 3-42** presents the complete summary of the preferred forecast for based aircraft, enplanements, and operations by type.

Table 3-43 details the recommended forecast of enplanements and total airport operations (all activity types) in comparison to the FAA TAF forecast. At the end of the first five years of the planning period, the recommended forecast predicts a level of enplanements 6.8% above the DAY TAF, and total Airport operations 5.9% above the DAY TAF. Per FAA requirements, forecasts should be within 10 percent of the TAF in the first 5 years and 15 percent in 10 years.

Table 3-42: Overall Recommended Forecast Summary

Year	**Based Aircraft**	**Enplanements**	**Total Operations**			
			Air Carrier	**GA**	**Cargo**	**Total Ops.**
2021	36	433,751	20,690	15,220	542	36,452
2026	36	913,094	27,739	15,378	596	43,713
2031	36	936,142	28,715	15,538	656	44,909
2041	37	970,401	31,127	15,862	792	47,781
CAGR 2021-2041	**0.12%**	**4.11%**	**2.06%**	**0.21%**	**1.91%**	**1.36%**

Source: Dayton International Airport, Passero Associates

Table 3-43: Overall Recommended Forecast vs. FAA TAF

Year	Enplanements			Operations		
	TAF	Recommended Forecast	Recommended Forecast vs. TAF	TAF	Recommended Forecast	Recommended Forecast vs. TAF
2021	406,175	433,751	6.8%	34,406	36,452	5.9%
2026	***855,043***	913,094	***6.8%***	***41,570***	**43,713**	***5.2%***
2031	***876,626***	936,142	***6.8%***	***42,620***	**44,909**	***5.4%***
2041	908,707	970,401	6.8%	45,186	47,781	5.7%
CAGR 2021-2041	**4.11%**	**4.11%**		**1.37%**	**1.36%**	

Source: Dayton International Airport, Passero Associates

3.7 Current and Projected Critical Aircraft

Evaluating the Airport's current fleet mix and determining the current design aircraft, as well as the projected design aircraft, are important aspects of the Master Plan Study. The design aircraft (commonly referred to as the "critical aircraft") determination is a key consideration in FAA decision making on project justification.

3.7.1 Aircraft Classification

The FAA has established aircraft classification systems that group aircraft types based on their performance and geometric characteristics. These classification systems (described below) are used to determine the appropriate airport design standards for specific runway, taxiway, taxilane, apron, or other facilities, as described in FAA AC 150/5300-13A, *Airport Design*. The standard classifications are summarized in **Table 3-44**.

- Aircraft Approach Category (AAC) – AAC is a grouping of aircraft based on a reference landing speed (VREF), if specified, or if VREF is not specified, 1.3 times stall speed (VSO) at the maximum certificated landing weight. VREF, VSO, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.
- Airplane Design Group (ADG) – ADG is a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used.
- Taxiway Design Group (TDG) – TDG is a classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

Table 3-44: Aircraft Classification Criteria: AAC & ADG

Aircraft Approach Category (AAC)			
Approach Category	**Air Speed (knots)**		**Example Aircraft**
A	<91		Cessna Caravan, Pilatus PC-12
B	91 ≤ 121		Bombardier CRJ-700, Cessna Citation X
C	121 ≤ 141		McDonnell Douglas MD-80, Boeing 737-7, Airbus A320
D	141 ≤ 166		Boeing 737-8/9, Boeing 767-4, Gulfstream G650
E	166+		Military Fighter Jets
Airplane Design Group (ADG)			
Design Group	**Tail Height (ft.)**	**Wingspan (ft.)**	**Example Aircraft**
I	<20	<49	Cessna 152, Citation CJ1 (Model C525)
II	20-<30	49 ≤ 79	Bombardier CRJ-2/4, Cessna Caravan
III	30-<45	79 ≤ 118	McDonnell Douglas MD-80, Boeing 737-7
IV	45-<60	118 ≤ 171	Boeing 757-2, Boeing 767-4
V	60-<66	171 ≤ 214	Airbus A330-3
VI	66-<80	214 ≤ 262	Airbus A380-800, Boeing 787

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

The applicability of these classification systems to the FAA airport design standards for individual airport components (such as runways, taxiways, or aprons) is presented in **Table 3-45**.

Table 3-45: Applicability of Aircraft Classifications

Aircraft Classification	Related Design Components
Aircraft Approach Speed (AAC)	Runway Safety Area (RSA), Runway Object Free Area (ROFA), Runway Protection Zone (RPZ), runway width, runway-to-taxiway separation, runway-to-fixed object
Airplane Design Group (ADG)	Runway, Taxiway, and apron Object Free Areas (OFAs), parking configuration, taxiway-to-taxiway separation, runway-to-taxiway separation
Taxiway Design Group (TDG)	Taxiway width, radius, fillet design, apron area, parking layout

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

3.7.2 Design Aircraft Family

The "design aircraft" or "design aircraft family" represent the most demanding aircraft or grouping of aircraft with similar characteristics (relative to AAC, ADG, TDG), that are currently using or are anticipated to use an airport on a regular[17] basis. Upon review of the FAA's TFMSC data, T100 and forecast fleet mix assumptions described in this chapter, the design aircraft family identified for DAY is presented in **Table 3-46**. This grouping represents the typical commercial aircraft and cargo aircraft anticipated to operate at DAY over the planning horizon. These aircraft generally have higher AAC, ADG, and TDG classifications than the other regularly scheduled commercial aircraft. While the Study is not limited to planning for the design aircraft, they must still be considered when planning airfield and landside facilities as they may require specific facility design accommodations within their designated areas of operation. The current critical aircraft for DAY is the Boeing 757-200PF (TDG 4), which is anticipated to be retired and replaced with either the Boeing 767-300F (TDG 5).

[17] According to FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, the terminology of "regular use" is defined as 500 annual operations, including itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing.

Table 3-46: Design Aircraft Family

Aircraft	Total Operations (2021)	Total Operations (2041)	AAC	ADG	TDG	AAC	ADG		TDG	
						Approach Speed (knots)	Wingspan (ft.)	Tail Height (ft.)	CMG (ft.)	MGW (ft.)
Operated by Passenger Airlines										
A319	88	125	C	III	3	126	111.88	39.73	44.9	29.36
A320/321	430	1,525	C	III	3	136	111.88	39.63	50.2	29.36
CRJ-700	3,216	7,844	C	II	2	135	76.27	24.83	49.25	16.39
CRJ-900	5,612	11,548	C	III	2	140	81.53	24.12	56.76	16.39
Cargo Operations										
Boeing 757-200PF	542	0	C	IV	4	137	124.83	45.08	72.00	28.00
Boeing 767-300F	0	792	C	IV	5	140	156.08	52.92	82.17	35.75

Source: Dayton International Airport, Passero Associates

3.7.3 Airport & Runway Classification

The FAA classifies airports and runways based on their current and planned operational capabilities. These classifications (described below), along with the aircraft classifications defined previously, are used to determine the appropriate FAA standards (per AC 150/5300-13A) for airfield facilities.

The Airport Reference Code (ARC) is an airport designation that represents the AAC and ADG of the aircraft that the airfield is intended to accommodate on a regular basis. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport. The Boeing 757-200PF is identified as the current overall critical aircraft. The future critical aircraft for airfield and pavement design is expected to be the Boeing 767-300F (AAC C, TDG 5).

In the next section of the report all three runways will be evaluated taking into consideration the annual service volume analysis. The three runways will be classified (primary, secondary, crosswind or additional), eligibility will be identified, and the design standards for each runway will be noted. Runway 18-36 is eligible as a crosswind runway to design standards RDC B-II. The airport will seek special consideration with the FAA for additional airfield geometry for both Runway 18-36 and 6R-24L.

Chapter 4:

Airfield Capacity and Facility Requirements

The preceding chapters have described the existing facilities at Dayton International Airport (DAY) and forecasted aviation demand estimates of future growth in passenger levels, aircraft operations and based aircraft. This information will be used in this chapter to describe the airfield capacity and future facility requirements needed to meet the projected demand for both airside and landside areas of the Airport. If DAY is to accommodate the existing and forecasted demand through the planning period, specific components of the Airport must be evaluated and further developed.

Airport owners/sponsors that accept funds from FAA-administered airport financial assistance programs must agree to certain obligations (or assurances) that require their facilities to operate in a safe and efficient manner. FAA advisory circular (AC) 150/5300-13B, *Airport Design*, includes FAA standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other facilities at civil airports. Along with other ACs, the AC 150/5300-13B will be the primary source of design criteria presented in this chapter; however, Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* and AC 150/5060-5, *Airport Capacity and Delay* is also referenced with respect to airspace criteria.

The facility requirements are developed with demand and capacity evaluations to determine if the Airport can accommodate the forecasted aviation operations. The demand and capacity analysis considers possible design features or additional facilities that may increase overall capacity levels to accommodate demand. Planning, acquiring land, and designing required facilities at an airport begin when airport operational capacity reaches 60 percent.

This chapter will provide an overview of the following components:

- Mission and Vision
- Airfield Capacity
- Airside Facility Requirements
- Parking and Roadway Access Facility Requirements
- General Aviation and Landside Facility Requirements
- Support Facilities
- Terminal Facility Requirements

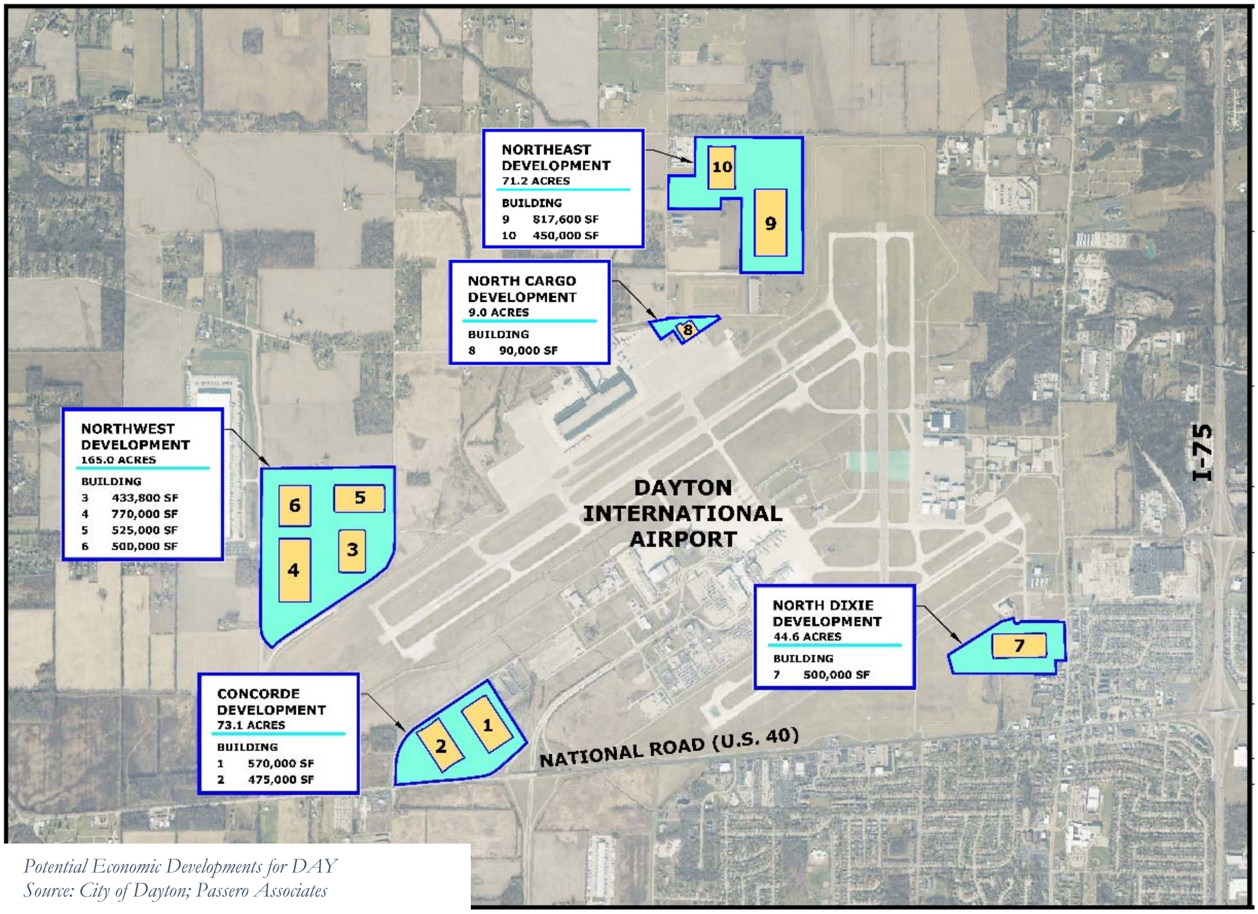
Mission and Vision

This section emphasizes the Dayton International Airport (DAY) and its Mission and Vision Statement for the airport, moving into the future.

At the crossroads of innovation, sustainability, and economic growth, the City of Dayton's – Dayton International Airport (DAY) continues its important mission of operating a safe and efficient Airport while enhancing our passenger experiences at every opportunity. The airport serves as a vital transportation asset and is a key component of the Economic engine to the Dayton region and the State of Ohio. The vision is to connect the Dayton Region and Southwest Ohio to the rest of the World, while expanding and improving our Airport Infrastructure to accommodate both current and future needs of the Region. Dayton International Airport is focused on the following:

- Hub for Innovation in the Aviation Industry
- Engine for Economic Development in the Region
- Promoting the Aerospace & Defense Industry
- Support for Wright Patterson Air Force Base – Mission/Our Community
- Transportation Hub to the Rest of the World

In the last seven years, DAY has experiences real and tangible growth with an immediate economic impact to the area. Ten (10) new facilities, encompassing nearly five million (5 million) square feet of commercial space has been developed adjacent to the Airport, including companies such as Chewy, Inc (Pet products), Crocs (Footwear), Energizer, ALPLA (plastics fabrication), Amazon, and Proctor and Gamble to name a few. Over $400 million is new investment in the area, has resulted in nearly 4,000 new jobs to the community. Additionally, two more large facilities are currently being constructed at this time.



Potential Economic Developments for DAY
Source: City of Dayton; Passero Associates

This real growth has and will continue to lead to future air travel and enplanement growth, increasing cargo shipments, and logistics support associated with increased employment numbers, associated vendors, as well as support Contractors and suppliers.

As discussed in Chapter 2, and shown in Table 3-4 and Figure 3-5, the Gross Regional Product (GRP) for the Dayton-Kettering area between the period of 2010 to 2020 was 2.9%. Among the top industries that contribute to the growth of GRP in the Dayton metro area is the manufacturing industry.

Projecting the average growth rate of 2.9% out 20 years would result in a projected GRP of approximately $72,210,425,847 for the Dayton-Kettering area.

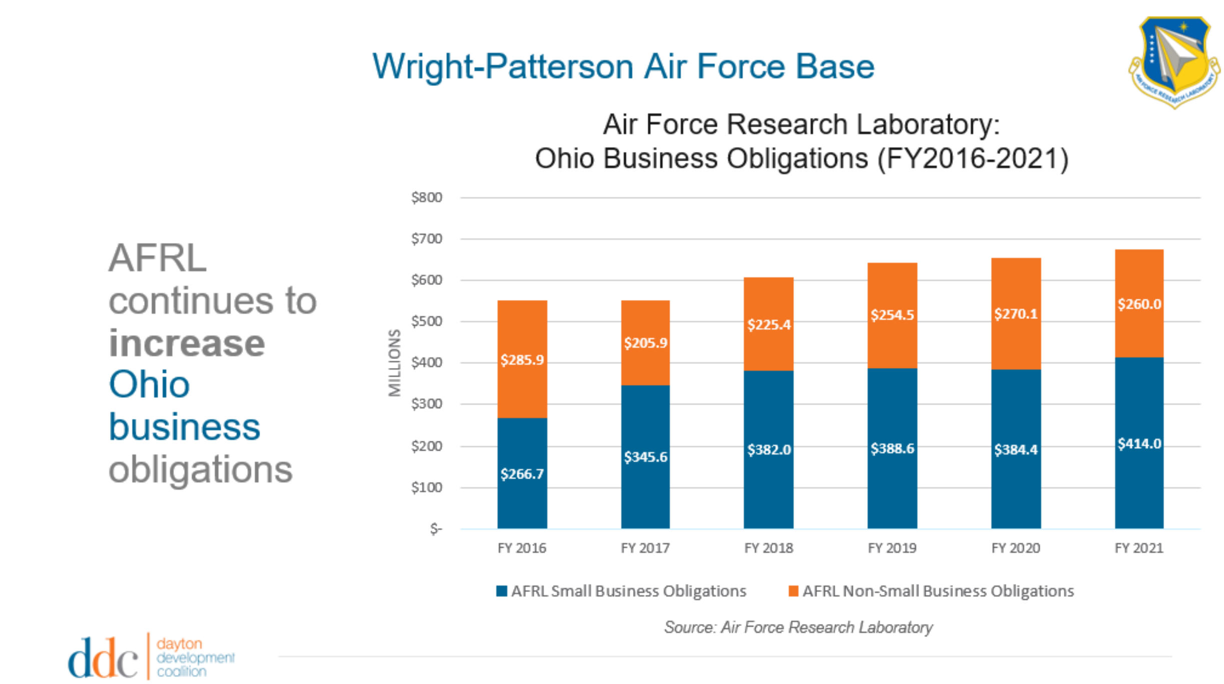
In addition to the growth of the GRP, the FAA approved forecast outline in Chapter 3 of this report is also projecting growth in aeronautical operations at DAY. As the airport is steadily recovering from the temporary loss in enplanements and operations due to the COVID-19 pandemic, the 2021-2041 forecast

projects that enplanements, based aircraft and total operations are projected to grow to 908,707 enplanements (CAGR 4.11%), 37 based aircraft (CAGR 0.12%), and 47,781 (CAGR 1.36%), respectively.
To help understand how the operational activity at DAY could contribute to the Dayton-Kettering region and GRP, Airport staff have the following vision statements for the Airport to increase the efficiency in airport operations.

- ***Continue to support adjacent and regional economic development around the airport while at the same time maintaining and protecting existing infrastructure (Runways, Taxiways, Aprons, NAVAIDS, etc.) and also protecting Airspace (Part 77 Airspace, Approach & Departure Surfaces, Runway Protection Zones (RPZ), Object Free areas and clear heights.***
- ***Air Service Growth: With increased area businesses and employment coming into the region, additional passenger enplanements are anticipated. The Airport continues its efforts to maintain and attract new Airlines (Air Service) to the DAY Airport. Legacy carriers such as American, United, and Delta, as well as low cost carriers such as Allegiant are key partners to address current and future air travel demand.***

A recent update report provided by the Dayton Development Coalition (report dated 10/17/22 summarizing Development through Q3 of 2022) shows that the Dayton Region attracted 30 new development projects to the area, creating 5,870 new jobs, while retaining nearly 12,000 existing jobs for the local economy, of which resulted from a nearly $5.7B investment from these 30 Companies. Prominent names like Honda, Orbis, SNC, Polaris, SemCorp, Abbott, The Connor Group, and many more all chose the Dayton Region, of which the DAY Airport plays a critical role in these developments and local business strategies.

Furthermore, the Wright-Patterson Air Force Base, specifically the Air Force Research Laboratory (AFRL) continues to increase its Ohio Business Obligations which realized an increase over the last 5 years from $552M in 2016 to nearly $674M in 2021 (over a 20% increase). Again promoting the positive growth and revival of the Dayton region.



Aviation Development

In tandem with DAY's operational vision, Airport staff also has a vision to build on recent development at DAY.

Just last year, DAY, the City of Dayton, and the State of Ohio were able to welcome a new Aerospace Defense Contractor to the Airport with the recent construction of a 90,000 SF + Aircraft Hangar built to accommodate some of the largest military and civilian airplanes in the world, including the Lockheed C-5 Galaxy and the Boeing 747.

This facility located strategically on the north side of the airfield, will be able to accommodate future expansion of the northeast cargo area for future facilities of comparable size. As such, provisions for future expansion have been added to the Airport Layout Plan/ Airport Master Plan.

The Aviation Development Vision Statement is as follows:

- ***Develop the northeast side of the Airfield into a major campus of very large Aircraft Hangars to support growth in the Aerospace Defense industry, as well as promote future innovation and technological advancements in the Aviation Industry.***

Northeast Development Vision at DAY
Source: City of Dayton; Passero Associates

Available MRO Sites
Source: City of Dayton; Passero Associates

<u>Additional -Maintenance/ Repair/Overhaul (MRO) Organization Vision</u>

These types of operations currently exist on the Airport, including operations associated with PSA Airlines maintenance facility (over 100,000 SF facility), Stevens Aviation, and the previously referenced new Aerospace Defense Contractor.

Regarding MRO's Airport staff have the following vision statements.

- ***Develop new additional MRO facilities around the airfield. The exhibit, as shown on the exhibit at the bottom of the preceding page, outlines available locations on the airfield that can support MRO type operations, including aprons to park aircraft, connecting taxiways, and existing utilities & infrastructure either on or nearby the location.***
- ***Proposed MRO facilities in the northwest area outlined in the exhibit below. This type of facility could also be developed into a small aircraft (or even electric aircraft development / eVTOL R&D facility or similar).***

Proposed Northwest MRO Development
Source: City of Dayton; Passero Associates

With the growing economic development boom around the airport, and in the Greater Dayton Region, the Sponsor foresees an increase in freight traffic.

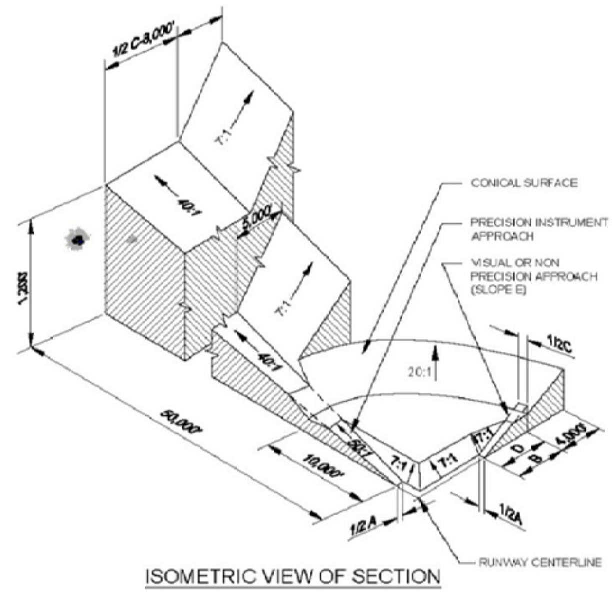
4.1 Airspace Design Criteria

14 CFR Part 77 prescribes airspace standards which establish criteria for evaluating navigable airspace. Part 77 surfaces are established relative to the airport and its runways. These surfaces are intended to restrict obstacles and hazards within the vicinity of an airport. For example. as stated in AC 70/7460-1L *Obstruction Marking and Lighting*, if an obstacle exceeds any obstruction standard included within 14 CFR Part 77, the obstacle should be marked and/or lit with an obstruction light.

It should be noted that Part 77 surfaces have distinctive design criteria from other FAA design surfaces such as threshold siting or Terminal Instrument Procedures (TERPS) surfaces. However, much like threshold siting surfaces, the size of each imaginary surface is based on the runway category, with respect to the type of instrument approach that is existing or planned for the runway.

Based on the existing instrument approaches for each runway, the following imaginary surfaces are described in further detail below and shown in **Figure 4-1.**

Figure 3-1: Generic Part 77 Isometric View



ISOMETRIC VIEW OF SECTION

FEDERAL AVIATION REGULATIONS PART 77, STATES THAT A STRUCTURE IS PRESUMED TO HAVE A SUBSTANTIAL ADVERSE EFFECT UPON THE SAFE AND EFFICIENT USE OF NAVIGABLE AIRSPACE IF ITS HEIGHT EXCEEDS THE FOLLOWING STANDARDS:

1. A HEIGHT OF FIVE HUNDRED (500) FEET ABOVE GROUND LEVEL AT THE SITE OF THE OBJECT ANYWHERE IN THE STATE.
2. A HEIGHT THAT IS TWO HUNDRED (200) FEET ABOVE GROUND LEVEL OR ABOVE THE ESTABLISHED AIRPORT ELEVATION, WHICHEVER IS HIGHER, WITHIN THREE (3) NAUTICAL MILES OF THE ESTABLISHED REFERENCED POINT OF A PUBLIC-USE AIRPORT, EXCLUDING HELIPORTS, AND THE HEIGHT INCREASES IN THE PROPORTION OF ONE HUNDRED (100) FEET FOR EACH ADDITIONAL NAUTICAL MILE OF DISTANCE FROM THE AIRPORT UP TO A MAXIMUM OF FIVE HUNDRED (500) FEET.
3. A HEIGHT WITHIN A TERMINAL OBSTACLE CLEARANCE AREA, INCLUDING AN INITIAL APPROACH SEGMENT, A DEPARTURE AREA, AND A CIRCLING APPROACH AREA, AS DEFINED BY FEDERAL LAWS AND REGULATIONS, WHICH WOULD RESULT IN THE VERTICAL DISTANCE BETWEEN ANY POINT ON THE OBJECT AND AN ESTABLISHED MINIMUM INSTRUMENT FLIGHT ALTITUDE WITHIN THAT AREA OR SEGMENT TO BE LESS THAN THE REQUIRED OBSTACLE CLEARANCE.
4. A HEIGHT WITHIN AN EN ROUTE OBSTACLE CLEARANCE AREA, AS DEFINED BY FEDERAL LAWS AND REGULATIONS, INCLUDING TURN AND TERMINATION AREAS, OF A FEDERAL AIRWAY OR APPROVED OFF-AIRWAY ROUTE, THAT WOULD INCREASE THE MINIMUM OBSTACLE CLEARANCE ALTITUDE.
5. THE SURFACE OF A TAKEOFF AND LANDING AREA OF A PUBLIC-USE AIRPORT OR ANY IMAGINARY SURFACE AS ESTABLISHED BY FAR PART 77. HOWEVER, NO PART OF THE TAKEOFF OR LANDING AREA ITSELF WILL BE CONSIDERED TO BE AN OBSTRUCTION.

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILES
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
E - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

PASSERO ASSOCIATES | Dayton International Airport | Generic Part 77 Isometric View | Fig. 4-1

Source: CFR 14 Part 77

4.1.1 Primary Surface

The primary surface is a rectangular area symmetrically located about the runway centerline and extending 200 feet beyond each runway end. The elevation of the primary surface is the same elevation as the nearest point of the runway.

For DAY, the width of the primary surfaces for Runways 6L-24R, 6R-24L and 18-36 are all 1,000 feet. It should be noted that Runway 36 has a Part 77 category of C and therefore has a different width than Runway 18 which has a PIR Part 77 category. Because the primary surface width outlines the entire runway and the overall width is contingent on the runway with the highest Part 77 category, the Primary Surface width for Runway 36 will therefore equal 1,000 feet wide.

4.1.2 Horizontal Surface

The horizontal surface is an oval shaped area located 150 feet above the published airport elevation. Its dimensions are determined by radii, measuring 5,000 feet or 10,000 feet depending on the runway type (i.e., visual or instrument), which are centered about the midpoint of each end of the primary surface. These radii are then connected by tangential lines to enclose the limits of the horizontal surface. Being that the airport elevation at DAY is approximately 1,009.1 feet Mean Sea Level (MSL), the horizontal surface will sit approximately 1,159.1 feet MSL above DAY's airport elevation.

4.1.3 Conical Surface

The conical surface is a sloped area originating at the edge of the horizontal surface and extending outward and upward at a slope of 20:1 for a horizontal distance of 4,000 feet.

4.1.4 Transitional Surfaces

These surfaces extend outward and upward at right angles to the runway centerline and centerline extended at a slope of 7:1 from the sides of the primary surface as well as from the sides of the approach surface. Transitional surfaces for those portions of the precision approach, which project through and beyond the limits of the conical surface, extend 5,000 feet measured horizontally from the edge of the approach surface at right angles to the runway centerline.

4.1.5 Approach Surface

This surface begins at the ends of the primary surface and slopes upward at a predetermined ratio while at the same time flaring out horizontally. The width and elevation of the inner ends conform to that of the primary surface, while the slope, length, and outer width are determined by the runway service category and existing or proposed instrument approach capabilities.

4.1.6 Part 77 Summary

Table 4-1 presents the design dimensional information for the existing Part 77 airspace around DAY based on the published approach procedures. Should recommendations be made to seek improved visibility minima for an existing instrument approach or implement a new instrument approach on a runway currently served only by visual approach capability, some Part 77 criteria may change. Furthermore, Part 77 airspace models are also dependent on runway end locations. Should recommendations be made to relocate a runway end, the Part 77 model will shift 200 feet from the new runway end. Part 77 models always reflect the planned future condition of an airfield and its associated instrument approaches.

	RUNWAY 6L	RUNWAY 24R	RUNWAY 6R	RUNWAY 24L	RUNWAY 18	RUNWAY 36
PART 77 CATEGORY	PIR	PIR	D	PIR	PIR	C
PRIMARY SURFACE						
WIDTH	1,000'	1,000'	1,000'	1,000'	1,000'	1,000' (500')
LENGTH BEYOND RUNWAY END	200'	200'	200'	200'	200'	200'
APPROACH SURFACE						
INNER WIDTH	1,000'	1,000'	1,000'	1,000'	1,000'	1,000'
OUTER WIDTH	16,000'	16,000'	4,000'	16,000'	16,000'	3,500'
SURFACE LENGTH	10,000'/ 40,000'	10,000'/ 40,000'	10,000'	10,000'/ 40,000'	10,000'/ 40,000'	10,000'
SLOPE	50:1/40:1	50:1/40:1	34:1	50:1/40:1	50:1/40:1	34:1
HORIZONTAL SURFACE RADIUS	10,000'	10,000'	10,000'	10,000'	10,000'	10,000'

Table 4-1: Existing Part 77 Criteria Summary
Source: CFR 14 Part 77

4.1.7 Airspace Design Standards

In addition to CFR Part 77 standards, The AC 150/5300-13B identifies airspace design surfaces that need to be evaluated for future obstructions. These are identified in Tables 3-3, 3-4 and 3-5 in the AC, as shown in **Figure 4-2**. These surfaces protect and determine obstructions to the runway threshold that may impact approach and departure procedures.

Runways 6L, 24R, 24L, and 18 have precision instrument approach procedures, with visibility minimums less than ¾ statute mile (Line 5). Runways 6R and 36 have non-precision instrument approach procedures. Runway 6R has visibility minimums not lower than ¾ statute mile (Line 4), and Runway 36 has visibility minimums not lower than 1 statute mile (Line 4). It should be noted that every Runway has Local Performance with Vertical (LPV) Guidance, and Area and Lateral Navigation (LNAV/RNAV) Guidance (Line 6). Each Runway also has departure procedures (Line 7). There can be no obstructions to these surfaces. A full obstruction analysis of the 14 CFR Part 77 and 13B surfaces will be completed as a part of the Airport Layout Plan (ALP) completion.

Figure 4-2. Runway Design Standards (Source: AC 150/5300-13B)

Table 3-3. Non-Precision and IFR Circling Approach Surfaces

Surface	Runway Type	Visibility minimums	A ft (m)	B ft (m)	C ft (m)	D ft (m)	Slope
Surface 4	Approach end of runways that supports IFR circling procedures and procedures only providing lateral guidance (VOR, NDB, LNAV, LP, and LOC).	≥ ¾ statute mile (1.2 km)	200 (61)	400 (122)	3,400 (1,036)	10,000 (3,048)	20:1
		< ¾ statute mile (1.2 km)	200 (61)	400 (122)	3,400 (1,036)	10,000 (3,048)	34:1

Note 1: Dimension A is relative to the runway threshold.
Note 2: Refer to the U.S Terminal Procedures Publication (TPP) to determine if circling minimums are available.
Note 3: Marking and lighting of obstacle penetrations to this surface or the use of a Visual Guidance Lighting System (VGLS) may mitigate displacement of the threshold. Contact the Flight Procedures Team if existing obstacles penetrate this surface.
Note 4: 10,000 feet (3,048 m) represents a nominal value for planning purposes. The length is dependent on the Visual Descent Point (VDP) location.

Table 3-4. APV and PA Instrument Runway Approach Surfaces

Surface	Runway Type	Visibility minimums	A ft (m)	B ft (m)	C ft (m)	D [4] ft (m)	Slope
Surface 5	Approach end of runways providing ILS, MMLS, PAR, and landing distance available (LDA) with glidepath, LPV, LNAV/VNAV, RNP, or GLS.	≥ ¾ statute mile (1.2 km)	200 (61)	400 (122)	3,400 (1,036)	10,000 (3,048)	20:1
		< ¾ statute mile (1.2 km)	200 (61)	400 (122)	3,400 (1,036)	10,000 (3,048)	34:1
Surface 6	Approach end of runways providing ILS, MMLS, PAR, and LDA with glidepath, LPV, LNAV/VNAV, RNP, or GLS.	All	0	Runway Width + 200 (61)	1,520 (463)	10,200 (3,109)	30:1

Note 1: Dimension A is relative to the runway threshold.
Note 2: Surface 5 represents the TERPS visual portion of the final approach segment. Surface 6 represents the TERPS Vertical Guidance Surface (VGS). Both surfaces apply for APV and PA procedures. Contact the Flight Procedures Team if existing obstacles penetrate this surface.
Note 3: The FAA assesses TERPS final approach segment criteria (e.g., W, X, Y surfaces) for all runway ends authorized for ILS, mobile microwave landing system (MMLS), precision approach radar (PAR), and LDA with glide slope, LPV, and GLS procedures. Refer to FAA Order 8260.3 for additional information on TERPS surfaces.
Note 4: Represents a nominal value for planning purposes. The actual length depends on the precision final approach fix.

Table 3-5. Instrument Departure Surface

Surface	Runway Type	A ft (m)	B ft (m)	C ft (m)	D [4] ft (m)	E ft (m)	Section 2 Angle θ [2]	Section 2 Transverse Slope m[2]
Surface 7	Runways providing instrument departure operations	60 (18.3)	470 (143)	7,512 (2,290)	12,152 (3,704)	6,152 (1,875)	17:7	3.13:1
		75 (22.9)	462.5 (141)				18.0	3.08:1
		100 (30.5)	450 (137)				18.4	3.00:1
		150 (46)	425 (130)				19.4	2.83:1
		200 (61)	400 (122)				20.6	2.67:1

Note 1: Section 1 of the departure surface starts at the DER elevation for the width of the runway and rises along the extended runway centerline at 40:1. Section 2 starts at an equal elevation to the adjoining Section 1. Section 2 continues until reaching 304 ft (93 m) and then levels off until reaching the line where Section 1 and Section 2 reach 304 ft (93 m) above DER elevation, then that part of Section 2 that leveled off continues at a 40:1 slope.
Note 2: See Figure 3-11 for a graphical depiction of these values.
Note 3: The start of the surface is relative to the departure end of the runway. For runways with published declared distances, the TODA indicates the beginning of the departure surface. See Figure 3-10.
Note 4: 12,152 feet (3,704 m) represents a 2 nm nominal value for planning purposes.
Note 5: For other runway width values, interpolation is required to determine the value of "B", the Section 2 angle, and the Section transverse slope.

4.1.8 Airspace Design Summary

The airfield and airspace design parameters discussed in the previous sections will be utilized in this section, when considering future facility requirements. Current inabilities to meet the design standards will be addressed directly, and future airport development will be proposed to meet the prescribed standards and recommendations. The following section will specifically discuss the demand/capacity relationships at the airport and future facility requirement recommendations.

Recommendation:

Obstructions that were identified during the completion of this project include trees and poles off each runway end. Mitigation measures are identified for each obstruction within the ALP.

4.2 Airfield Capacity

The purpose the demand/capacity is to assess the ability of the airport facilities to accommodate existing and forecasted aircraft operations and determine any capacity related improvements that may be required to support aircraft operations. The airfield capacity was calculated using AC 150/5060-5, *Airport Capacity and Delay,* which uses the throughput method, based on hourly airfield capacities.

The following airfield capacity and delay component are used in this evaluation:

Peak Hour capacity – The maximum number of aircraft operations that can occur in one hour, under specific operations conditions. Hourly capacity for Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) are calculated separately.

Annual Service Volume (ASV) – a reasonable estimate of an airport's annual capacity that accounts for differences in various conditions (runway use, aircraft mix, weather conditions, etc.) that could be encountered. ASV assumes an acceptable level of aircraft delay, and is used for long term planning.

Annual Average delay per operation – an estimate of the average delay each aircraft operation will experience over a one-year period.

There are several factors that can impact airfield capacity and delay, including:

- Aircraft fleet mix index
- Airfield layout and runway configuration
- Percentage of arrivals to overall operations
- Touch and Go Factor
- Number and location of exit taxiways
- Meteorological conditions

4.2.1 Aircraft Fleet Mix Index

Within AC 150/5060-5, four categories of aircraft are classified by their maximum takeoff weight. **Table 4-2** lists these categories. Note that the aircraft class used in calculating capacity are different than the Aircraft Approach Categories (AAC) in FAA AC 150/5300-13. Aircraft class are based on takeoff weight, while AAC is based on approach speed. The mix index has a significant impact on airfield capacity. The heavier an aircraft is more separation is needed between aircraft, thus increasing the amount of time aircraft use the airfield, ultimately reducing the capacity. Calculations for how the ASV information presented in this section is included in **Appendix I**.

Table 4-2: Aircraft Capacity Classifications

Aircraft Class	MTOW (lbs.)	Number of Engines	Wake Turbulence
A	<12,500	Single	Small (S)
B	<12,500	Multi	
C	12,500 – 300,000	Multi	Large (L)
D	>300,000	Multi	Heavy (H)

Source: FAA AC 150/5060-5

Mix Index is a mathematical expression for the percent of Class C aircraft plus three times the percent of Class D aircraft. This expression is written as %(C+3D). The ranges for fleet mix fall into one of the following categories:

- 0 to 20
- 21 to 50
- 51 to 80
- 81 to 120
- 121 to 180

To determine the mix index for this Master Plan, TFMSC data from October 2020 to September 2021 was examined (consistent with the forecast chapter) and cross referenced against the FAA Aircraft Characteristics database for weight.

Class C = 91.28% of the Airport's operations
Class D = 0.087% of the Airport's operations

Applying this equation, the base year aircraft mix index is 91.55%, calculated by .9128+3(0.00087) = ***91.55%***. Based on the projected fleet mix changes described in Chapter 3 for commercial, and cargo operations, there is an anticipated change in the cargo aircraft from Class C group to Class D group. However, given the number of operations, it is not anticipated there will be enough change to affect the mix index. Therefore, the airport will remain in the **81-120** mix index.

4.2.2 Runway Use Configuration

The functionality of the runway system, coupled with the taxiway system, directly impacts the airfield capacity at an airport. Consider parallel runways as one runway orientation. For planning purposes, a two-runway orientation is considered where the runways are not intersecting, referencing primary Runway 6L-24R and crosswind Runway 18-36.

Annual runway utilization data was provided by Dayton Air Traffic Control, obtained from CountOps, for air taxi and air carrier operations at DAY for fiscal year 2021, as shown in **Table 4-3.** Each runways' annual usage is shown independently, with Runway 6L used approximately 19.4%, Runway 24R approximately 41.4%, Runway 6R approximately 5.2%, Runway 24L approximately 16.2%, Runway 18 approximately 8.8% and Runway 36 approximately 9.0%.

Primary Runway 6L-24R (i.e., the longest of the runways) is used 60.8% of the time, while Runway 6R-24L (i.e., the shorter parallel) is used 21.5%, with crosswind Runway 18-36 used 17.7% of the time.

Table 4-3: Runway Utilization

Runway End	Runway End Utilization	Runway Utilization
6L	19.4%	60.8%
24R	41.4%	
6R	5.2%	21.5%
24L	16.2%	
18	8.8%	17.7%
36	9.0%	

Source: DAY ATC CountOps, Jan-Dec 2021, after removing unknowns.

From an aircraft operations perspective, Runway 6L-24R supports approximately 29,050 annual operations, Runway 6R-24L supports approximately 10,273 annual operations, and Runway 18-36 supports approximately 8,457 annual operations. And each of the three runways regularly supports air carrier, air cargo and general aviation aircraft operations.

See **Appendix I** for various runway use configurations and ASV values, what follows is the configuration of Runway 6L-24R and 18-36.

4.2.3 Percentage of Aircraft Arrivals

Arriving aircraft usually contribute more to delay than departing aircraft. This percentage is the ratio of landing operations to total operations at an airport during a specified period and is generally assumed to be equal to the percentage of departing operations. Based on TFMSC data a factor of 50 percent will be used for the capacity calculations for the Airport.

Since the airport has two parallel runways, the guidance in AC 150/5060-5 outlines the runway configuration that should be used to be the two-runway orientation that is operated more frequently. Thus, Runway 6L-24R and 18-36 are examined for the runway configuration. Using the Mix Index and the percent arrival, referencing diagram number 75, the VFR and IFR hourly capacity base (C*) is calculated:

VFR hourly capacity = 80

IFR hourly capacity = 58

4.2.4 Percentage of Touch and Go Operations

A touch and go operation is defined when an aircraft lands and immediately takes off without taxiing. Such operations are associated with flight training activities for general aviation and Wright Patterson. The later uses Runway 6L-24R for military training operations. The factor defined below is a percentage of touch and go to total operations, considering the mix index. Given the mix index for the airport, the touch and go operations are minimal, with the touch and go factors (T) defined below:

Touch and Go VFR = 1

Touch and Go IFR = 1

4.2.5 Location of Exit Taxiways

A parallel taxiway and the number of taxiway exits directly impact the capacity of a runway, directly by the amount of time an aircraft remains on the runway. FAA AC 150/5060-5 identifies the criteria for determining taxiway exit factors based on the mix index and the distance the taxiway exits are from the runway threshold and other taxiway connections. As the Airport's existing mix index range was calculated to be 81 to 120 over the planning period, only exit taxiways that are located between 5,000 and 7,000 feet from the threshold and spaced at least 750 feet apart contribute to the taxiway exit factors.

Runway 6L: 2,623’; 4,269’; 5,885’; 7,448’; 9,431’; 10,901’
Runway 24R: 1,422’; 3,442’; 4,953’; 6,572’; 8,268’; 10,901’
Runway 18: 2,297’; 3,505’; 5,750’; 6,571’; 6,992’; 8,502’
Runway 36: 1,498’; 1,957’; 2,779’; 4,993’; 6,227’; 8,502’

Applying these considerations, there is one exit taxiway for Runway 6L-24R, while Runway 18-36 has two exit taxiways.
Referencing mix indexes of 81-120 and 91-120 (VFR & IFR) the exit factor (E) are calculated – for planning purposes one exit taxiway is used:

Exit Factor VFR = 0.87
Exit Factor IFR = 0.98

4.2.6 Meteorological Conditions

Weather conditions impact and airport’s capacity. There are two categories of weather conditions related to operating aircraft: Visual Flight Rules (VFR) and Instrument Flight Rules (IFR).

Visual Flight Rules (VFR) – Cloud ceiling is greater than 1,000 feet above ground level (AGL) and visibility is at least three statute miles.

Instrument Flight Rules (IFR) – Cloud ceiling is at least 500 feet AGL but less than 1,000 feet AGL and/or the visibility is at least one statute mile but less than three statute miles. Included in IFR is Poor Visibility Condition (PVC), when the weather is below IFR.

The weather needs to be differentiated because greater separation is needed when the weather condition is IFR. Using data obtained from the National Climatic Data Center (NCDC), obtained from the Dayton International Airport for the period of 2011 to 2020 the following observations were obtained:

VFR weather conditions = 84.1%
IFR weather conditions = 15.9%

4.2.7 Summary of Capacity Calculation Factors

Table 4-4 summarizes these parameters calculated for DAY, which were used to define the hourly capacity (in VFR and IFR conditions), the ASV, and average delay for the Airport.

Table 4-4: Calculated Capacity Parameters

Factor	2021
Aircraft Fleet Mix Index	91.55%
Hourly Capacity (C*) (VFR/IFR)	80/58
Percentage of Aircraft Arrivals	50%
Touch and Go Factor (VFR / IFR) (T)	1.0/1.0
Taxiway Exit Factor (VFR / IFR) (E)	0.87/ 0.98
Meteorological Conditions (VFR / IFR)	84.1% / 15.9%

Source: VFR/IFR percentages were derived via FAA Wind data (NCDC 2011-2020)

4.2.8 Hourly Capacity

Hourly capacity for the airfield is a measurement of the maximum number of aircraft operations (VFR and IFR) that an airfield can support in an hour based on runway configuration. Using graphs provided in AC 150/5060-5, VFR and IFR hourly capacity bases were established by applying the given VFR and IFR operational capacities for the runway use configuration, the aircraft mix index, and percentage of aircraft arrivals. Once the hourly capacity bases are identified, they were multiplied by the touch-and-go factors and taxiway exit factors to determine the hourly capacities. This equation is expressed as:

Hourly Capacity = C x T x E*
C = Hourly Capacity Base*
T = Touch-and-Go Factor
E = Taxiway Exit Factor

Table 4-5 shows the results of the hourly capacity calculations. These graphs are included in **Appendix I**.

Table 4-5: Calculation of Hourly Capacity (Current Airfield Configuration)

Factors	VFR / IFR
Hourly Capacity Base	80/58
Touch-and-Go Factor	1/1
Taxiway Exit Factor	0.87/0.98
Calculated Hourly Capacity	***69.6/56.8***

Note: FAA AC 150/5060-5 [VFR (Figure 3-6), IFR (Figure 3-45)]
Source: FAA AC 150/5060-5

4.2.9 Annual Service Volume

Annual Service Volume (ASV) is an expression of the total number of aircraft operations that an airfield can support annually. The formula for estimating an airport's ASV is based on the ratio of annual operations to average daily operations during the peak month, multiplied by the ratio of average daily operations to average peak hour operations during the peak month. The product of these values is then multiplied by the *weighted* hourly capacity to determine the ASV.

Weighted hourly capacity accounts for the varying operating conditions at the airport, which are applied to the hourly capacity determined in the previous section. The formula for weighted hourly capacity is expressed as:

$$C_w = \frac{(C_{n1} \times W_{n1} \times P_{n1}) + (C_{n2} \times W_{n2} \times P_{n2})}{((W_{n1} \times P_{n1}) + (W_{n2} \times P_{n2}))}$$

C_w =Airfield weighted hourly capacity

$_n$ =Number of runway-use configurations. Due to the operational limitations of the intersecting runways, the airfield operates as a single runway with two configurations: VFR and IFR.

C = Hourly Capacity of each configuration. ***(Base) VFR/IFR = 69.6/56.8***

W =FAA ASV weighting factor, based on mix index & percentage and hourly capacity. ***VFR/IFR = 1/1***

P = Percent of time the Airport operates in each configuration.

For DAY, this applies as VFR and IFR conditions. ***VFR/IFR = 84.1%/15.9%***

Applying the data presented above to this equation yields the following:

$$C_w = \frac{(69.6 \times 1 \times 0.841) + (56.8 \times 1 \times 0.159)}{((1 \times .841) + (1 \times .159))}$$

$$C_w \; 67.57$$

The ASV formula accounts for a variety of conditions that occur at an airport, including low- and high-volume activity periods, and is expressed as:

ASV = Cw x D x H

C_w = Weighted Hourly Capacity.

D = Daily Demand Ratio (ratio of annual operations to average daily operations during peak month).

H = Hourly Demand Ratio (ratio of average daily operations to average peak hour operations during peak month)

The Daily Demand Ratio (D) is the ratio of annual demand to average daily demand in the peak month. Using the forecasts from earlier this has been calculated as follows:

D= Annual Demand/Peak Month Average Daily Demand

D = 36,452/104

D= 350.5

The Hourly Demand Ratio (H) is the ratio of average daily demand to average peak hour demand during the peak month. Using the forecasts from earlier this has been calculated as follows:

H= Peak Month Average Day Demand /Peak Hour Demand

H = 104/10.4

H= 10

Annual Service Volume (ASV) is defined as:

ASV = Cw*D*H

ASV = 67.57*350.5*10

ASV = 236,837 operations

4.2.10 Runway Demand/Capacity Summary

Typically, when an airport's annual operations total exceeds 60 percent of its airfield capacity (i.e., ASV) some level of delay may occur. Therefore, when the airport operations are approaching 60 percent of capacity, capacity enhancements should be planned and begin.

The ASV has been calculated to be approximately 236,837 operations, above the total forecasted 47,781 operations, identified earlier in Chapter 3, which translates into the airport operating at approximately 20% of its annual capacity. Even with an increase in air carrier service (i.e., additional air carrier operations beyond the forecast levels) the fleet mix will not increase sufficiently to trigger capacity enhancement needs, which is noted at 60% capacity. In summary, the airfield configuration at Dayton International Airport meets the demand requirements throughout the planning period.

It is noted that delays can still be incurred during periods of peak activity, especially during periods of low visibility. However, when examining the delay curve in *AC 150/5060-5*, it is anticipated that the periods of delay should be minimal.

4.3 Airside Facility Requirements

Airside facilities encompass the movement areas for aircraft, consisting of runways, taxiways and other select areas used for taxiing, takeoff and landing aircraft, including the safety areas surrounding these facilities.

FAA establishes criteria to ensure proper safety for the planning of future development of the airport based on the most demanding aircraft that is expected to regularly use the facility. As defined in AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, regular use is defined of at least 500 operations, excluding touch-and-go operations, occurring in the most recent 12-month period. Correctly identifying the future aircraft that performs regular use is critical to future facility planning. Once the aircraft, or fleet of aircraft is identified, then the FAA pre-established design standards can be identified from AC 150/5300-13B, *Airport Design.*

4.3.1 Runway Design Code

AC 150/5300-13B defines the runway design code (RDC) that signifies the design standards to apply to an existing or planned runway. It consists of three elements:

- The Aircraft Approach Category (AAC) which is determined by the approach speed of the design aircraft;
- The Airplane Design Group (ADG) which is the classification of the design aircraft based on wingspan and tail height; and,
- The visibility minimums based on Runway Visual Range (RVR).

Tables 4-6, **4-7** and **4-8** describe each element of the RDC further.

Table 4-6: Aircraft Approach Category (AAC)

AIRCRAFT APPROACH CATEGORY	APPROACH SPEED
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

Source: FAA AC 150/5300-13B, Table 1-1

Table 4-7: Airplane Design Group (ADG)

GROUP #	TAIL HEIGHT (FT)	WINGSPAN (FT)
I	<20'	<49'
II	20' - <30'	49' - < 79'
III	30' - < 45'	79' - < 118'
IV	45' - < 60'	118' - < 171'
V	60' - < 66'	171' - < 214'
VI	66' - < 80'	214' - < 262'

Source: FAA AC 150/5300-13B, Table 1-2
Note: Critical aircraft can be determined by either the tail height or wingspan (whichever is more restrictive).

Table 4-8: Visibility Minimums

RVR	INSTRUMENT FLIGHT VISIBILITY CATEGORY (STATUTE MILE)
5000	NOT LOWER THAN 1 MILE
4000	LOWER THAN 1 MILE BUT NOT LOWER THAN 3/4 MILE
2400	LOWER THAN 3/4 MILE BUT NOT LOWER THAN 1/2 MILE
1600	LOWER THAN 1/2 MILE BUT NOT LOWER THAN 1/4 MILE
1200	Lower than 1/4 mile

Source: FAA AC 150/5300-13B, Table 1-3

The following airfield facilities will be discussed in the following sections:

- Runway Length
- Runway Width
- Runway Pavement Strength and Condition
- Runway Safety Standards
  - Runway Safety Areas
  - Runway Object Free Areas
  - Runway Object Free Zone
  - Line of Sight/Runway Visibility Zone
  - Runway Protection Zones
  - Modification of Standards
  - Declared Distances
- Runway Design Criteria
  - Runway/Taxiway Separations
  - Runway Designation
  - Runway Markings
- Taxiway and Taxilane System Requirements
  - Taxiway Geometry
  - Taxiway Pavement Condition
- Navigational Aids, Airfield Lighting
  - Instrument Approach Procedure Needs
  - Glide Slope and Localizer

    - Airfield Lighting
    - Rotating Beacon
    - Terminal weather aids
- Airfield Signage
- Terminal Building Requirements
    - Terminal Apron
    - Roadway Access and Parking Facilities

Parking Assessment

- General Aviation and Landside Facilities
    - General Aviation Apron Requirements
    - General Aviation Hangars
    - General Aviation Vehicle Parking and Access
- Support Facilities
    - Air Traffic Control Tower
    - Airport Rescue and Fire Fighting
    - Airfield Maintenance and Snow Removal
    - Holding Bay
    - Deicing Apron
    - Fuel
    - Airfield Electric Vault
    - Maintenance Repair and Overhaul Facilities
    - Security and Fencing
    - Wildlife

A summary of facility requirements will be included at the end of this chapter.

Figure 4-3 provides the runway geometry standards for C/D/E-IV aircraft, while **Figure 4-4** provides the runway geometry standards for C/D/E-III aircraft.

Figure 4-3: Runway Design Standards, C-IV (Source: FAA AC 150-5300-13B)

Table G-10. Runway Design Standards Matrix, C/D/E-IV

Aircraft Approach Category (AAC) and Airplane Design Group (ADG):		C/D/E – IV			
ITEM	DIM [1]		VISIBILITY MINIMUMS		
		Visual	Not Lower than 1 mile	Not Lower than 3/4 mile	Lower than 3/4 mile
RUNWAY DESIGN					
Runway Length	A		*Refer to paragraphs 3.3 and 3.7.1*		
Runway Width	B	150 ft	150 ft	150 ft	150 ft
Shoulder Width		25 ft	25 ft	25 ft	25 ft
Blast Pad Width		200 ft	200 ft	200 ft	200 ft
Blast Pad Length		200 ft	200 ft	200 ft	200 ft
Crosswind Component		20 knots	20 knots	20 knots	20 knots
RUNWAY PROTECTION					
Runway Safety Area (RSA)					
Length beyond departure end [9, 10]	R	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	C	500 ft	500 ft	500 ft	500 ft
Runway Object Free Area (ROFA)					
Length beyond runway end	R	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	Q	800 ft	800 ft	800 ft	800 ft
Obstacle Free Zone (OFZ)					
Runway, Inner-approach, Inner-Transitional			*Refer to paragraph 3.11*		
Precision Obstacle Free Zone (POFZ)					
Length		N/A	N/A	N/A	200 ft
Width		N/A	N/A	N/A	800 ft
Approach Runway Protection Zone (RPZ)					
Length	L	1,700 ft	1,700 ft	1,700 ft	2,500 ft
Inner Width	U	500 ft	500 ft	1,000 ft	1,000 ft
Outer Width	V	1,010 ft	1,010 ft	1,510 ft	1,750 ft
Departure Runway Protection Zone (RPZ)					
Length	L	1,700 ft	1,700 ft	1,700 ft	1,700 ft
Inner Width	U	500 ft	500 ft	500 ft	500 ft
Outer Width	V	1,010 ft	1,010 ft	1,010 ft	1,010 ft
RUNWAY SEPARATION					
Runway centerline to:					
Parallel runway centerline	H		*Refer to paragraph 3.9*		
Holding Position [8]		250 ft	250 ft	250 ft	250 ft
Parallel taxiway/taxilane centerline [2]	D	400 ft	400 ft	400 ft	400 ft
Aircraft parking area	G		*Refer to paragraph 5.4.1.2*		
Helicopter touchdown pad			*Refer to AC 150/5390-2*		

Note: Values in the table are rounded to the nearest foot. 1 foot = 0.305 meters.

Note: See the Footnotes on the page after Table G-12.

Figure 4-4: Runway Design Standards, C-III (Source: FAA AC 150-5300-13B)

Table G-9. Runway Design Standards Matrix, C/D/E-III

Aircraft Approach Category (AAC) and Airplane Design Group (ADG):		**C/D/E – III**			
ITEM	DIM [1]	VISIBILITY MINIMUMS			
		Visual	Not Lower than 1 mile	Not Lower than 3/4 mile	Lower than 3/4 mile
RUNWAY DESIGN					
Runway Length	A	*Refer to paragraphs 3.3 and 3.7.1*			
Runway Width [12]	B	100 ft	100 ft	100 ft	100 ft
Shoulder Width [12]		20 ft	20 ft	20 ft	20 ft
Blast Pad Width [12]		140 ft	140 ft	140 ft	140 ft
Blast Pad Length		200 ft	200 ft	200 ft	200 ft
Crosswind Component		16 knots	16 knots	16 knots	16 knots
RUNWAY PROTECTION					
Runway Safety Area (RSA)					
Length beyond departure end [9, 10]	R	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	C	500 ft	500 ft	500 ft	500 ft
Runway Object Free Area (ROFA)					
Length beyond runway end	R	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	Q	800 ft	800 ft	800 ft	800 ft
Obstacle Free Zone (OFZ)					
Runway, Inner-approach, Inner-Transitional		*Refer to paragraph 3.11*			
Precision Obstacle Free Zone (POFZ)					
Length		N/A	N/A	N/A	200 ft
Width		N/A	N/A	N/A	800 ft
Approach Runway Protection Zone (RPZ)					
Length	L	1,700 ft	1,700 ft	1,700 ft	2,500 ft
Inner Width	U	500 ft	500 ft	1,000 ft	1,000 ft
Outer Width	V	1,010 ft	1,010 ft	1,510 ft	1,750 ft
Departure Runway Protection Zone (RPZ)					
Length	L	1,700 ft	1,700 ft	1,700 ft	1,700 ft
Inner Width	U	500 ft	500 ft	500 ft	500 ft
Outer Width	V	1,010 ft	1,010 ft	1,010 ft	1,010 ft
RUNWAY SEPARATION					
Runway centerline to:					
Parallel runway centerline	H	*Refer to paragraph 3.9*			
Holding Position [8]		250 ft	250 ft	250 ft	250 ft
Parallel taxiway/taxilane centerline [2]	D	400 ft	400 ft	400 ft	400 ft
Aircraft parking area	G	*Refer to paragraph 5.4.1.2*			
Helicopter touchdown pad		*Refer to AC 150/5390-2*			

Note: Values in the table are rounded to the nearest foot. 1 foot = 0.305 meters.

Note: See the Footnotes on the page after Table G-12.

4.3.2 Runway Length

A runway's length is determined by the types of aircraft that use that runway and the number of operations per aircraft. The runway length needs to accommodate the aircraft, or group of aircraft that regularly use the runway *and* require the longest amount of pavement. This aircraft, or group of aircraft, is known as the critical aircraft (or critical aircraft group). Specifically, in order to be classified as the critical aircraft for runway length, the aircraft must be the most demanding aircraft to use the runway—and needs the most pavement—and must perform at least 500 operations over a recent 12-month period. It is important to note that the critical aircraft for runway length may be a different critical aircraft than the critical aircraft for other planning and design standards.

When performing runway length analysis, the FAA AC 150/5325-4B *Runway Length Requirements for Airport Design* is referenced for determining the existing and future runway length. This AC outlines procedures to determine recommended runway lengths for critical aircraft. It is important to note that these findings are to be used for airport planning purposes only. Due to the COVID-19 pandemic, the data used to determine critical aircraft is from the same period as used in the forecasting section earlier in this report.

Since DAY has three runways, and each runway may have its own critical aircraft that determines runway length, each runway will be analyzed below. While each runway requires analyzing data specific to that runway, the following data and assumptions were used to complete the runway length analysis:

- Airport Elevation 1,009.1 feet
- Mean Daily Maximum Temperature of the Hottest Month 84.8 °F (July)
- Assume 75 Percent of Fleet at 60 & 75 Percent Useful Load
- Departure at Max Takeoff Weight
- Wet Conditions for Arrivals Only

Runway classification is defined in FAA Order 5100.38D. The runway types and eligibility are defined as follows:

> *<u>Primary Runway</u>: A single runway at an airport is eligible for development consistent with FAA design and engineering standards. This runway is eligible for FAA AIP funding.*
>
> *<u>Crosswind Runway</u>: For the first crosswind, the wind coverage on the primary runway must be less than 95%. Based on the data presented earlier in this master plan, Runway 6L-24R does not provide the wind coverage for RDC B-II aircraft, thus Runway 18-36 is a crosswind runway for these aircraft. As such this runway is eligible for FAA AIP funding as a crosswind runway.*
>
> *<u>Secondary Runway</u>: Is considered when there is more than one runway at the airport. The runway is not a crosswind runway and either of the following: (a) the primary runway (or primary AND all secondary runways) is operating at 60% or more of its annual capacity (this is not the case for DAY); or (b) APP-400 has made a specific determination that the runway is required for operation of the airport. A secondary runway is eligible for FAA AIP funding, if justified.*
>
> *<u>Additional Runway</u>: Occurs when there is more than one runway on the airport; the FAA ADO has determined that this runway does not meet the requirements to be designed a*

crosswind runway; and the ADO has determined that this runway does not meet the requirements to be designated a secondary runway. As such, this type of runway is ineligible for FAA AIP funding.

Dayton International Airport's airfield configuration and specific aircraft operations have several unique features that need to be considered when examining efficient runway usage, classification, length and critical aircraft assignment. As previously noted, from an aircraft operations perspective Runway 6L-24R supports approximately 29,050 total annual operations, Runway 6R-24L supports approximately 10,273 total annual operations, and Runway 18-36 supports approximately total 8,457 annual operations. And each of the three runways regularly supports air carrier, air cargo and general aviation aircraft operations.

FAA Approach Control Guidance to Inbound Aircraft: For approaching aircraft, Dayton International Airport is under the authority of the FAA's Columbus Approach Center, which assigns the initial runway that each aircraft will utilize. As noted in Section 4.2.2, the assignment and use of all three runways occurs consistently, on a daily, weekly, monthly and annual basis.

Wind Coverage, Weather and Seasonality: While most calm weather conditions and crosswind conditions favor aircraft usage on the two parallel runways, other factors result in increased usage of Runway 18-36. For example, when winds are out of the north and southwest, and/or when rain and lightning approach from the west, aircraft regularly use Runway 18-36.

During all winter storm events, Runway 18-36 is used to support aircraft operations while parallel Runways 6-24 are being cleared, to again support aircraft operations. This procedure is well documented and needed to maintain consistent airline operations.

Aircraft Separation: When large aircraft are using Runway 6L-24R, DAY local ATCT will separate aircraft types and speeds, moving slower aircraft to Runway 6R-24L or 18-36 for operational and safety purposes. Large, local and transient military aircraft regularly use DAY for training purposes and pattern work. Because of anticipated wake turbulence, DAY ATCT will regularly separate aircraft and use either Runway 6R-24L or 18-36.

This also holds true with General Aviation (GA) aircraft operations including piston engine, light twin, and smaller turbine aircraft, which are also typically separated from both the larger aircraft operations (military and cargo aircraft) as well as the commercial service aircraft.

A new tenant (i.e., the Sierra Nevada Corporation, or SNC) has established a new aerospace maintenance facility on the airport that has been specifically designed to accommodate very large aircraft (i.e., Boeing 747 and Lockheed C-5 aircraft). These aircraft will perform all of their civilian, maintenance test flights at DAY, beginning in January of 2023. As noted above, when these aircraft are using primary Runway 6L-24R, aircraft separation and movements to each of the other two runways will occur. As an MRO they are required to do engine testing on the primary runway. During these times the runway will be closed to traffic, diverting other traffic to Runway 6R-24L, since Runway 18-36 can not be used while Runway 6L-24R is occupied because of the runway orientation and safety area overlaps.

Minimized Conflict with Surrounding Airspace: With continued usage of both parallel runways at DAY, ATCT can expedite local operations and avoid airspace conflicts that could result from aircraft in queue on long final approach, minimizing aircraft delays for the airlines.

Also, the availability of both parallel runways minimizes existing airspace conflicts with Wright Patterson Airspace. It should be noted that DAY's southeast Class "C" airspace and Wright Patterson northwest

"Class D" airspace overlap each other, involving close coordination between the airports and ATC to avoid airspace and aircraft conflicts, with DAY airspace having precedent.

Aviation Special Events – Dayton Air Show: Each year since 1975, the Dayton Air Show draws tens of thousands of people to the Dayton International Airport. Recognized as *"one of the most prestigious shows in North America,"* it attracts internationally known civilian and military aircraft and operations during this week-long event. The static exhibits usually occupy the general aviation area of the airfield. During the airshow week, a number of taxiways and Runways 18-36 and Runway 6L-24R are closed to commercial service, restricted to airshow exhibits and static display equipment. All commercial service and general aviation operations are diverted to Runway 6R-24L.

This airshow is an active collaboration with the FAA ADO and ATCT and is a viable aviation and economic generator to the airport, the surrounding communities, and the Greater Dayton Region as a whole. It is important to maintain as many runways and taxiways as possible to support this special event, and to support commercial airlines and general aviation needs, without interruption and delay to normal aircraft operations.

Minimized Taxi Distances and Access to Tenant Facilities: Due to the significant economic growth in the Region, which can directly correlate to increased passenger traffic and aircraft operations, DAY has added numerous new Aviation Users / Tenants that have invested millions of dollars both on and around the Airfield, as well as in the local community. Several of these Tenants, whose business decisions were dependent on the layout of the airport, the runways/taxiways/aprons available, air traffic control capabilities, and the access to scheduled commercial service flights have expressed their concerns and support for the DAY Airport's infrastructure as it exists today, as a three-runway system.

New hangar facilities have been constructed, with more planned in the short-term horizon. New tenants including Aerospace Defense Contractors, Suppliers, Vendors and other aviation related businesses are moving to DAY and the region to support these new businesses and growth with expected increased aircraft operations, air carrier demand, and additional larger aircraft usage, that may cause a need to separate operations on the parallel runways during peak times.

When a newer tenant/operator, or any tenant/operator, fly to and from DAY there is a logical and planned expectation that they will be able to use the closest and most efficient components of the taxiway and runway system, based on ATC guidance and weather conditions. If the three-runway system were significantly altered or reduced, then taxi distances could result in excess of 10,000-feet to access remote runway ends, with corresponding and costly aircraft operational times much greater than a tenant had planned during their investment into facilities at DAY. Also, increased taxi distances and aircraft taxiing times would result in additional and unwanted aircraft fuel consumption. The additional aircraft fuel consumption would directly increase the actual carbon footprint of the airport operation itself, and be in direct conflict with the airport's sustainability plan and related "green" initiatives.

Copies of several Tenant letters and others affected by the Airport's capabilities are attached in **Appendix H** of this report. This overwhelming support from the aviation and business community provides additional justification as well as outlines the special conditions and unique circumstances associated with the DAY Airport and the need to maintain its airside infrastructure and support facilities.

Furthermore, the Airport's own recent landing weight analysis updated for this study (found in **Appendix I)**, uses Airline Bank structure data (specific airline and aircraft operations), coupled with wind directional data retrieved from the Weather Bureau (NOAA), which supports the significant utilization of all three runways. The detailed spreadsheet analysis is provided within the above referenced appendix.

Lastly, new Air Service, through Avelo, will provide additional passengers and operations to DAY, through the direct flights to Orlando, Florida. Increased commercial aircraft operations may cause the need to separate commercial airline aircraft from general aviation aircraft on the two parallel runways.

Recommendation (based on these special conditions at DAY): Maintain primary Runway 6L-24R at its current length and width. Maintain crosswind Runway 18-36 at its current length and width. Maintain secondary Runway 6R-24L at its current length and width.
Table 4-9 lists the minimum runway length for the aircraft currently operating at DAY. A review of the Aircraft Performance Manuals, along with the max gross takeoff weight (MGTOW) of each critical aircraft, are identified below.
Please refer to **Appendix I** for the runway length analysis charts and Aircraft Performance Manuals.

Table 4-9: Existing Aircraft Runway Lengths at MGTOW

Aircraft	MTOW (pounds)	Runway Length at MGTOW for DAY
Embraer 145	48,502	8,100
Embraer 175	40,370	7,900
CRJ 200	53,000	6,800
CRJ 700	72,750	6,000
CRJ 900	82,500	7,500
717	121,000	8,500
757-200PF	255,000	10,400
767-300F	412,000	10,400
A319	166,448	8,000
A320	174,165	8,200

Source: Manufacturer Aircraft Performance Manuals

Runway 6L-24R

The 10,901-foot-long runway is the longest runway at the airport, with the most advanced instrument approach procedures. This runway is classified as the primary runway at the airport. It is the primary runway that serves the operations of the commercial passenger and cargo operations, although all three runways regularly serves air carrier, air cargo and general aviation aircraft operations. It also serves any other large or heavy aircraft arriving or departing DAY. Therefore, to determine runway length, Chapter 4 of FAA AC 150/5325 is applied, which covers runway lengths for regional jets and those airplanes with a maximum certified takeoff weight of more than 60,000-pounds.

The runway length analysis is divided into two parts (i.e., existing and future analysis). It is important that the runway is not only sufficient for the aircraft using it today and the short-term planning period, but also sufficient for the long-term planning period. Since removing and adding pavement is a lengthy and costly process, if the runway length exceeds what is necessary today, but not what is necessary in the future, then the master plan would not recommend removing pavement, since it will be needed again in the future.

The existing and future analyses process are the same except that the critical aircraft may differ between today and the future. Once the critical aircraft is determined, the runway length requirements are based on the data in the critical aircraft's airport planning manual.

Based on the previous forecasting chapter, the existing critical aircraft is the Boeing 757-200PF, which conducts greater than five hundred annual operations. The future critical aircraft is anticipated to be the Boeing 767-300F. Both cargo aircraft are used by FedEx daily. Applying FAA AC 150/5325 to these respective aircraft, result in a corresponding runway length of 10,400-feet. Additional length is added for the runway gradient change between the runway ends since this runway is a non-zero gradient runway. In this case the adjustment would be an additional twenty-three feet. Based on this guidance, this adjustment does not change the required minimum runway length of 10,400-feet.

Sierra Nevada Corporation (SNC), new aerospace hangar complex at DAY, started construction of their facilities during the Master Plan. This facility, located to the west of primary Runway 6L-24R, will have large ADG V aircraft, such as the Boeing 747-800, the C-17 and the Lockheed C-5 Galaxy aircraft. These aircraft are not anticipated to meet the regular use criteria, thus are not yet the critical aircraft for runway length. However, with potential operational growth of these large aircraft we recommend keeping the runway length at 10,900 feet.

The future critical aircraft on this runway is the Boeing 767-300F, which will be the primary cargo aircraft operating at DAY. This aircraft also requires 10,400-feet for takeoff. Therefore, the required runway length of 10,400-feet will not change when the critical aircraft changes to the Boeing 767-300F. The RDC for this aircraft is C-IV. Runway 6L-24R instrument approach plates list the visibility at ½ mile for both ends. Therefore, the RDC for this runway is C-IV-1200.

Runway 18-36

This 8,502-long runway is considered the crosswind runway at the airport, based on wind coverage alone. When the winds are present in a more northerly or southerly direction, Runway 18-36 is used instead of the two parallel runways. It is also a preferred runway by local ATC when Runway 6L-24R is being cleared during winter operations. Crosswind runway lengths are dependent on the wind coverage for various sized aircraft on the primary runway in addition to the number of operations by the aircraft that require the crosswind runway. Based on the wind data at DAY, the aircraft that require a crosswind runway—those aircraft that do not have 95% wind coverage on the primary runway—are classified as RDC B-II aircraft.

The RDC B-II aircraft that regularly use the airport are aircraft that weigh more than 12,500 lb. To determine the required runway length for these aircraft, Chapter 3 of FAA AC 150/5325 was referenced. This chapter organizes the aircraft into two separate tables:

Table 3-1 "Airplanes that Make Up 75 Percent of the Fleet"
Table 3-2 "Remaining 25 Percent of Airplanes that Make Up 100 Percent of Fleet"

Examining TFMSC data the critical group of aircraft are the business jet aircraft, specifically Dassault Falcon 2000, Cessna Citation X, Cessna Citation II/Bravo, Dassault Falcon 900 and Cessna III/VI/VII. These aircraft are listed in Table 3-2 of AC 150/5325-4B. Table 3-2 of AC 5325-4B references two useful load figures, "60 percent useful load" and "90 percent useful load". These group of business jet aircraft operate routes to Florida, Texas and the west coast of the United States. As such Figure 3-2 was chosen which results in a runway length of at least 8,000-feet. Additional feet are added for the runway gradient change between the runway ends since this runway is a non-zero gradient runway. In this case the adjustment would be an additional 165 feet, culminating in a required minimum runway length of 8,200 feet. Being that the

Cessna and Dassault aircraft only require 8,200 feet, the existing length of Runway 18-36 accommodates these aircraft.

While classified as a crosswind runway, the runway usage for arrivals at DAY are primarily assigned by the FAA's Columbus Center. After reviewing DAY CountOps for 2021, Runway 18-36 was used by air taxi and air carrier aircraft exclusively for about 4,000 operations, out of the total 8,457 operations using this runway.

Further study of the actual airline bank data, which includes the airline fleet type and number of operations per day, coupled with the actual wind direction for the day, and actual runway usage data provided by ATCT, for calendar year 2021, concludes that Runway 18-36 is used extensively by the commercial fleet of aircraft – RDC C-II and C-III aircraft (see **Appendix I**).
Determining the critical aircraft for this runway follows the guidance set forth in AC 150/5100-17, *Critical Aircraft and Regular Use Determination, Appendix A.* This crosswind runway is used by commercial service aircraft in the last 12 months and meets the regular use threshold. The use of the runway is not temporary, as it clearly was used every month throughout the year, based on DAY Countops data. However, when examining the haul routes that these aircraft fly based on the flight schedules and destination, these aircraft (i.e., ERJ-135/140/145, E-170, E-175, CRJ-700, CRJ-900, B-717, A-319, A-320) weights do not require a longer runway than the RDC B-II aircraft identified above. The visibility minimums for Runway 18 is ½ mile, while Runway 36 has a visibility of 1 ½ mile. Therefore, the existing RDC is C-III-2400.
To determine the future critical aircraft the FAA forecasts are again considered. The commercial fleet of aircraft is anticipated to change over the planning horizon, with most of the commercial operations conducted by ADG C-III aircraft. These aircraft likely will continue to use the Runway, but a long-haul flight would be required to meet the need for a longer runway for the commercial aircraft only. Therefore, the future critical aircraft would be RDC of C-III-2400, with the runway length needed to meet the ADG B-II criteria, as defined in Table 1-3 of AC 150/5325-4B.

Runway 6R-24L
Like Runway 18-36 above, Runway 6R-24L is used by air traffic control, both issued from the FAA's Columbus Center, as well as local air traffic control to separate aircraft fleet, particularly when military operations are being conducted on Runway 6L-24R. Thus, Runway 6R-24L provides service to commercial service aircraft along with some business jet aircraft. Its current runway length is 7,285-feet. When reviewing DAY CountOps for 2021 this runway is used 21.5% of the time which accounts for about 6,000 air taxi and air carrier operations exclusively (of the total 10,273 operations using this Runway). This runway provides connection to the main terminal and the business jet aircraft. The existing design aircraft for this runway is an RDC C-III aircraft.

The existing visibility minimum of Runway 6R is ¾ mile while Runway 24L is ½ mile. The existing critical aircraft would be C-III-2400. To determine the future critical aircraft the FAA forecasts are again considered. The commercial fleet of aircraft is anticipated to change over the planning horizon, with most of the commercial operations conducted by RDC C-III aircraft. Therefore, the future critical aircraft would be RDC of C-III-2400.

Recommendation: Maintain primary Runway 6L-24R at a length of 10,900 feet. Maintain crosswind Runway 18-36 at its existing runway length of 8,502 feet. Maintain the smaller parallel Runway 6R-24L as a secondary runway at its current runway length of 7,285 feet.

4.3.3 Runway Width

All three runways currently measure 150 feet wide.

4.3.3.1 Runway Width Requirements

Based on the FAA 150/5300-13B *Airport Design*, runway width standards are based on the aircraft design group and approach visibility minimums. The width requirements have a margin of error factored in which account for wind effects during runway takeoff and landing operations. Reviewing the visibility minimums for each runway, coupled with the RDG identified above, **Table 4-10** provides a synopsis of runway width:

Table 4-10: Runway Widths

Runway	RDC	Visibility Minimums	Existing Runway Width
Rwy 6L-24R	C-IV	½ mile	150'
Rwy 6R-24L	C-III	½ mile	150'
Rwy 18-36	C-III	½ mile	150'

Recommendation: Maintain existing widths of all three Runways, each at 150 feet wide.

4.3.3.2 Runway Pavement Strength and Condition

Aircraft identified in the TFMSC data were reviewed to determine if the existing runway pavement strength can accommodate the existing and proposed critical aircraft**.** As part of this Master Plan, a new Pavement Management Study was completed. **Table 4-11** provides the pavement strength for all the runways. The published PCI is also provided.

Table 4-11: Runway Pavement Condition

Pavement Name	Existing Critical Aircraft (lbs.)	Published Pavement Maximum Strength SW (lbs.)	Published PCN	PCI	Condition	Period Rehabilitation Needed (Short, Mid, Long Term)
Rwy 6L-24R	255,000	870,000	100	71-100	Satisfactory/Good	Mid/Long Term
Rwy 6R-24L	255,000	870,000	57	86-100	Good	Long Term
Rwy 18-36	255,000	870,000	62	86-100	Good	Long Term

Source: Passero, 2022; Pavement Management Study (RDM), SW = single wheel, DW = dual wheel configuration

Runway 6L-24R

Based on the pavement management study completed by RDM, base year 2020, the Pavement Condition Index (PCI) varies. The eastern half of the runway has a PCI between 71-85. The western half has a PCI between 86-100. Overall, the pavement of this runway is in satisfactory to good condition. The blast pad off Runway 6L has a PCI of 86, while the blast pad off of Runway 24L has a PCI ranging from 56-70, which is in fair condition. The goal is to make sure that the Airport PCI is above 70; therefore, the eastern portion of the runway will require rehabilitation in the short-mid-term, while and Runway 24R blast pad may require rehabilitation in the short-term of the planning period.

Runway 18-36

Based on the pavement study completed by RDM, the Pavement Condition Index (PCI) varies. Most of the Runway has a PCI between 86-100, in good condition, with the exception of the northern most portion of the runway which is in satisfactory condition. The Runway 18 blast pad has a PCI ranging between 71-85, and the Runway 36 has a PCI ranging between 86-100. Because the entire runway and blast pads have PCIs that range between 71-100, rehabilitation may be required in the long-term portion of the planning period.

Runway 6R-24L

Based on the pavement study completed by RDM, the Pavement Condition Index (PCI) varies. Most of the Runway has a PCI between 86-100, which means that the runway pavement is in good condition. The Runway 6R blast pad has a PCI ranging between 71-85 in satisfactory condition, and the Runway 24L blast pad has a PCI ranging between 56-70 in fair condition. The Runway 24L blast pad will require rehabilitation in the short-term portion of the planning period.

Recommendations:

- Short-Term: Perform rehabilitation on the Runway 24R and 24L blast pads within the short-term portion of the planning period.
- Mid/Long-Term: Perform preventative maintenance as needed for Runways 6L-24R, 6R-24L and 18-36. Perform rehabilitation in the long-term, if needed.

4.3.4 Runway Safety Standards

The following sections discuss each of the applicable runway safety clearance areas.

4.3.4.1 Runway Safety Area (RSA)

The runway safety area (RSA) is a defined surface surrounding the runway to reduce the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. The RSA is required to be cleared of any potentially hazardous and graded to support the weight of the critical aircraft and/or firefighting and rescue vehicles. The RSA should be free of objects, except for those that need to be located within the RSA because of their function. Objects higher than 3 inches above grade must be frangible mounted with a frangible point no higher than 3 inches above grade.
Table 4-12 list the RSA dimensions and violations at DAY, where applicable.

Table 4-12: RSA Design Standards

Runway	RSA Width	Length Beyond Runway End	Length Prior to Thresh.	Grading Req. Met?	Violation Description	Mitigation
6L	500’	1,000’	600’	No	None	None
24R	500’	1,000’	600’	No	There are grading nonconformities within the RSA adjacent to Runway 24R. There are no RSA violations off the Runway 24R end.	Grading Project.
18	500’	1,000’	600’	No	There are grading nonconformities within the RSA adjacent to Runway 18 and off the Runway end.	Grading Project.
36	500’	1,000’	600’	No	There are grading nonconformities within the RSA adjacent to Runway 36 and off the Runway end.	Grading Project.

6R	500’	1,000’	600’	No	The Airport perimeter fence and North Dixie Dr. are located within the RSA off the departure end of Runway 6R.	Apply Declared Distances.
24L	500’	1,000’	600’	No	There are grading nonconformities within the RSA adjacent to Runway 24L and off the Runway end. The Airport perimeter fence and West National Rd. are located within the RSA off the departure end of Runway 24L.	Grading Project. Apply Declared Distances.

Source: AC 150/5300-13B; PBSJ Dayton International Airport Modification Study (2009); Passero Associates

4.3.4.2 Runway Object Free Area (ROFA)

The runway object free area (ROFA) is centered about the runway centerline. The ROFA clearing standards require above-ground objects protruding above the nearest point of the RSA to be cleared. However, it is acceptable for objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes to protrude above the nearest point of the RSA.

To the extent practicable, objects located in the ROFA should meet the same frangibility requirements of those within the RSA. Objects non-essential for air navigation or aircraft ground maneuvering purposes must not be placed in the ROFA. This includes parked aircraft and agricultural operations.

Table 4-13 list the ROFA dimensions and violations at DAY, where applicable.

Table 4-13: ROFA Design Standards

Runway	ROFA Width	Length Beyond Runway End	Length Prior to Threshold	Violation Description	Mitigation
6L	800’	1,000’	600’	None.	N/A
24R	800’	1,000’	600’	None.	N/A
18	800’	1,000’	600’	None.	N/A
36	800’	1,000’	600’	None.	N/A
6R	800’	1,000’	600’	Airport Perimeter fence and North Dixie Dr. located within the ROFA off the Departure End of Runway 6R.	Possible use of Declared Distances.
24L	800’	1,000’	600’	Airport Perimeter fence and West National Rd. located within the ROFA off the	Possible use of Declared Distances.

				Departure End of Runway 24L.	

Source: AC 150/5300-13B; Passero Associates

4.3.4.3 Runway Obstacle Free Zone (OFZ)

This surface is a design and operational surface kept clear during aircraft operations. For DAY, the OFZ is composed of the following: (1) runway OFZ, (2) precision OFZ, (3) the inner approach OFZ and (4) the inner transitional OFZ. The runway OFZ measures 400 feet wide and extends 200 feet off each runway end. The precision OFZ measures 800 feet wide by 200 feet long off each approach runway end for Runways 6R, 6L, 24R, 24L and 18.

Table 4-14 list the ROFZ dimensions and violations at DAY, where applicable.

Table 4-14: OFZ Design Standards

Runway	Runway OFZ Width	Length Beyond Runway End	Precision OFZ Width	Inner Approach OFZ Length Slope 50:1	Inner Transitional
6L	400’	200’	800’	Begins 200’ from runway end, Extends 2,600’ from runway end	Yes
24R	400’	200’	800’	Begins 200’ from runway end, Extends 1,600’ from runway end.	Yes
6R	400’	200’	N/A	None	N/A.
24L	400’	200’	800’	Begins 200’ from runway end, Extends 1,600’ from runway end.	Yes
18	400’	200’	800’	Begins 200’ from runway end, Extends 1,600’ from runway end.	Yes
36	400’	200’	N/A	None	N/A

Source: AC 150/5300-13B; Passero Associates

4.3.4.4 Line of Sight/Runway Visibility Zone (RVZ)

Runway line of sight requirements facilitate coordination among aircraft, and between aircraft and vehicles that are operating on active runways.

When runways intersect, the runway visibility zone is used to define an area in which an object five feet above the ground should be mutually visible at any other point within the RVZ. When runways do not intersect they are treated as single runways. If there is a full-length parallel taxiway, then a point five feet above the runway centerline is mutually visible with any other point five feet above the runway centerline for a distance equal to half the length of the runway length. Visual obstructions should be removed from these areas entirely.

A runway visibility zone exists for the intersection between Runway 6R-24L and Runway 18-36. Although the extended centerlines of Runways 6L-24R and 18-36 converge without the runways intersecting, an

RVZ is not required between these runways do to the fact that DAY has a 24-hour ATCT and can coordinate activity on these runways (AC 150/5300-13B).

Based on an existing line of site study at DAY, the current grading along Runway 18-36 near the intersection of Runway 6R-24L, and at the intersection of the two runways do not meet grading line of sight standards. Based on the FAA AC 150/5300-13B, any point five feet above runway centerline and in the runway visibility zone must be mutually visible with any other point five feet above the centerline of the crossing runway and inside the runway visibility zone. This is not the case at DAY and should be evaluated in the alternatives section, for either mitigation or Modification to Standard (MOS) for grading.

4.3.4.5 Runway Protection Zone (RPZ)

The RPZ is the area at ground level 200 feet prior to the threshold or beyond the runway end to enhance the safety and protection of people and property on the ground. The departure RPZ has the same requirements as the approach RPZ and is located 200 feet off of the runway end only.

Based on the "Interim Guidance on Land Uses Within a Runway Protection Zone" FAA memo, new construction of buildings and transportation infrastructure must follow the RPZ requirements set forth by the FAA. For existing incompatible land uses within RPZs however, the FAA may not require any changes and will work with airport sponsors to mitigate the non-standard conditions, as necessary.

Tables 4-15 and **4-16** lists the design standards and non-conforming land use descriptions within each RPZ, where applicable.

Table 4-15: RPZ Design Standards

Runway	RPZ Inner Width	RPZ Outer Width	RPZ Length	Description	Mitigation
6L	1,000'	1,750'	2,500'	Dog Leg Road is in RPZ.	This is an existing non-conforming land use within the RPZ. Airport should continue monitoring activity on Dog Leg Road and coordinate with the FAA as needed.
24R	1,000'	1,750'	2,500'	None.	N/A
6R	1,000'	1,510'	1,700'	West National Road and Peters Pike are in the RPZ.	This is an existing non-conforming land use within the RPZ. Airport should continue monitoring activity on Peters Pike and West National Road, and coordinate with the FAA as needed.

24L	1,000'	1,750'	2,500'	North Dixie Drive is in the RPZ.	This is an existing non-conforming land use within the RPZ. Airport should continue monitoring activity on North Dixie Drive and coordinate with the FAA as needed.

Source: AC 150/5300-13B; Passero Associates

Table 4-16: RPZ Design Standards Cont'd.

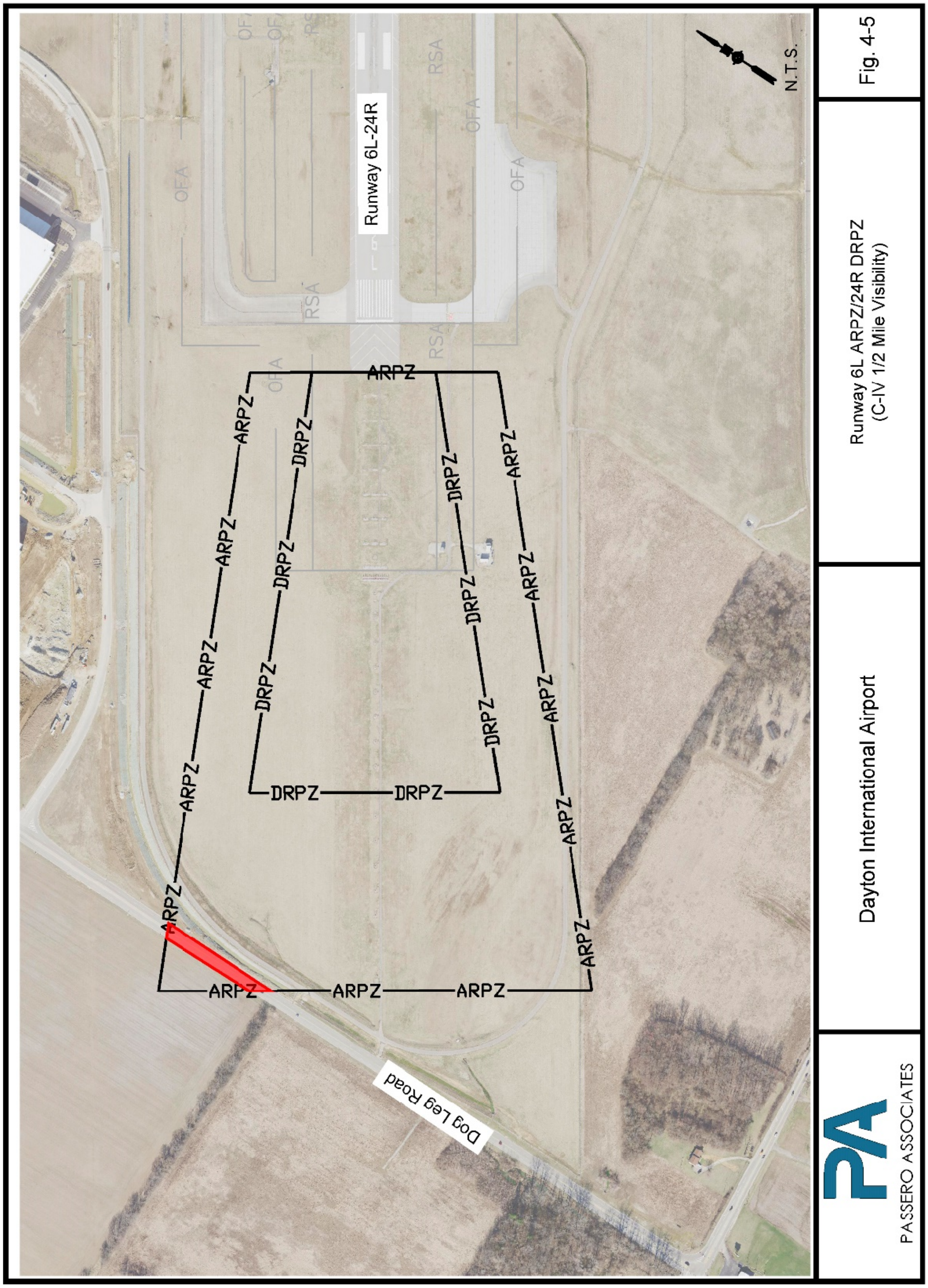
Runway	RPZ Inner Width	RPZ Outer Width	RPZ Length	Description	Mitigation
18	1,000'	1,750'	2,500'	Lightner Road is in the RPZ.	This is an existing non-conforming land use within the RPZ. Airport should continue monitoring activity on Lightner Road and coordinate with the FAA as needed.
36	500'	1,010'	1,700'	West National Road is in the RPZ. Buildings (mostly commercial with some residential) are located within the RPZ.	West National Road is an existing non-conforming land use within the RPZ. Airport should continue monitoring activity on West National Rd. and coordinate with the FAA as needed. Buildings located within an RPZ poses risk to the occupants inside. Therefore, Runway 36 should be displaced to move the RPZ away from both West National Rd. and the non-conforming buildings.

Source: AC 150/5300-13B; Passero Associates

Figures 4-5 through **4-10** depicts these non-conforming land uses within the RPZ.
Recommendations:

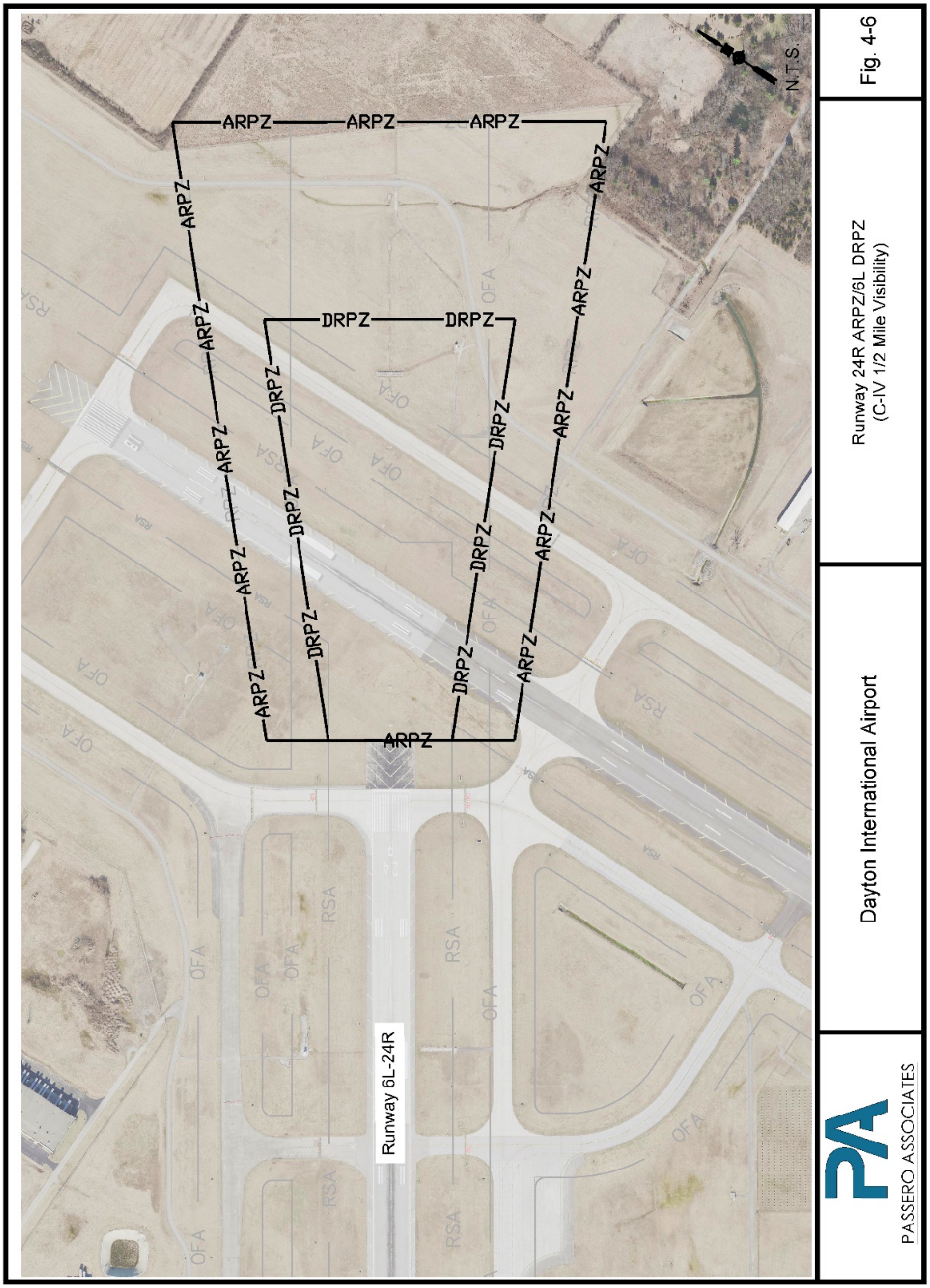
- Analyze alternatives to address design standards for the RSA, ROFA, RPZ, RVZ and ROFZ for all three runways at DAY.
- DAY management should monitor all activities on West National Road, Lightner Road, North Dixie Drive, Peters Pike, and Dog Leg Road where they intersect with the Runway RPZs.
- It is recommended that the Runway 36 threshold be relocated to ensure that buildings are no longer within the RPZ.

Figure 4-5 Runway 6L Approach RPZ/Runway 24R Departure RPZ



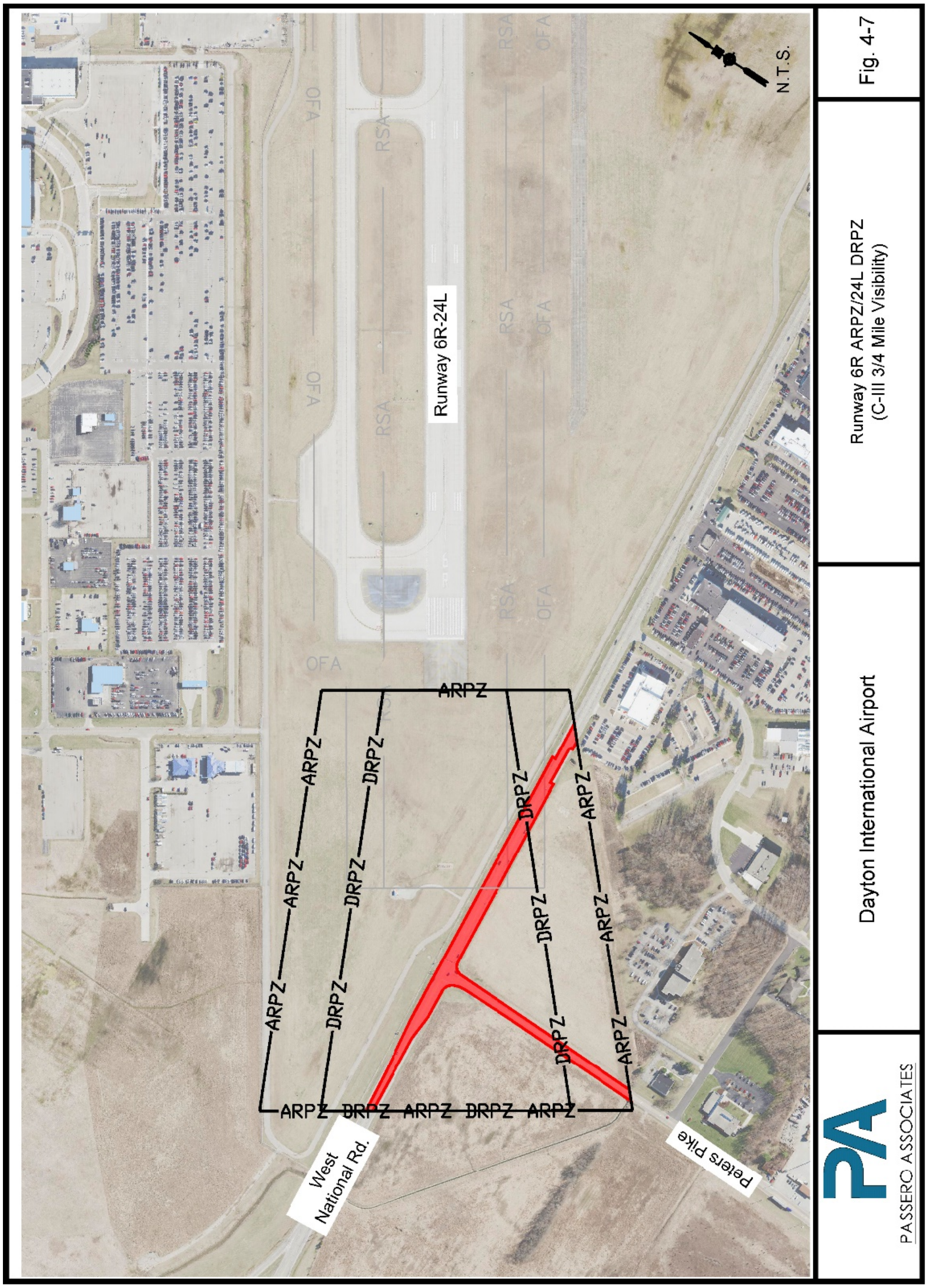
Source: FAA; Passero Associates

Figure 4-6 Runway 24R Approach RPZ/Runway 6L Departure RPZ Deficiency



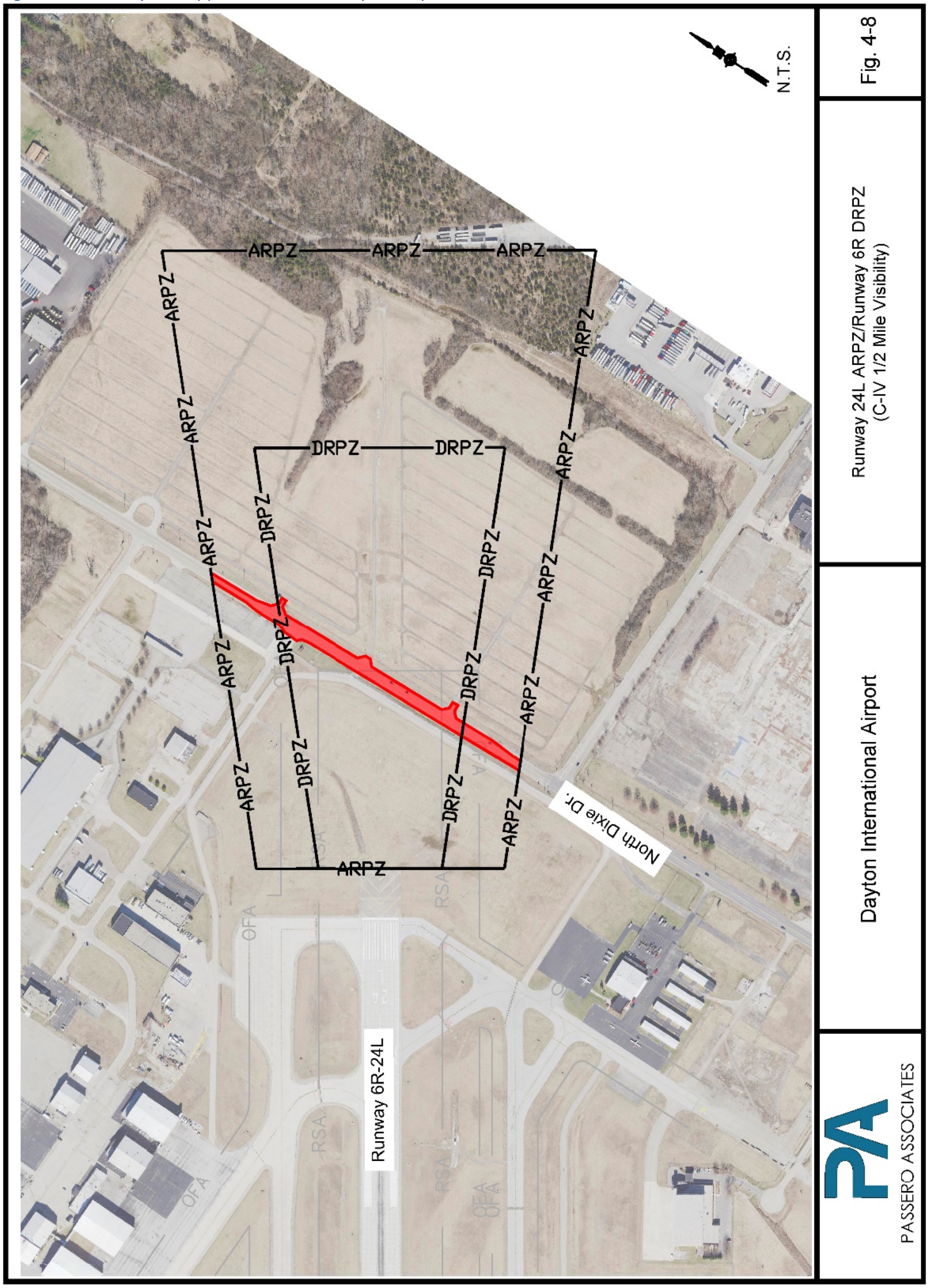
Source: FAA; Passero Associates

Figure 4-7 Runway 6R Approach RPZ/Runway 24L Departure RPZ



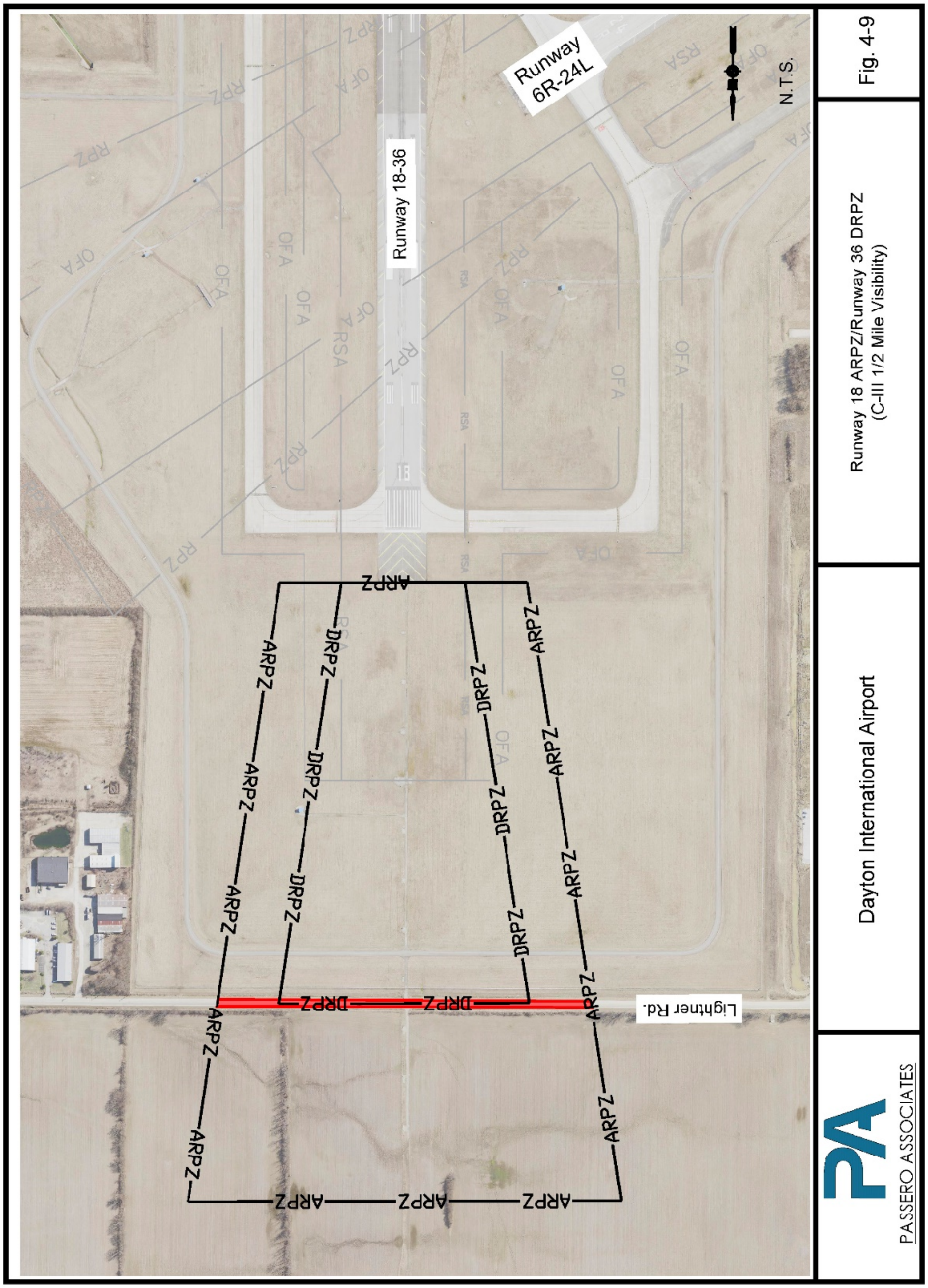
Source: FAA; Passero Associates

Figure 4-8 Runway 24L Approach RPZ/Runway 6R Departure RPZ



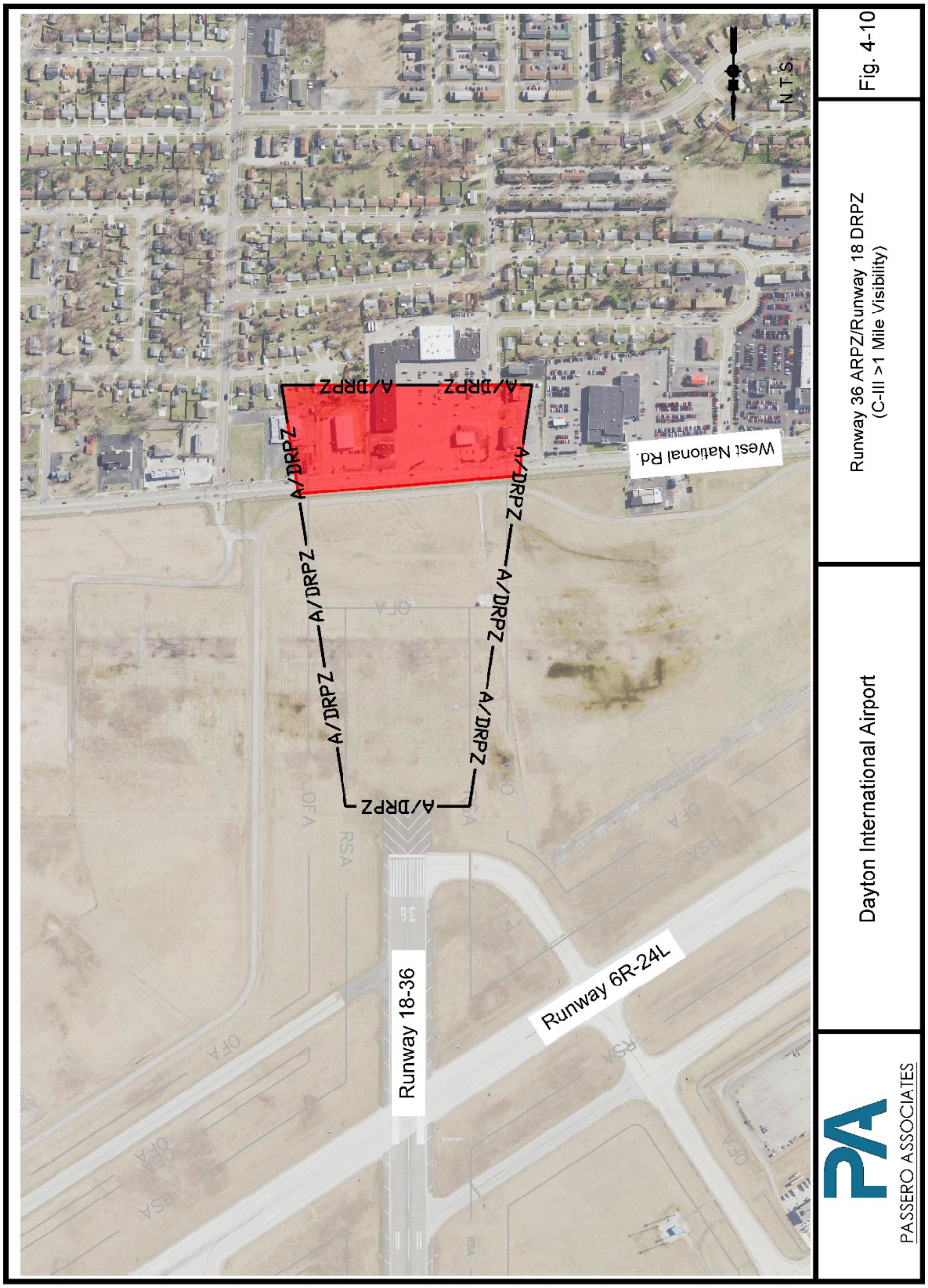
Source: FAA; Passero Associates

Figure 4-9 Runway 18 Approach RPZ/Runway 36 Departure RPZ



Source: FAA; Passero Associates

Figure 4-10 Runway 36 Approach RPZ/Runway 18 Departure RPZ



Source: FAA; Passero Associates

4.3.4.6 Modification of Standards

There is an existing modification for grading on Runway 18-36.

4.3.5 Declared Distances

Declared distances are determined by airport sponsors to determine available distances for turbine powered aircraft takeoff run available (TORA), takeoff distance available (TODA), accelerate stop distance available (ASDA) and landing distance available (LDA). Declared distances are applied to runways to obtain additional runway safety area and/or object free area prior to runway thresholds (the start of the LDA). In addition, declared distances are used to mitigate incompatible land uses that may lie in Runway Protection Zones (RPZ).

A general definition of each declared distance from the AC 150/5300-13B, and the description for each Runway is provided in the sections below.

TORA

The TORA is the length of runway declared available and suitable for satisfying takeoff run requirements. The TORA considers the Departure RPZ to determine the declared distances for each runway end. AC 150/5200-13B also states that "*FAA does not recommend reducing the TORA on runways to mitigate incompatible land uses in the departure RPZ*."

The TORA for each runway end at DAY is as follows:

- **Runway 6L-24R:** No objects are in 6L and 24R Departure RPZs. Therefore, the TORA for both runways 10,900 feet.
- **Runway 6R:** North Dixie Drive is a pre-existing roadway located within the Runway 6R Departure RPZ. Based on the statement above, TORA for this runway is 7,284 feet.
- **Runway 24L:** West National Road and Peters Pike Road are pre-existing roadways located within the Runway 24L Departure RPZ. Based on the statement above, the TORA for this runway is 7,284 feet.
- **Runway 18:** Lightner Road and buildings are pre-existing located within the Runway 18 Departure RPZ. Based on the statement above, the TORA for this runway is 8,501 feet.
- **Runway 36:** West National Road is pre-existing roadway located within the Runway 36 Departure RPZ. Based on the statement above, the TORA for this runway is 8,501 feet.

TODA

The TODA is equal to the TORA plus the length of any remaining runway or clearway (if applicable) beyond the departure end of the runway. The TODA considers the obstruction analysis of Departure End of Runway (DER) surface to determine the declared distances for each runway end.

The TODA for each runway at DAY is as follows:

Runway 6L-24R: All objects (e.g., trees, poles, towers, etc.) can be mitigated with lights, or clearing; therefore, the relocation of the DER surface is not anticipated for Runways 6L and 24R. The TODA for Runways 6L and 24R equals 10,900 feet.

Runway 6R-24L: All objects (e.g., trees, poles, towers, etc.) can be mitigated with lights, or clearing; therefore, the relocation of the DER surface is not anticipated for Runways 6R and 24L. The TODA for Runways 6R and 24L equals 7,284 feet.

Runway 18-36: All objects (e.g., trees, poles, towers, etc.) can be mitigated with lights, or clearing; therefore, the relocation of the DER surface is not anticipated for Runways 18 and 36. The TODA for Runways 18 and 36 equals 8,501 feet.

ASDA

The ASDA is the length of runway, plus the stopway (if applicable) to determine the accelerated stop distance requirements for a rejected takeoff. The runway design standards considered for ASDA are the RSA and ROFA on the departure end.

The ASDA for each runway at DAY is as follows:

Runway 6L-24R: No objects are located within the Runways 6L and 24R RSA and ROFA, and no obstacles located within the RSA and ROFA off the runway ends. Therefore, the ASDA equals 10,900 feet.

Runway 6R: The airport perimeter fence and North Dixie Dr are currently within the RSA and ROFA off the departure end of the runway. Therefore, the declared distance for this runway is 6,945 feet (7284 -339) to remove the fence from the ROFA.

Runway 24L: The airport perimeter fence and West National Drive are currently within the RSA and ROFA off the departure end of the Runway. Therefore, the declared distance for this runway is 6,768 feet (7,284 feet-516 feet) to remove the fence from the ROFA.

Runway 18-36: No objects are located within the Runways 18 and 36 RSA and ROFA. Therefore, the ASDA for Runways 18 and 36 equals 8,501 feet.

LDA

The LDA is the length of runway that is available, and suitable, for landing operation requirements. The LDA considers the approach RPZs, the RSA and ROFA prior to runway thresholds, and the RSA and ROFA beyond the departure end of runways. There are existing roadways off each runway end within the approach RPZ. Following the Interim RPZ guidance, new roadways are to be reviewed by FAA APP-400. There are trees within the threshold siting surface on airport property that can be mitigated. The roadways within each approach RPZ are existing, with no history of incident. If the approach RPZ were taken into consideration, there is a significant adverse impact to the runway usability. Therefore, the calculations below show the runway length considering the approach RPZ and RSA/ROFA lengths; as well as offering an alternative approach considering the RSA/ROFA impacts only.

The LDA for each runway at DAY is as follows:

Runway 6L: Dog Leg Road cuts through the Runway 6L approach RPZ. Considering declaring the distance for the approach RPZ, LDA would equal 10,588 feet and also require the threshold to be displaced. As mentioned above, Dog Leg Road is an existing public road that cuts through the RPZ, with no incidents. An alternative approach is to address the RSA/ROFA only. Therefore, the LDA for Runway 6L equals 10,900 feet.

Runway 24R: There are no objects within the Runway 24R approach RPZ, and no objects within the RSA and ROFA on the departure end of the Runway; therefore, the LDA for Runway 24R equals 10,900 feet.

Runway 6R: West National Drive and Peters Pike Road are located within the Runway 6R approach RPZ. There is approximately 484 feet prior to the Runway 6R threshold to maintain the perimeter fence outside the ROFA; therefore, the threshold needs to be displaced. The airport perimeter fence on the departure end of the runway lies within the 1,000-foot ROFA length, and therefore requires a declared reduction of 339 feet, with approximately 661 feet beyond the end of the runway (1,000 - 661 = 339). When considering the approach RPZ and addressing the RSA and ROFA, the LDA would equal 4,943 feet. This would adversely impact the runway usability. An alternative approach is to only address the RSA and ROFA requirements prior to the runway thresholds. Therefore, Runway 6R threshold should be relocated 116 feet to ensure that the Runway 6R ROFA has a clearance of at least 600 feet prior to the threshold (600 - 484 = 116). Therefore, the LDA would equal 6,829 (7,284 - 339 - 116).

Runway 24L: The airport fence and North Dixie Drive are within the approach RPZ. Reducing the LDA based on the approach RPZ would reduce the LDA length to 4,459 feet. This would adversely impact the runway usability. Therefore, and as mentioned in the previous section, the Runway 24L declared distances will only address the RSA and ROFA requirements prior to the runway thresholds. The airport fence is more than 600 feet from the Runway 24L threshold and meets RSA/ROFA standards. However, the airport fence is within the ROFA on the departure end, which requires 1,000 feet. There is only 484 feet beyond the departure end of runway to the airport fence; therefore, the LDA needs to be reduced by 516 feet on the departure end (1,000 - 484 = 516). Therefore, the LDA would equal 6,768 feet (7284 feet - 516 feet).

Runway 18: Lightner Road is located within the approach RPZ. There is 600 feet before the Runway 18 threshold, and 1000 feet beyond the runway end. Considering the approach RPZ the LDA would equal 7,683 feet. This would adversely impact the runway usability. In addition, runway Lightner Road is an existing road that cuts through the Runway 18 approach RPZ, without incident. Therefore the LDA equals 8501 feet.

Runway 36: West National Road and buildings lie within the Runway 36 approach RPZ. There is 600 feet prior to the threshold and 1,000 feet beyond the runway end to meet RSA/ROFA standards. If the threshold is relocated to accommodate the approach RPZ, the LDA would equal 8,052 feet. An alternative approach is to address the RSA/ROFA only, in which case the LDA would be 8,501 feet.

A breakdown of the published declared distances for DAY are provided in **Table 4-17** and shown in **Figures 4-11 thru 4-13.**

Table 4-17: Proposed Declared Distances

Declared distance	Runway 6L	Runway 24R	Runway 6R	Runway 24L	Runway 18	Runway 36
TORA	10,901	10,901	7,285	7,285	8,502	8,502
TODA	10,901	10,901	7,285	7,285	8,502	8,502
ASDA	10,901	10,901	6,946	6,769	8,502	8,502
LDA	10,901	10,901	6,830	6,769	8,502	8,502

Source: Airport Master Record, NFDC

Recommendations:

- Relocate Runway 6R threshold 116 feet to create 600 feet prior to threshold for the ROFA.
- Apply declared distances for each runway. Discuss with FAA APP-400 for the approach RPZ for the LDA.

This section of the facilities requirements analyzes runway/taxiway separations, runway designation and markings.

4.3.1 Runway/Taxiway Separations

The AC 150/5300-13B *Airport Design*, provides guidance on the design of runway environments at airports. The runway geometries at DAY are as follows:

Runway 6L-24R

Runway 6L-24R is located north of the commercial service terminal. The surveyed length of Runway 6L-24R measures approximately 10,900 feet long by 150 feet wide. Runway 6L-24R has one parallel taxiway (Taxiway R) that is located south of the Runway, in which the taxiway centerline is offset approximately 450 feet from the Runway centerline. This separation distance meets the requirements for C-IV aircraft. There is no non-standard geometry for Runway 6L-24R.

Runway 6R-24L

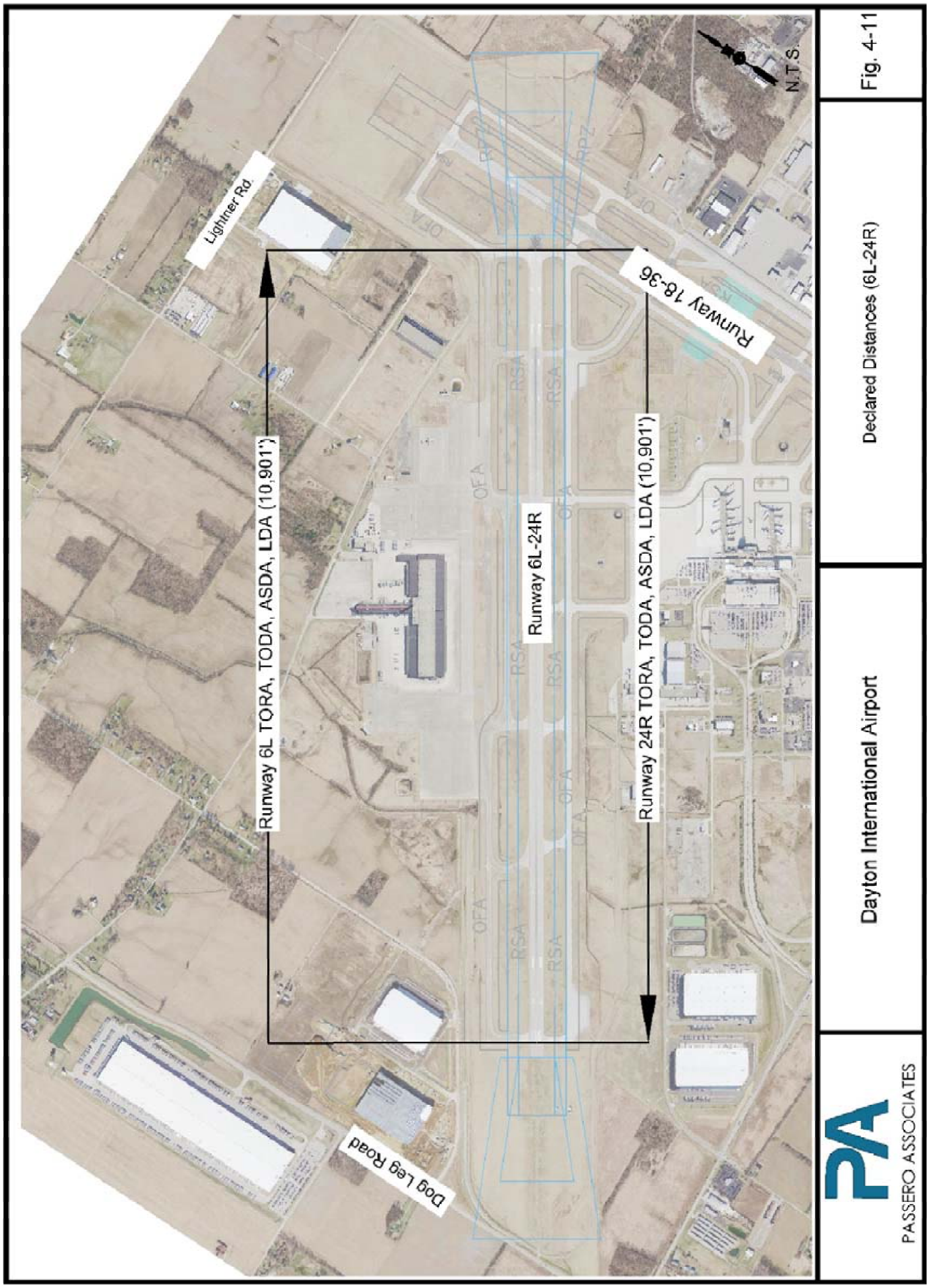
Runway 6R-24L intersects Runway 18-36 and is just south of the commercial service terminal. Runway 6R-24L measures approximately 7,284 feet long by 150 feet wide. The Runway has one parallel taxiway (Taxiway E) that is located north of the Runway, in which the taxiway centerline is offset approximately 400 feet from the Runway centerline. This separation distance meets the requirements for C-IV aircraft. There is no non-standard geometry for Runway 6L-24R.

Runway 18-36

Runway 18-36 intersects Runway 6R-24L and is just east of the commercial service terminal. Runway 18-36 measures approximately 8,501 feet long by 150 feet wide. Taxiways A, C and D are parallel to the Runway and provide access to both runway ends. The three taxiways are offset 400 – 1,000 feet from Runway 18-36. This separation distance meets the requirements for C-IV aircraft. There is a documented hotspot at the intersection of Runway 36, Taxiway D and Taxiway H. A hotspot is defined as a location on an airport movement area with a history of potential risk of collision or runway incursion. Hotspot #1 is noted as "*aircraft taxiing from Taxiway D, with a left turn on Runway 36, destined for Taxiway H sometimes miss the turn onto Taxiway H and enter Runway 6R-24L.*"

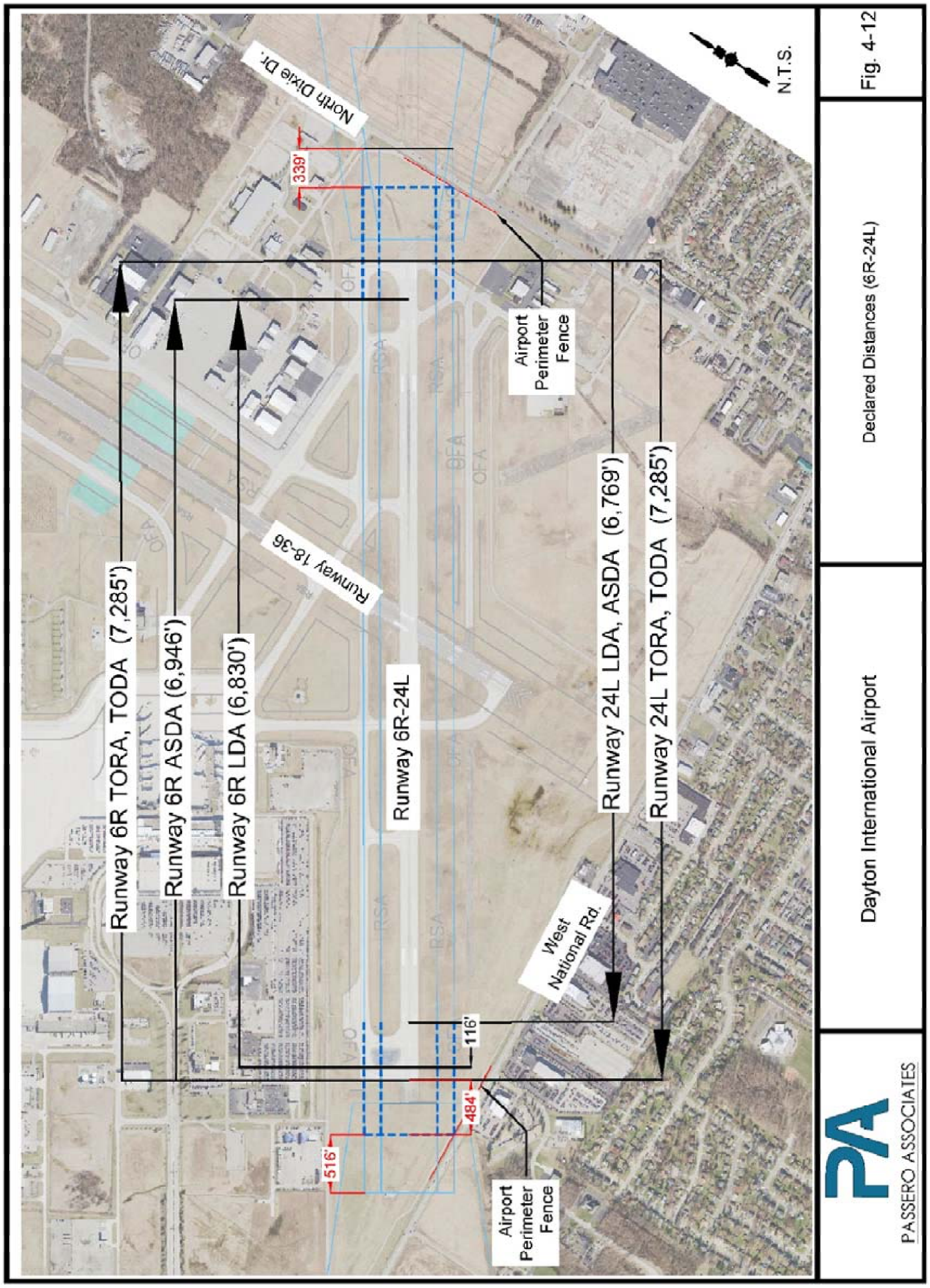
The runway to taxiway separation meets criteria, however there is a documented hot spot that needs to be mitigated during the alternatives section. **Figure 4-14** shows the location of the hotspot.

Figure 4-11. Declared Distances (6L-24R)



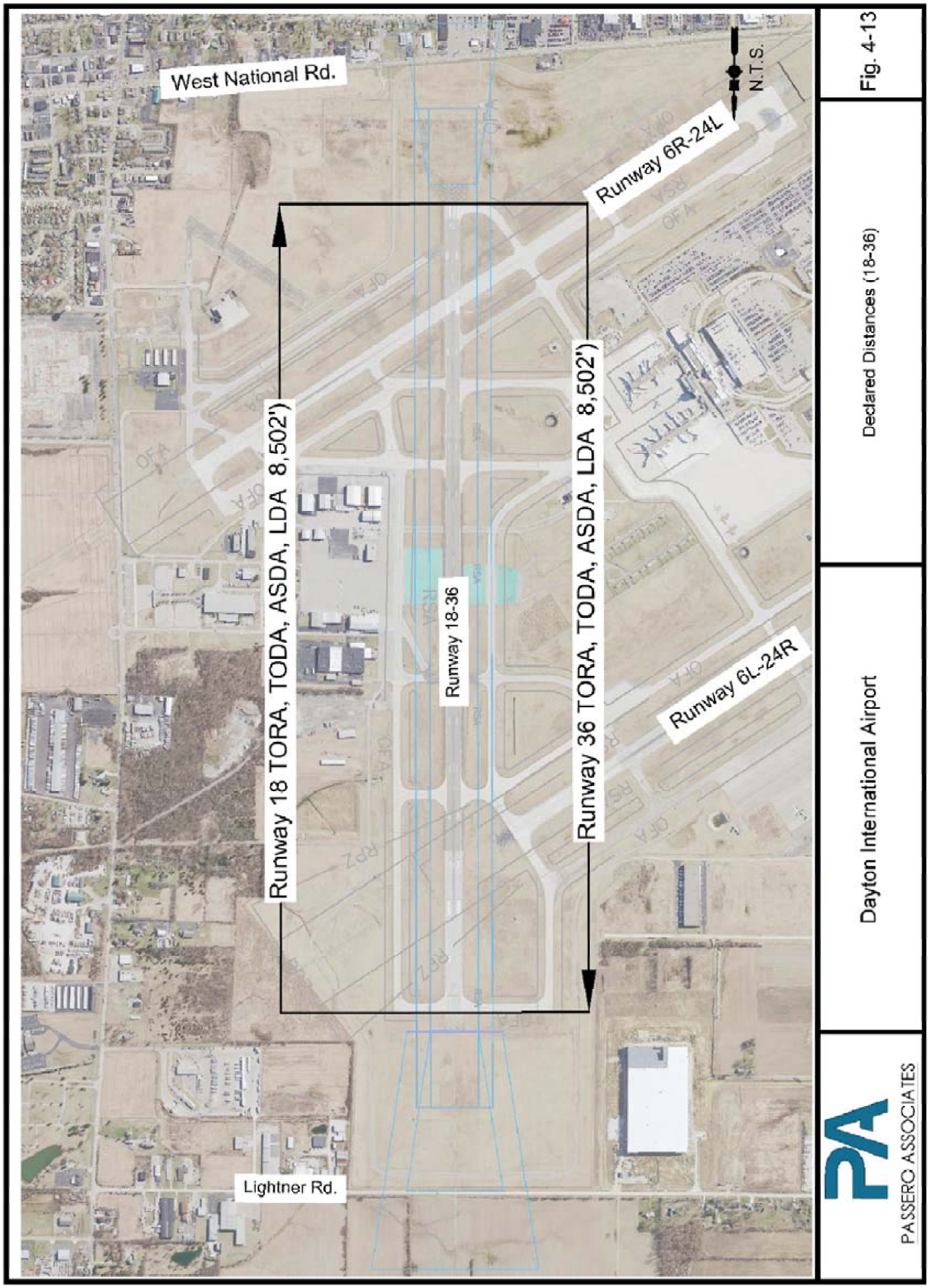
Source: FAA; Passero Associates

Figure 4-12. Declared Distances (6R-24L)



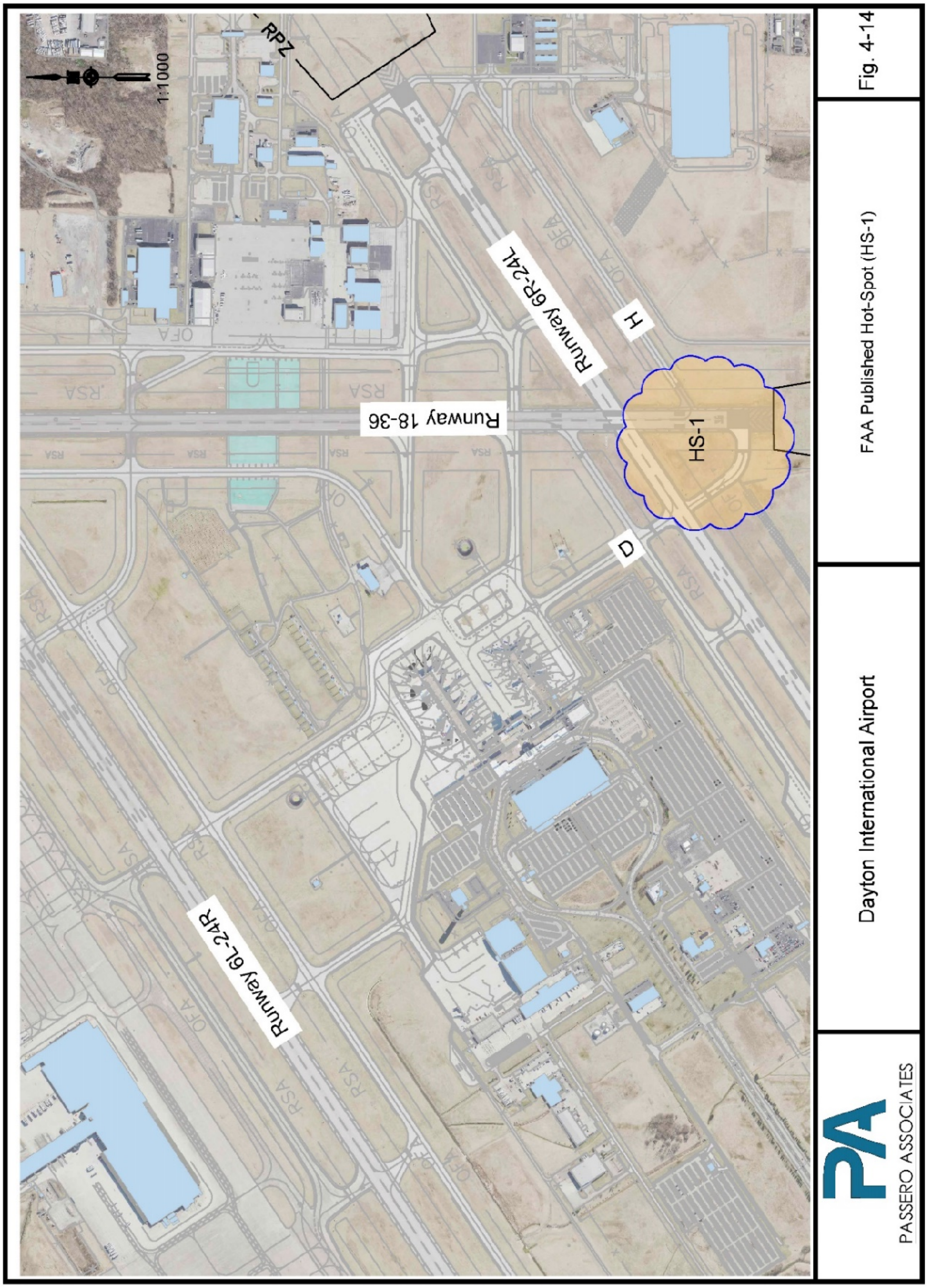
Source: FAA AC 150/5300-13, Airport Design; Passero Associates

Figure 4-13. Declared Distances (18-36)



Source: FAA AC 150/5300-13, Airport Design; Passero Associates

Figure 4-14- FAA Published Hot-Spot (HS-1)



Source: FAA; Passero Associates

Recommendation:

- Mitigate Hotspot #1, which is at the intersection of Runway 6R-24L, Taxiway D and Runway 36.

4.3.2 Runway Designation

A runway is identified by the whole number nearest the magnetic azimuth on runway bearing, and designated as such through painted markings. This number is then rounded off to the nearest unit of ten. Magnetic azimuth is determined by adjusting the geodetic azimuth associated with a runway to compensate for magnetic declination. Magnetic declination is defined as the difference between true north and magnetic north which varies over time and is relative to any specific location on earth. Magnetic declination is a natural process and does periodically require the re-designation of runways.

The current magnetic declination for the area around DAY was obtained from the National Geophysical Data Center in January of 2020, and was calculated to be 06°13’ West changing by 2' West per year. Furthermore, runway true bearings for both Runways 6L-24R, 6R-24L and 18-36 were obtained from the surveyed data and National Flight Data Center (NFDC).

Runway true bearing, or true north, is the points where the lines of longitude converge. The Runway magnetic bearing, or magnetic north, does not coincide with true north due to the constant change of the Earth’s magnetic poles. Because of this, the magnetic bearing of runways are subject to change. Therefore, Runway numbering is based on the magnetic bearing.

Using the method of *West is best – East is least*, the declination of 06°13’ West would need to be added to the Runway's true bearing to determine its magnetic bearing.

The results from this analysis are listed in **Table 4-18.**

Table 4-18: Runway Designation Calculation within the 20-Year Planning Period

RUNWAY	TRUE BEARING	MAGNETIC DECLINATION	MAGNETIC BEARING IN 2038	RUNWAY DESIGNATION REQUIRED
6L	55° 19' 50.95"	+ 06°13’ West	62° 10' 48”	6L
24R	235° 21' 04.76"	+ 06°13’ West	242° 11' 60"	24R
6R	55° 20' 55.32"	+ 06°13’ West	62° 12' 00"	6R
24L	235° 21' 44.64"	+ 06°13’ West	242° 12' 36"	24L
18	178° 31' 00.34"	+ 06°13’ West	185° 22' 12"	***19***
36	358° 31' 02.15"	+ 06°13’ West	365° 22' 12"	***01***

Source: Passero Associates, Woolpert, Inc.

Recommendation:

- Further discussions with flight procedures are needed for the re-designation of Runway 18-36 to 01-19 over the planning period.

4.3.3 Runway Markings

Painted markings, lines and symbols provide information to the pilot during the approach and departure phase of a flight, and also during ground movements. There are three standard sets of markings used depending on the type of runway – visual markings, non-precision markings and precision markings.

Depending on the type of aircraft activity and physical characteristics of the pavement, additional markings may be required for any of the three categories identified above. The FAA also allows markings on runways to be upgraded to the next group (e.g., visual markings upgraded to non-precision markings) at any time. Runway pavement and displaced threshold markings are painted white, while taxiway pavement markings are painted yellow. FAA guidelines state that taxiways should have centerline markings and runway holding position markings whenever they intersect with a runway.

At DAY, Runway 6L-24R, 6R-24L and 18-36 have precision instrument approach (PIR) markings that are all in good condition.

Recommendation:

- Perform periodic maintenance (check pavement markings for wear and visibility)
- Remark pavement is runway end is shifted.

4.4 Taxiway and Taxilane System Requirements

The purpose for any taxiway system is to support the operational activity and enhance the safety of aircraft ground movements. In addition, taxiways can enhance the capacity of the runway system when thoughtfully designed in a way to minimize runway occupancy time and unnecessary runway crossings. A quality taxiway system is designed to provide freedom of movement to and from the runways and between aviation facilities at an airport. Taxiway systems include parallel taxiways, entrance/exit taxiways, by-pass taxiways, taxiway run-up areas, hangar taxilanes, and apron taxilanes.

Planning standards include taxiway width, safety areas, object free areas, shoulders and the distance between runway and taxiways. The dimensions are governed by the airplane design group (ADG) for safety area, object free area and runway/taxiway separation, whereas the taxiway width is based on the taxiway design group (TDG). **Tables 4-19** and **4-20** shows the dimensions.

Table 4-19: Taxiway Requirements – Airplane Design Group

	AIRPLANE DESIGN GROUP					
	I	II	III	IV	V	VI
TAXIWAY SAFETY AREA	49 ft	79 ft	118 ft	171 ft	214 ft	262 ft
TAXIWAY OBJECT FREE AREA	89 ft	131 ft	186 ft	259 ft	320 ft	386 ft
RUNWAY/TAXIWAY SEPARATION	225-400* ft	240-400* ft	400 ft	400 ft	400 ft	500* ft

Source: FAA AC 150/5300-13B, Table 4-1.

Table 4-20: Existing Taxiway Design Group Standards

	TAXIWAY DESIGN GROUP						
	1	2	3	4	5	6	7
TAXIWAY WIDTH	25 ft	35 ft	50 ft	50 ft	75 ft	75 ft	82ft
TAXIWAY EDGE SAFETY MARGIN[1]	5 ft	7.5 ft	10 ft	10 ft	15 ft	15 ft	15ft
TAXIWAY SHOULDER WIDTH[2]	10 ft	10 ft	20 ft	20 ft	25 ft	35 ft	40 ft

Note: TESM – the distance between the outer edge of the landing gear of an airplane with its nose gear on the taxiway centerline and the edge of the taxiway pavement.
Source: FAA AC 150/5300-13B, Table 4-2.

4.4.1 Taxiway Geometry

As stated in Chapter 2, DAY is comprised of 20 taxiways. These taxiways are mixture of full parallel taxiways, and taxiways that provide access to various parts of the airfield. The taxiways widths range from 70 feet to 100 feet, which exceed TDG design up to TDG4. The TDG for Runway 6L-24R is an existing TDG of 4, with a future TDG of 5, while the remaining parallel taxiways should be TDG 3.

When reviewing taxiway geometry the following criteria are examined:

- 90 degree turns from taxiway to runway

- Three path concept: having no more than 3 paths to chose at an intersection
- Channelized taxiing: minimizing large expanses of pavement at intersections
- Runway access from aprons: ensure an aircraft cannot taxiway directly onto a runway without making a turn
- Designated hotspot/Runway Incursion Mitigation (RIM) Locations: identified at DAY at the intersection of Taxiways D, H and Runway 36.

The taxiway geometries that should be examined are identified below and graphically illustrated in **Figure 4-15**.

It should be noted that taxiway shoulders are required for taxiways that accommodate ADG IV aircraft and larger. Therefore, taxiway shoulders should be implemented for taxiways at DAY that accommodate ADG IV aircraft. Stabilized shoulders are required for taxiways serving ADG I, II and III (typically in the form of stabilized soil).

Taxiway A

Taxiway A provides access from the Terminal area to Runway 24R. Airport Rescue and Firefighting (ARFF) can directly access Runway 24R via Taxiway A as well. Although Taxiway A is parallel to Runway 18-36 and provides access to Runway 24R, the limited circulation of Taxiway A to other portions of the airfield makes this connection not feasible, especially with the fact that the ARFF needs more direct access to other runways. Furthermore, with the ARFF being close to the intersection of Taxiways A and N, there is a greater potential for a collision between ARFF vehicles and an aircraft. This taxiway acts is a route to access Runway 18 for the critical aircraft, thus should be kept at TDG 5.

Therefore, Chapter 5 should examine alternatives where Taxiway A intersects with Taxiway N.

Taxiway B

The AC 150/5300-13B states that taxiways should not be connected to two runways. Furthermore, to limit the number of runway crossing, taxiway/runway crossings should be limited to the outer third portion of the runway. Taxiway B currently connects Runways 18-36, and 6R-24L. Furthermore, Taxiway B provides a direct connection from the Terminal apron to Runway 18-36, which is not in accordance with taxiway design guidelines in the AC 150/5300-13B. This taxiway acts as a route to access Runway 18 for the critical aircraft; thus, should be kept at TDG 5. Mitigation for the Taxiway B direct connection should also be analyzed.

Taxiway C

This taxiway provides access between Runway 18 and Taxiway B on the east side of Runway 18-36 for the general aviation aircraft. An area of this taxiway between Taxiway N and Z does not provide the separation Group IV aircraft. The alignment of Taxiway C at the south end intersection with Taxiway B, is not parallel and should be examined further for line of sight.

Therefore, Chapter 5 should examine alternatives to Taxiway C alignment and width for TDG 3 aircraft.

Taxiway D

Taxiway D provides access from the Terminal area to Runway 36. The FAA has a documented and published area where Taxiway D meets Runway 36 as a hotspot. Furthermore, and very similar to Taxiway B, Taxiway D connects Runway 36 with Runway 6R-24L. Taxiways should not intersect multiple runways, not to mention that there is a “high energy” intersection at Taxiways D, E and Runway 6R-24L. This taxiway acts as a route to access Runway 36 for the critical aircraft, thus should be kept at TDG 5.

Therefore, Chapter 5 should investigate alternatives to mitigate the hotspot.

Taxiways E and F

Taxiways E and F are parallel to 6R-24L. Taxiway E provides access to Runway 6R, while Taxiway F provides access to Runway 24L, however they are not connected to form a full parallel taxiway to Runway 6R-24L. These taxiways meet geometrical separations. To elaborate further, in order for aircraft to travel from the area adjacent to Runway 24L to Runway 6R, pilots will need to use Taxiways B and N, crossing Runway 18-36, then access Taxiway D (passing through the terminal area) in order to get to Taxiway E. There are several potential areas where collisions may occur along these routes; thus, increasing the safety issues at the Airport. This taxiway acts as a route to access Runway 36 for the critical aircraft, thus should be kept at TDG 5.

Therefore, Chapter 5 should investigate alternatives to increase the accessibility of Taxiways E and F alongside Runway 6R-24L.

Taxiway H

The existing geometry of Taxiway H provides connection to Runway 24L, but dead-ends at Runway 18-36 approximately 430 feet from the Runway 36 end. Being that Taxiway H provides access to Runway 24L, it is a pivotal taxiway for general aviation airfield operations in the southeast section of the airport. However, being that Taxiway H connects to Runway 18-36 near Taxiway D (published FAA hotspot), this connection increases the likelihood of an airfield collision. Taxiway H is not available to Group IV aircraft.

Therefore, Chapter 5 should investigate alternatives to mitigate this taxiway connection near Runway 36 hotspot.

Taxiway J

Taxiway J provides access to Runway 24L; however, Taxiways H and K also provide access to Runway 24L. Being that Taxiway J does not connect to the Runway 24L end, the positioning of this taxiway promotes a dangerous non-perpendicular crossing towards Taxiway N. The FAA urges airports to reduce unnecessary runway crossing wherever possible. Taxiway J is not available to Group IV aircraft.

Therefore, Chapter 5 should examine alternatives for the intersection of Taxiways J. Consider reducing with to TDG 3 standards.

Taxiway K

This taxiway provides access to the Runway 24L. Although Taxiway K measures approximately 64 feet wide, the taxiway not available to Group IV aircraft. This taxiway provides access to one of the FBO areas – Aviation Sales, Inc. Although Taxiway K provides a vital connection between the general aviation area and Runway 24L, there are several taxiway connectors that may create safety hazards adjacent to Runway 6R-24L (specifically Taxiway J).

Therefore, Chapter 5 should examine alternatives for the intersection of Taxiways K. If maintained consider reducing width to TDG 3 standards.

Taxiway L

Taxiway L provides access to Taxiway H from the Aviation Sales Inc. area. Being that the PCI of this taxiway is classified in poor condition, and the fact that aircraft can access Taxiway H and Runway 24L via Taxiway K, Taxiway L is excess pavement.

Therefore, Chapter 5 should examine alternatives regarding the taxiways in this area of the airport. If maintained consider reducing width to TDG 3 standards.

Taxiway M

Taxiway M is used to provide access between the former Emery Cargo site and the terminal area. Taxiway M provides direct access from an apron to Runway 6L-24R. The part of Taxiway M between Runway 6L-24R and Taxiway W was reopened during this Master Plan. With the redevelopment of the cargo area, this taxiway is designed to 75 feet to serve the aircraft using the cargo apron. This is a taxi route for the critical aircraft and should be maintained at its current width.

Therefore, alternatives should be explored to mitigate this direct connection in Chapter 5.

Taxiway N

Taxiway N provides access between the terminal area and Stevens Aviation, Inc. Although it is important to provide a connection between the terminal area and the FBO for airfield operations, runway crossings should be mitigated wherever necessary, especially if they can be considered as "high energy" connections. This is a taxi route for the critical aircraft and should be maintained at its current width.

Therefore, Chapter 5 should examine alternatives to mitigate this taxiway crossing, while also providing access to the terminal area to maintain efficient airport operations.

Taxiway R

Taxiway R provides access between the terminal and Runway 6L-24R on the south side of the runway. This taxiway serves the critical aircraft and should be maintained at its width to meet TDG 5 for the future critical aircraft.

Taxiway S

This taxiway between Runway 6L-24R and Taxiway W is presently closed. With the redevelopment of the cargo apron this taxiway should be reactivated.

Therefore, Chapter 5 should examine alternatives to reactivate this alignment.

Taxiway T

This taxiway between Runway 6L-24R and Taxiway W is presently closed. With the redevelopment of the cargo apron this taxiway should be reactivated. This is a taxi route for the critical aircraft and should be maintained at its current width.

Therefore, Chapter 5 will examine alternatives to mitigate this direct connection.

Taxiway U

Taxiway U provides direct access from the terminal area to Runway 6L-24R. Furthermore, the portion of Taxiway U adjacent to the non-movement area presents a blind-spot for controllers within the ATCT because they cannot see a portion of the taxiway below the cab. This is a taxi route for the critical aircraft and should be maintained at its current width.

Therefore, Chapter 5 will examine alternatives to mitigate this direct connection.

Taxiway V

Taxiway V connects Taxiways C and Z together. As stated in the AC 150/5300-13B, taxiway should connect to other taxiways and runways at an angle of no less than 50 degrees. The angle of measurement at the intersection of Taxiway C and V is approximately 28, and 152 degrees. Connections should be made at 90 degrees when possible.

Therefore, Chapter 5 will examine alternatives for Taxiway V. If maintained this pavement width should match Taxiway C.

Taxiway W

Taxiway W is the full-length parallel taxiway on the north side of Runway 6L-24R serving the former cargo apron. This taxiway was closed when Emery Cargo left the airport, but renewed interest in the apron by multi tenants has begun and development of hangars on the north side is already underway. To provide access to the runway ends, this apron should be re-opened to accommodate TDG 5 aircraft.

Therefore, Chapter 5 will examine alternatives for Taxiway V.

Taxiway Z

Taxiway Z provides access from the Wright Bros. Aero, Inc. area (on the east side of the airport) to the run-up pad off Taxiway R, and onto Runway 6L-24R. This taxiway can be considered a high-energy connection to Runway 18-36. Furthermore, with this taxiway running through a run-up pad and connecting to Runway 6L-24R, this presents potential aircraft collisions and congestion.

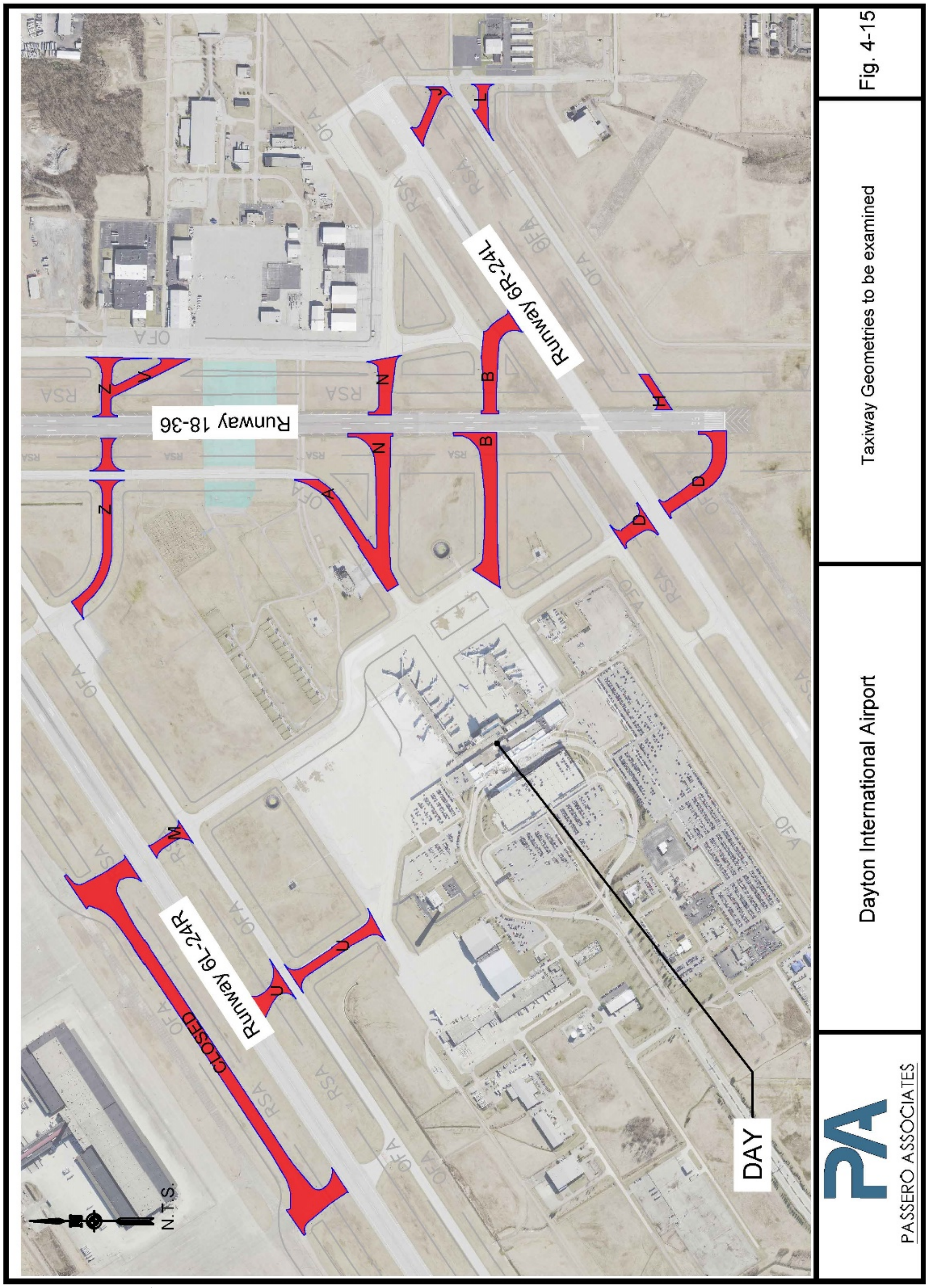
Taxiway Z between Runway 6L-24R was reopened as a part of the Taxiway W project. Although this taxiway helped provide access between Taxiway W and Taxiway A, this portion of Taxiway Z creates an unnecessary crossing because Taxiway W connects to the start of Taxiway A adjacent to the Runway 24R end. This taxi route should be maintained at its current width.

Therefore, Chapter 5 will examine alternatives for Taxiway Z.

4.4.2 Taxiway Pavement Condition

Based on the pavement study completed by RDM in 2021, most of the taxiways are in fair to good condition based on their PCIs. However, there are some taxiways that are not in fair condition. For the purposes of this plan, taxiway pavement with a PCI less than 71 will be recommended for rehabilitation in the short-term. Taxiways with PCIs less than 56 will be recommended for reconstruction in the short to mid-term. Please refer to Figure 2-15 in Chapter 2. **Table 4-21** lists the taxiways that have PCIs less than 71 with proposed dispositions.

Figure 4-*15. Taxiway Geometry to be examined*



Source: FAA AC 150/5300-13, Airport Design; Passero Associates

Table 4-21: Taxiway PCI Below 71

Taxiway Name	Taxiway PCI	Condition	Location	Disposition	Time Period
Taxiway A	51	Poor	Adjacent to Taxiway RW 18	Rehabilitate	Short-Term
Taxiway A	44-55	Poor	Adjacent to RW 24R and TW Y	Reconstruct	Short-Term
Taxiway A	59-65	Fair	Parallel to RW 18-36	Rehabilitate	Short to Mid-Term
Taxiway C	46	Poor	Adjacent to RW 18	Reconstruct	Short-Term
Taxiway C	36	Very Poor	Adjacent to Wright Bros. Aero Inc and Stevens Aviation Inc.	Reconstruct	Short-Term
Taxiway H	63	Fair	Adjacent to TW L	Rehabilitate	Short to Mid-Term
Taxiway J	65	Fair	At intersection to RW 6R-24L	Rehabilitate	Short to Mid-Term
Taxiway K	59	Fair	Adjacent to TW L	Rehabilitate	Short to Mid-Term
Taxiway L	29	Very Poor	Adjacent to TWs H and K	Reconstruct	Short-Term
Taxiway M	61	Fair	Adjacent to TW R	Rehabilitate	Short to Mid-Term
Taxiway M	69	Fair	Terminal area to RW 6L-24R	Rehabilitate	Short to Mid-Term
Taxiway R	64	Fair	Parallel to RW 6L-24R	Rehabilitate	Short to Mid-Term
Taxiway Y	41	Poor	At Intersection to RW 18-36	Reconstruct	Short-Term
Taxiway Y	46	Poor	At intersection to TW C	Reconstruct	Short-Term
Taxiway Z	44	Poor	Adjacent to TW A and the TW Run-Up Pad	Reconstruct	Short-Term
Taxiway Z	55	Poor	At intersection to TW W	Reconstruct	Short-Term

Source: Airport Master Record, NFDC

It should be noted that all the other taxiways at DAY not listed in the table above have PCIs greater than 70.

Recommendation:

- Evaluate taxiway alternatives identified above.
- Perform maintenance (i.e., rehabilitation and reconstruction) on the taxiways within the 20-year planning period.

4.4.2.1 Taxiway Markings

Taxiway markings are denoted with solid yellow lines in the center of the pavement with solid yellow edge markings. From conversations with Airport personnel and observations during site visits, the taxiway markings are in good condition.

Recommendation:

- Perform maintenance on markings as painting fades to maintain adequate visibility

4.5 Navigations Aids, Airfield Lighting

The following section will identify the various navigational aids at the airport and airfield lighting.

4.5.1 Instrument Approach Procedure Needs

As discussed in Chapter 2, runways at DAY are equipped with various instrument approaches (i.e., ILS, GPS, RNAV). These approaches provide pilots with enhanced capabilities during lower visibility when approach runways. These approaches are valuable for general aviation airports as they increase airfield safety and utility and require no fixed equipment at the Airport. In recent years the FAA has worked to increase as many GPS based non-precision approaches as possible. Based on the IFR wind-rose presented in Chapter 2, adequate wind coverage is provided for all category of aircraft. Each runway end has an instrument approach published.

Recommendation: None

4.5.2 Glide Slope and Localizer

Per the AC 150/5300-13B, and AC, there is a protective zone around glide slope and localizer equipment.

Glide Slope

The Glideslope (GS) signal provides vertical descent guidance for a pilot to land at a designated point on the runway. The GS is located along the side of the runway, optimally outside of the ROFA and RSA limits. However, End Fire GS are fixed-by-function and can be located within the ROFA on frangible mounts. If a runway threshold should change then need to verify the effect the new location will have on the glideslope performance with respect t touchdown point, threshold crossing height and PAPI runway point of intersection.

Runway 6L-24R have GSs located inside of the ROFA. To be in accordance with the AC 150/5300-13B, the GSs should be relocated outside of the ROFA.

The Runway 24L also has a GS located within the ROFA, while the Runway 18 GS is located outside of the Runway 18-36 ROFA.

Localizer

The Localizer (LOC) antenna array is typically located beyond the RSA on the extended runway centerline. The localizer has a critical area around to ensure its signal accuracy. The critical area should remain clear of objects, maintain the longitudinal grade between the antenna array and runway end, maintain a -0.5 to -3.0 percent symmetrical transverse grades from the centerline to the outer edges of the critical area.

Starting with Runway 6L-24R, the LOC on both ends of the Runway are located outside of the RSA. Furthermore, the LOC for the Runway 18 ILS is also located just outside of the RSA on the Runway 36 end. The LOC for the 24L ILS system, however, is located within the RSA off the Runway 6L end. Although the ideal solution is to move the LOC outside of the RSA, it would be very difficult to relocate the LOC on the extended 6R runway centerline due to the close proximity of the ROAD. Alternatives will be explored to mitigate this deficiency.

Recommendation:

- Perform routine maintenance on ground-based approach aid equipment.
- Relocate the GS outside of the ROFA for Runways 6L, 24R and 24L.
- Explore alternatives to mitigate the non-standard LOC within the Runway 6R-24L RSA.

4.5.3 Airfield Lighting

All runways at DAY are equipment with High Intensity Runway Lights (HIRL) Runways 6L, 24R, 24L and 18 are all equipped with an approach lighting system (ALS).

All runways at DAY, except for Runway 18, are equipped with Precision Approach Path Indicators (PAPIs). PAPIs help pilots maintain safe distances above hazardous objects. Furthermore, the visual aiming point provided by PAPIs reduce the probability of under and overshoots. Although it is not required for Runway 18 to be equipped with a PAPI, having a PAPI would greatly improve the safety of pilots approaching Runway 18 during VFR conditions.

Table 4-22 provides runway lighting and runway NAVAIDs at DAY.

Table 4-22: Runway Ligting and NAVAIDs

Runway	Runway Lights	ALS	PAPI	REILs
6L	HIRL	ALSF2: 2,400’	4 box: 3 degrees	N/A
24R	HIRL	MALSR: 1,400’	4 box: 3 degrees	N/A
6R	HIRL	N/A	4 box: 3 degrees	N/A
24L	HIRL	MALSR: 1,400’	4 box: 3 degrees	N/A
18	HIRL	MALSR: 1,400’	N/A	N/A
36	HIRL	N/A	4 box: 3 degrees	N/A

The airfield is equipped with LED and incandescent lighting. As edge lighting projects are in need of replacement, LED lights should be considered. LED lights exist on Taxiway R only currently.

Regarding taxiways, all taxiways at DAY are equipped with Medium Intensity Taxiway Lighting (MITL).

Recommendation:

- Perform routine maintenance on runway and taxiway lighting system, as needed.
- Replace lighting with LED lights as edge lighting projects come up.
- Construct PAPI on Runway 18 during the planning period.

4.5.4 Rotating Beacon

As stated in Chapter 2, a rotating beacon is located on the roof of the commercial terminal. During conversations with ATCT controllers, it was mentioned that the beacon light shines directly in the tower cab which negatively effects the controllers. It is important for the controllers view of the airfield to be unobstructed.

Therefore, alternate locations for the beacon should be explored in Chapter 5.

Recommendation:

- Explore alternate locations for the Airport Beacon.

4.5.5 Terminal Weather Aids

DAY's Automated Surface Observing System (ASOS) is located between Taxiway M , Z and south of Taxiway R. Per the FAA Order 6560.20C *Siting Criteria for Automated Surface Observing Systems (ASOS)*, the ASOS at its existing location is up to standard. No facilities violate the ASOS 500-foot critical area. Pilots can access weather information by dialing 937-415-6819.

Recommendation:

- Perform routine maintenance on the ASOS throughout the planning period as needed.

4.6 Airfield Signage

Currently there are several illuminated signs installed along the runways and taxiways at DAY. The airport recently completed an assessment of the signs. Taxiway location signs should be yellow text on black background with a yellow outline; while runway designation signs at the hold lines should be white text on a red background. **Appendix J** contains an assessment of the signs, which require corrective action, and will be included in the capital improvement program.

Recommendation:

- Replace signs that are faded, cracking or do not meet standards.
- Perform routine maintenance on airfield signage (signs that are leaning or require new lighting)

4.7 Terminal Building Requirements

As a commercial service airport the terminal building is a significant infrastructure that relates to the movement of passengers and baggage. The current terminal building consists of a central processing area separating into two concourses. There is a total of 21 bridges, and the terminal building totals approximately 350,000 square feet (SF). In 2015 the airport started with capital improvement project to improve the terminal building and passenger experience. The improvements completed to date include: newer terminal entrances, public entrance renovations, move rental cars from terminal to garage, add HVAC, ticketing finished renovation and upgrade baggage claim renovations., TSA checkpoint renovations. The Terminal Master Plan, was completed by LWC Incorporated (see **Appendix K**) outlining improvements to the terminal, divided into the following phases.

- Phase I: Partial roof replacement; restroom renovations. Terminal entrance replacement and terminal canopy renovations - Complete
- Phase II: Public Circulation Enhancements, TSA - Complete
- Phase IIIa: Enhance Concourse A
- Phase IIIb: Enhance Concourse B
- Phase IIIc: Terminal Access Drive
- Phase IVa: Concourse A Connector, Food Court and Escalator Lobby
- Phase IVb: Connector A Demolition
- Phase IVc: Connector B Demolition
- Phase IVd: Arrivals Bridge
- Phase V: Skylight Replacements
- Phase VI: Police Tenant Finish
- Phase VII: Administrative Tower
- Phase VIII: Inbound Baggage Carousel Improvements

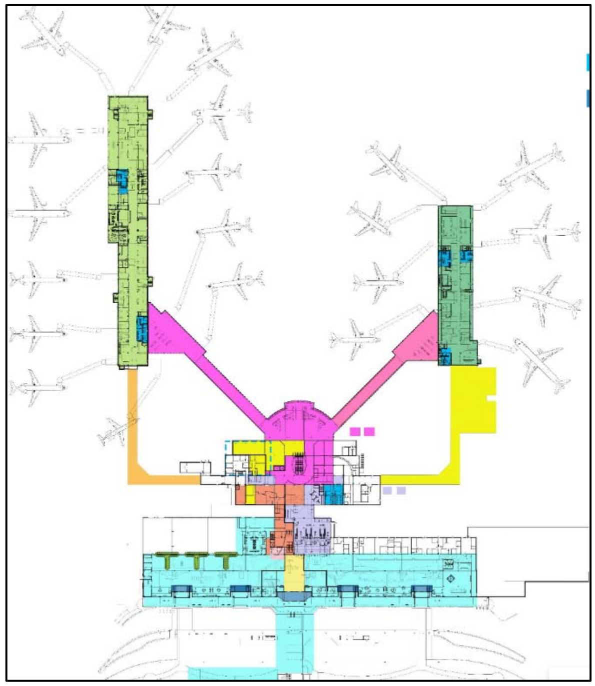


Figure 4-16. Terminal Rehabilitation Plan
Source: LWC Terminal Master Plan

In addition to the passenger terminal area, above the terminal building is an office tower that houses airport management and FAA/TSA personnel and other tenants. The lower level of the concourse are used for airline office.

Table 4-23 provides square footages for the terminal functional areas.

Table 4-23: Terminal Functional Areas

Terminal Functional Area	Existing Terminal Area (SF)
Passenger Boarding Gates	19 gates (3 shared)
Terminal Curb/Drop-off/Pick-Up (LF)	1700
Check-in/Ticketing	6 airlines with surplus
Outbound Baggage Makeup (SF)	3 inline lanes with 2 outbound carousels and one oversize (30,985 SF)
Passenger Security Screening Checkpoint (Lanes)	3 active lanes, can accommodate 6 lanes
Public space (upper concourses)	27,550 SF (in addition to gate hold space)
Gate Holding Space	24,743 SF
Other Functions/Tenants	267,434
Total Passenger Terminal	350,712

Source: Dayton International Airport PFC Application, 2015

4.7.1 Terminal Apron

Based on RDM's 2020 pavement study, the terminal apron is in "Serious" condition with a PCI range of 11-25. This PCI value was given to the terminal apron based on the amount of durability cracking observed. With the ongoing load related distresses and other factors that would rapidly deteriorate the terminal apron pavement, RDM predicts the terminal apron could have a PCI value of 5 by 2025.

4.7.2 Roadway Access and Parking Facilities

The roadway facilities assessment considers airport access and entrance road and circulation.

The Airport access is a defined access road from Interstate 75, named Dayton International Airport Access Road. There is also access from Route 40 into Dayton International Airport Access Road, which turns into Terminal Drive. This is a dedicated airport entrance road to/from the airport.

The airport entrance road and circulation providing access to the automobile parking, terminal building, air traffic control facility and cargo facilities. This one-way road is two lanes that travels in a counter clockwise direction. To the right of the entrance road is automobile parking, and access to Boeing Drive, which provides access to rental car staging areas and the cell phone lot. Heading toward the terminal building, on the corner is PSA headquarters on the right before the Economy Lot. As you drive toward the terminal building there is the short-term lot to the right and access to the parking garage to the left. Continuing around the airport access is a divided terminal curb, one on the terminal curb and a second further away from the terminal for TNC and shuttles. To the left of the terminal building is the employee parking lot and then the Air Traffic Control Center. Continuing away from the terminal building is PSA hangars and FedEx freight.

4.7.2.1 Parking Assessment

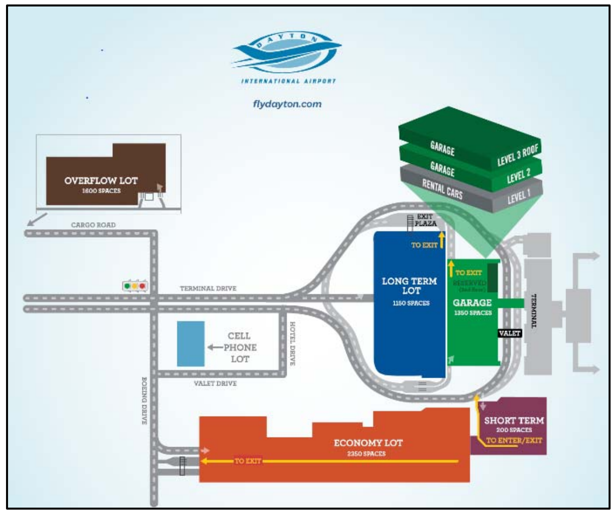
The airport is equipped with several surface lot parking lots along with a parking garage for passengers. In addition, there are surface lots for tenants and employees.

Table 4-24 breaks down the parking within the terminal area.

Table 4-24: Parking Lot Assessment

Parking Lot	Number of spots	Average Utilization
Economy Lot	2250	60%
Short Term Lot	200	5%
Blue Lot (Long Term)	1150	26%
Parking Garage*	1350	30%
Overflow Lot	1600	0%
Cell Phone Lot	206	-

Source: Passero Associates, City of Dayton, OH



*Parking garage: First floor dedicated to car rental. The car rental facility is attached to the parking garage along the roadway. Number of spots noted is for the 2nd and 3rd floors.

The cell phone lot is located off the entrance road near the intersection of Boeing Drive and Valet Drive.

A review of monthly parking data was conducted, based on 2019 data, prior to the effects of COVID. Based on historic information there is ample parking.

Recommendation:

- Maintain the terminal parking lots as needed.
- Reconstruct terminal apron pavement in the short-term.

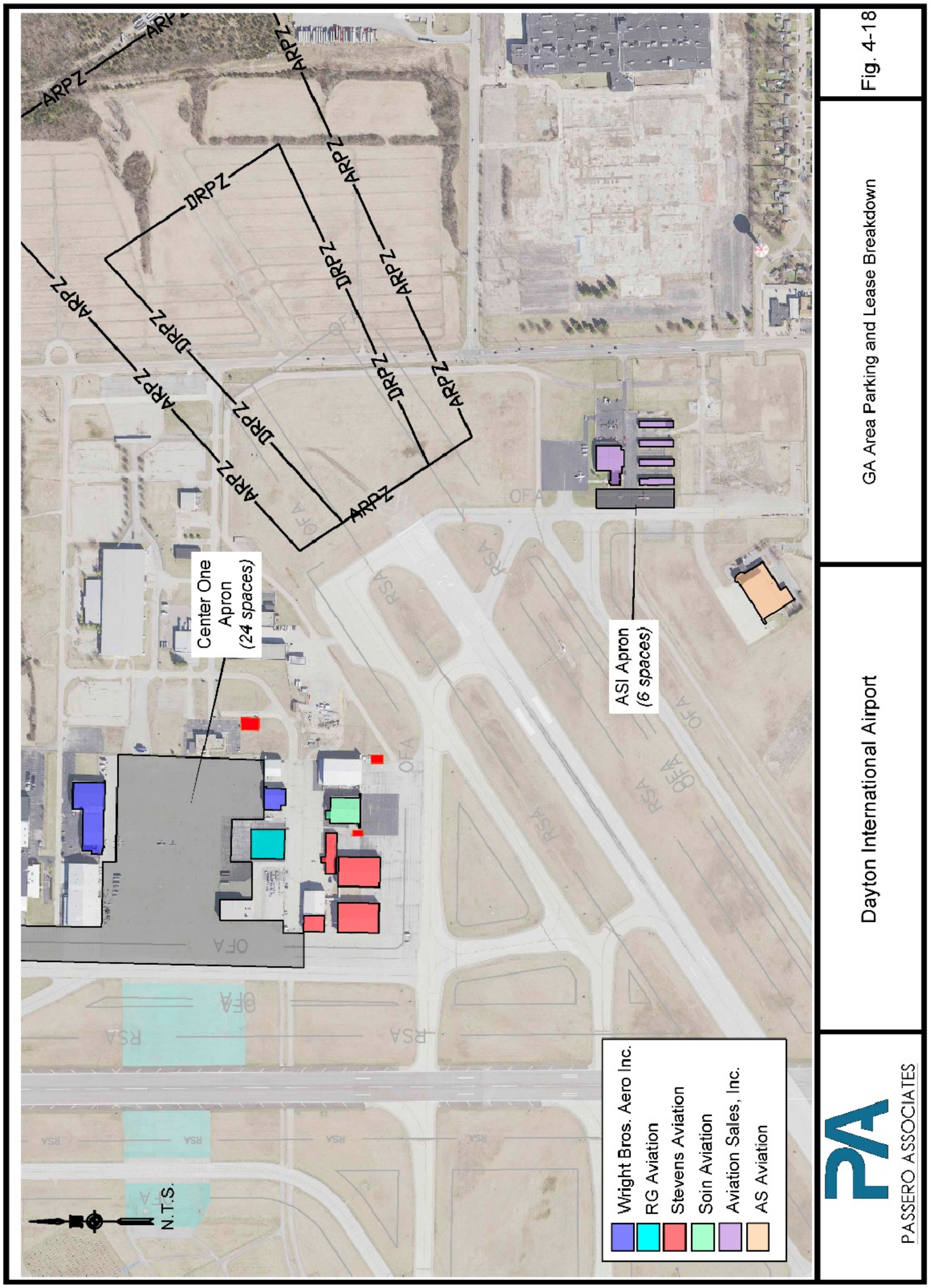
4.8 General Aviation and Landside Facility Requirements

Airside facility requirements are primarily predicated upon the level of aeronautical activities at an airport, the needs and desires of based aircraft owners, and the level of service an airport intends to provide to both its local and itinerant operators. The following sections will review a number of individual landside facilities at DAY and any specific requirements they may have over the planning horizon.

As mentioned in Chapter 2, DAY has three FBOs – Wright Bros. Aero Inc., Stevens Aviation, Inc., Aviation Sales, Inc. In addition to the three FBOs, three private aircraft owners – AS Aviation, RG Aviation, and Soin International Flight Department – also started leasing hangars at DAY. Although DAY listed 36 based aircraft for the base year during the completion of the forecast, the additional aircraft from the three private aircraft owners will be factored into the aircraft parking analysis to better understand GA aircraft parking demand at DAY.

Figure 4-18 provides a general overview and breakdown of the existing parking and lease areas for the three FBOs, and three private aircraft owners.

Figure 4-18.General Aviation Area Parking and Lease Breakdown



Source: FAA; Passero Associates

4.8.1 General Aviation Parking Apron Requirements

Given the wide variety of aircraft that can be categorized as General Aviation (GA) aircraft, planning GA aprons are largely dependent on aircraft parking and aircraft movement. GA aprons support a variety of functions, including parking and storage of based and itinerant aircraft, terminal access, fuel access, hangar access, and hangar utility.

At DAY, there are no based aircraft parked on the aprons. All based aircraft are parked in hangars. However, there is a total of 30 tie-down spaces available for itinerant operations located within the lease area of Aviation Sales Inc., and on the public apron (i.e., Center One apron) located between Wright Bros. Aero Inc. and Stevens Aviation, Inc.

Planning metrics to estimate the apron space required for itinerant aircraft parking are provided in the Airport Cooperative Research Program (ACRP) Report 96, *Apron Planning and Design Guidebook*. This report identifies that approximately 111 square yards of apron space should be provided for ADG I aircraft, 167 square yards for ADG II aircraft and 1,245 square yards for ADG III aircraft when an adjacent taxilane is provided. These square yardage measurements are the minimum requirements for each design group and do not account for aircraft maneuvering.

With the minimum square yardages in mind, there is a total of 4,662 s.y. available of apron space within the GA area at DAY. Because most GA aircraft that park on aprons are classified as ADG I, this square yardage number does not consider aircraft classified as ADG II or higher. However, parking is still available for these larger aircraft as they can occupy more than one tie-down, and there is a surplus of apron space available.

Table 4-25 calculates the future apron requirements using the following assumptions:

Adequate apron area must be reserved for all aircraft based on the apron as well as peak period itinerant aircraft without limiting access or utility of the adjacent hangars

The percentage of aircraft not stored in hangars (approximately 3.3 percent) will be maintained throughout the planning period.

The peak period for apron usage is calculated by applying a multiplier of 1.75 to the peak hour calculation for itinerant aircraft.

For planning purposes, it is assumed that larger aircraft will be parked in hangars and only ADG I aircraft will park on the apron.

As shown in the results above and based on the aeronautical forecast completed in Chapter 3, there is a surplus in aircraft apron parking spots. Furthermore, there could potentially be 20 available tie-down apron spaces available for itinerant aircraft in 2041.

Recommendation:

- Perform periodic pavement maintenance.

Table 4-25: Apron Area Requirements

	2021	2022	2026	2031	2041
Existing Based Aircraft Demand					
Based Aircraft	36	36	36	36	37
Additional Based Aircraft after forecast completion	6	6	6	6	6
Total Based Aircraft	42	42	42	42	43
Existing number of tie-down spaces Available	*30*	*30*	*30*	*30*	*30*
Based Aircraft on Apron (Existing Demand)	0	0	0	0	0
Total Apron Tie-Down Spaces Available for Itinerant Aircraft Demand	**30**	**30**	**30**	**30**	**30**
Itinerant Demand					
Itinerant Aircraft: Peak Period	5	5	5	6	6
Itinerant Aircraft: Peak Period Demand * 1.75	9	10	10	10	10
Total Itinerant Aircraft Demand	9	10	10	10	10
Total Based and Itinerant Aircraft During Peak Period	9	10	10	10	10
Surplus for Tie-Downs Available Throughout Planning Period	21	20	20	20	20
Available Apron SY	4662	4662	4662	4662	4662
Tie-Down Aircraft Demand	999	1110	1110	1110	1110
Surplus Apron SY Available Throughout Planning Period	3,663	3,552	3,552	3,552	3,552

Source: Passero Associates; ACRP 96; City of Dayton

4.8.1.1 Apron Pavement Condition

Based on RDM's 2020 pavement study, the public apron pavement adjacent to Stevens Aviation, Inc. and Wright Bros. Aero. Inc. FBOs is in fair to satisfactory condition (i.e., 56-85 PCI). The apron pavement adjacent to Aviation Sales, Inc. was not included in the RDM pavement assessment; however, was apron pavement was observed to be in good condition during the field observation.

Apron alternatives and phasing will be explored in Chapter 5.

Recommendation:

- Rehabilitate aprons adjacent to the FBOs in the mid to long-term.

4.8.2 General Aviation Hangars

Hangars are one of the most desirable means for aircraft storage at any airport when offered at reasonable rates. In general, hangar space is primarily used by aircraft based at an airport with only a small percentage used by itinerant traffic, generally for maintenance or overnight stays. Hangar types include a combination of the following facilities:

T-hangars – A t-hangar is a rectangular shaped building partitioned into numerous sections, often in the shape of a "T" that store multiple small single-engine or a light multi-engine aircraft.

Corporate Hangars – Corporate hangars usually have enough space to store multiple aircraft and include additional space for offices, restrooms, classrooms, conference rooms, break rooms storage and lobby areas.

Maintenance Hangars – Maintenance hangars can serve as a storage hangar and as a hangar for carrying out aircraft maintenance operations. The size of maintenance hangars depends on the size of the aircraft and the type of maintenance being performed. These hangars are often sized to accommodate multiple aircraft at once. These hangars also require space for tools, equipment storage, parts storage, offices, restrooms, and breakrooms. These spaces can either be constructed within the footprint of the hangar or as an external addition to the hangar.

Currently at DAY, all 42 based aircraft are parked in the various hangars. For planning purposes, the demand for each type of hangar will remain constant throughout the planning period (i.e., 33.3% demand for t-hangars, 19.0% demand for corporate hangars and 47.6% for maintenance hangars).
Table 4-26 provides a based aircraft hangar breakdown of each FBO and GA tenant who lease hangars at DAY.

Table 4-26: General Aviation Hangar Breakdown by FBO/Tenant

General Aviation Hangar Parking Breakdown by FBO/Tenant					
FBO/Tenant	Apron Tie-Downs/Space Parking	T-Hangar (units)	Corporate Hangar (units)	Maintenance Hangar Units	**Total Based Aircraft**
Wright Bros. Aero Inc.	0	0	0	10	**10**
Stevens Aviation, Inc.	0	0	0	4	**4**
Aviation Sales, Inc.	0	14	0	6	**20**
AS Aviation	0	0	3	0	**3**
RG Aviation	0	0	2	0	**2**
Soin International Flight Department	0	0	3	0	**3**
Total	**0**	**14**	**8**	**20**	**42**
% Hangar Breakdown	***0.0%***	***33.3%***	***19.0%***	***47.6%***	

Source: Passero Associates; City of Dayton

As shown in the table above there are different types of hangars that are being used. From field observations, the corporate and maitnenance hangars appeared to be full for each FBO and tenant. There did appear to be available T-Hangar units. Therefore, for planning purposes, an assumption was made that all available corporate and maintenenance hangar parking units are occupied.
Table 4-27 provides a breakdown of the hangar needs at DAY throughout the planning period.

Table 4-27: Hangar Facility Requirements

Element	2021	2022	2026	2031	2041
T-Hangar Demand (33.3% throughout planning period)					
T-Hangar Units Available	20	20	20	20	20
Based Aircraft T-Hangar Hangar demand	14	14	14	14	14

T-Hangar Surplus/(Deficiency)	***6***	***6***	***6***	***6***	***6***
Corporate Hangar Demand (19% throughout planning period)					
Corporate Hangar Units Available	8	8	8	8	8
Based Aircraft Corporate Hangar demand	8	8	8	8	8
Corporate Hangar Surplus/(Deficiency)	***0***	***0***	***0***	***0***	***0***
Maintenance Hangar Demand (47.6% throughout planning period)					
Maintenance Hangar Units Available	20	20	20	20	20
Based Aircraft Maintenance Hangar demand	20	20	20	20	20
Maintenance Hangar Surplus/(Deficiency)	***0***	***0***	***0***	***0***	***0***

Source: Passero Associates; City of Dayton

As shown in the results above, hangar demand is expected to remain stable over the 20-year planning period, resulting from very little change in based aircraft forecast between 2021 through 2041.

However, it should be noted that actual aviation activity within the planning period may be different than what was forecasted; therefore, hangar demand may be higher or lower than what is projected in the table above. As such, aircraft parking hangars should be built at DAY as warranted by demand.

Recommendation:

- Construct additional hangars at DAY as demand is warranted.

4.8.3 General Aviation Vehicle Parking and Access

At many general aviation airports, it is common for vehicles to park in the hangar facilities while the aircraft are in use. In some cases, vehicles are left on the aircraft parking apron during a flight or trip. This practice should be avoided whenever possible as it only increases the number of automobiles on the airside of the airport; thus, risking an incident between an aircraft and a vehicle. For these reasons, vehicle parking is an important facility to provide at an airport.

The parking lot adjacent to the FBO building currently has 280 vehicle parking spaces, including handicap parking spaces within the GA area. As operations at DAY increase demand will also increase for vehicle parking spaces.

Table 4-28 provides the vehicle parking breakdown for each FBO.

Table 4-28: GA Parking Space Breakdown per FBO/Tenant

FBO/Tenant	Parking Spaces Available at DAY in GA Area
Wright Bros. Aero Inc.	96
Stevens Aviation Inc.	76
Aviation Sales, Inc.	47
AS Aviation	44
RG Aviation	0
Soin International	17
Total	**280**

Source: Passero Associates; Woolpert; ACRP 25; ACRP 113; GSASP

To aid in the vehicle parking analysis for DAY, the ACRP 25 *Airport Passenger Terminal Planning and Design vol. 1*, ACRP 113 *Guidebook on General Aviation Facility Planning* and the GSASP were referenced. The results were listed in **Table 4-29**, and assumed the following assumptions:

Vehicle Parking demand will grow at the same rate as aviation demand;

2.5 parking spaces for every peak hour operation; and

1 space per 200 sf of office space (5 spaces minimum).

Table 4-29: General Aviation Vehicle Parking Analysis

	Peak Hour Operations	Parking Spaces for Every Peak Hour Operation	Total Number of Parking Spaces	Office Space Parking Requirement	Total Vehicle Parking Demand	Total Parking Spaces at DAY (Airport and Public)	Surplus/ (Deficiency)
Base Year							
2020	6.8	2.5	17	5	22	280	258
Forecast							
2021	6.8	2.5	17	5	**22**	**280**	258
2025	6.8	2.5	17	5	**23**	**280**	257
2030	6.9	2.5	17	5	**24**	**280**	256
2040	7.0	2.5	18	5	**26**	**280**	254

Source: Passero Associates; City of Dayton

Based on the analysis and forecast from Chapter 3 and Table 4-29, the existing parking lot within the GA area has a great supply of surplus parking and is projected to supply a sufficient number of vehicle parking throughout the 20-year planning period.

Recommendation:

- Maintain the parking lots within the General Aviation areas as needed.
- Recommend maximizing parking spaces by clearing objects from the parking lots.

4.9 Support Facility Requirements

This section will examine the facility needs for fuel, maintenance, security and fencing, and wildlife.

4.9.1 Air Traffic Control Tower (ATCT)

The ATCT was recently constructed in 2008 to a cab height of about 200 feet. It is located on the north side of Terminal Drive. The tower is operated 24/7.

Recommendation:

- No improvements to ATCT are recommended.

4.9.2 Airport Rescue and Fire Fighting

As stated in Chapter 2, the ARFF facility is located east of the terminal building along Taxiway A. The ARFF at DAY is an Index of C.

Regarding ARFF equipment, it should be replaced when the useful life is exhausted. Maintenance records should be kept for all repairs which will aid in the justification to upgrade the equipment, when needed.

The ARFF ramp adjacent to Twy A is a large area in which the pavement was observed to be in very poor condition during the field visit. Alternatives will be explored in Chapter 5 to reconstruct the ARFF apron pavement.

Recommendation:

- Replace ARFF equipment as useful life expires.
- Reconstruction of ARFF apron pavement is needed.
- Minimize pavement at the intersection of ARFF parking and Twy A.

4.9.3 Airfield Maintenance and Snow Removal Equipment (SRE)

As a Part 139 airport, the airport is required to maintain equipment necessary to keep the airport operational, for both grass cutting and snow removal. The airport maintains a Priority 1 snow removal area, and has 36 pieces of equipment in inventory to meet the demand. The equipment is kept in the snow removal building, located between McCauley, Maintenance Drives. The new building houses the sand and salt and equipment. A full list of the equipment can be found in Chapter 2, *Inventory of Existing Conditions.*

Airfield maintenance is off Wright Drive, on two buildings used to store additional airfield maintenance equipment, near the Runway 24L runup area. There is a separate building that is used to house supplemental airport equipment that is off McCauley Road off an access road, outside the fence with airfield access through a gate that ties into the perimeter fence.

Recommendation:

- Routine maintenance of existing facilities at DAY.

4.9.4 Holding Bay

A holding bay is an area where an aircraft can park outside the taxiway, so another aircraft can pass them. They can enhance capacity. When runway operations reach a level of 30 departures per hour. Presently there is a holding bay at the intersection of Taxiway Z and Taxiway R. While the runway doesn't meet the per hour demand, this holding bay provides critical operational flow to the primary runway.

Recommendation:

- Rehabilitate the holding bay when it reaches its useful life.

4.9.5 Deicing Aprons

Airports that are experience icing conditions will use deicing materials to spray down the aircraft prior to departure. This fluid is captured into deicing lagoons at the airport. There are two areas on the airport:

- On the north side of the terminal ramp there are 5 spaces available
- On the east side of the terminal ramp there are 3 spaces available

Recommendation:

- Continue to maintain the deicing lagoons and catch basins.

4.9.6 Fuel

There are several fueling systems on the airport. The main fueling system is located along Cargo Road and Freight Drive. This system pumps fuel to the cargo apron. The other main system is located in the general aviation area near the FBOs. This system is owned by Steven's Aviation and Wright Brother's. The FBOs provide fueling services for the airlines, in which the fuel service is available 24 hours a day/7 day a week. And dispensed via truck. Fuel supply is sufficient to accommodate current aviation demand.

Recommendation:

- Add additional fuel tanks/tankers if demand persists within the planning period.

4.9.7 Airfield Electrical Vault

The airport has two electrical vaults. One is in the basement of the terminal building and provides electricity to the east side of the airport. This equipment is dated. The other vault is infield, off the main terminal apron between the Taxiway U and Taxiway M. This vault mostly regulates the remaining airfield and the ATCT. All electrical demand is satisfied by both electrical vaults at DAY. The regulators should be monitored for upgrades. The addition of LED lighting will diminish the electrical load.

Recommendation:

- Perform routine maintenance and/or equipment replacement as demand is persists within the planning period.
- Upgrade constant current regulators within the planning period if demand persists.

4.9.8 Maintenance Repair and Overhaul Facilities

As stated in Chapter 2, airport maintenance is conducted by the FBOs, where more specifically, Stevens Aerospace provides maintenance and Maintenance Repair and Overhaul (MRO) operations. PSA provides full-service maintenance operations for American Airlines, which is appropriate because they are a subsidiary to American. Air Wisconsin performs maintenance operations for their aircraft. Furthermore, the old Emery building is currently used for non-aviation business. However, the apron area is being redeveloped for large SNC hangars. Additional facilities should be shown on the airport based on conversations with this entity.

Recommendation:

- Explore multiple MRO facility development on the former Emery cargo ramp.

4.9.9 Security and Fencing

Security fencing is the most common means of securing a perimeter of an airport. As shown in **Figure 4-10**, security fencing is primarily within the terminal area, leaving much of the rest of the airport open. As stated in the DOT/FAA/AR-00/52 R*ecommended Security Guidelines for Airport Planning, Design and Construction* chain link fencing is typically six to seven feet of fabric with one foot of 3 strands of barbed wire on top.

As the Airport is developed in the future, permanent separation between the airside and landside operations needs to be maintained. As such, there is perimeter fencing all around DAY made up of chain link material with barb wire. The fence stands total 12 feet tall (2 feet buried and 10 feet above ground) with 2 feet barbed wire atop the fence. The airfield is secured by airfield police and operations personnel. The fence along the Center One area (east side of the airport) is 6 feet tall with three rows of barb wire.

At the terminal, airport police and TSA secure the facility. Airport employees and badged personnel follow strict protocols when entering/exiting the secure side of the airport. Furthermore, TSA undergoes a thorough check on all checked and carry-on bags. In the case of flagged bag, TSA and airport police will interview passenger and determine next steps.

Non-badged contractors working within the Airport Operating Area (AOA) must be escorted by an authorized badged "positive" escort. Positive escort means that the non-badged person must be always within sight and sound of the badge holder.

Anyone who has applied for a badge and been denied cannot be escorted. Furthermore, anyone who has been issued a badge and lost it, cannot be escorted.

The fencing and security system at DAY is up to standards based on the DOT/FAA guidelines, and is functioning adequately.

Recommendation:

- Regularly check and test security protocols and correct potential security breaches.

4.9.10 Wildlife

The FAA has had a wildlife hazard management program in place for more than 50 years. This program focuses on mitigating wildlife hazards on or near airports through habitat modification, harassment technology, and research. The program continues to evolve and includes a number of advisory circulars, best management practices, and resources to assist airports. The current focus is for Airports to complete a site-specific wildlife hazard assessment (WHA) which systematically documents all potential wildlife threats on or in the vicinity of the airport.

A WHA was completed at DAY in 2017 to mitigate, deter and monitor potential wildlife hazards. White-Tailed deer were observed outside the perimeter fence, but none inside the perimeter fence. Furthermore, blackbirds (starlings, red-winged blackbirds, and brown-headed cowbirds) and doves (mourning doves and pigeons) were identified as the most hazardous species at DAY. The airfield turf and bare areas were noted as the most attractive habitats for these species groups.

To ensure the safety of the airport users from potential wildlife incursions, an action plan was developed and implemented at the Airport organized into a matrix. This matrix lists a WHA recommendation (e.g.,

Remove forested areas within the perimeter fence); a plan for implementation; priority of recommendation; target date of implementation or status; and, who is responsible for implementation.
Airport personnel is actively implementing recommendations from this matrix to minimize wildlife incidents.
Regarding wildlife incursions into the AOA, Airport staff recorded 542 wildlife sightings and 56 wildlife strikes, in which the majority of these pertain to bird sightings and strikes. The Airport has recorded coyote sightings on the airfield, but very minimal deer sightings.
DAY is evaluating its WHA plan regularly and uses a cannon to deter bird activity on the airfield.
Recommendation:

- Actively update the existing WHA plan as needed.

4.10 Facility Requirements Summary

This facility requirements for Dayton International Airport are shown in **Tables 4-30** and **4-31.** The table identifies the key elements divided into airside and landside improvements.

Table 4-30: Summary of Facility Requirements

SUMMARY OF FAILITY REQUIREMENTS	
RUNWAYS	• Maintain Runway 6L-24R at a length of 10,900 feet. • Maintain Runway 18-36 at its existing runway length of 8,502 feet. • Maintain the parallel Runway 6R-24L at its current runway length of 7,285 feet. • Maintain existing widths of all Runways – each at 150 feet wide. • Short-Term: Perform rehabilitation on the Runway 24R and 24L blast pads within the short-term portion of the planning period. • Mid/Long-Term: Perform preventative maintenance as needed for Runways 6L-24R, 6R-24L and 18-36. Perform rehabilitation in the long-term, if needed. • Review alternatives to address design standards for the RSA, ROFA, RPZ, RVZ and ROFZ for all three runways at DAY. • Monitor all activities on West National Rd., Lightner Rd., North Dixie Dr., Peters Pike, and Dog Leg Rd. where they intersect with the Runway RPZs. • It is recommended that the Runway 36 threshold be relocated to ensure that buildings are no longer within the RPZ. • Relocate Runway 6R threshold 116 feet to create 600 feet prior to threshold for the ROFA • Apply declared distances for each runway, where applicable. • Mitigate FAA hotspot at the intersection of Runway 6R-24L, Taxiway D and Runway 36. • Discuss with flight procedures to re-designate Runway 18-36 to 1-19 • Perform periodic maintenance on runway markings • Remark pavement is Runway end is shifted. • Perform routine maintenance on runway lighting systems, as needed, replace edge lighting with LED as needed.
TAXIWAYS	• Mitigate non-standard taxiway geometry to help improve taxi operations. • Perform maintenance (i.e., rehabilitation and reconstruction) on the taxiways within the 20-year planning period. • Perform maintenance on markings as painting fades to maintain adequate visibility. • Perform routine maintenance on taxiway lighting systems, as needed
AIRFIELD FACILITIES	• Perform routine maintenance on ground-based approach aid equipment. • Explore alternatives to mitigate the Glideslope outside of the ROFA for Runways 6L, 24R and 24L. • Explore alternatives to mitigate the LOC within the Runway 6R-24L RSA. • Construct PAPI on Runway 18 during the planning period. • Explore alternate locations for the Airport Beacon. • Replace signs that are faded, cracking or do not meet standards. • Perform routine maintenance on the ASOS throughout the planning period as needed.

	• Perform routine maintenance on airport signage (signs that are leaning or require new lighting). • Maintain the terminal parking lots as needed. • Reconstruct terminal apron pavement in the short-term. • Rehabilitate aprons adjacent to the FBOs in the mid to long term. • Construct additional hangars at DAY as demand is warranted. • Maintain the parking lots within the general aviation areas as needed. • Recommend maximizing parking spaces by clearing objects from the parking lots.

Source: Passero Associates

Table 4-31: Summary of Facility Requirements Cont'd.

SUMMARY OF FACILITY REQUIREMENTS Cont'd.	
AIRFIELD SUPPORT FACILIITIES	• Replace ARFF equipment as useful life expires. • Reconstruct ARFF apron pavement. • Minimize pavement at the intersection of ARFF parking and Twy A. • Routine upkeep of existing maintenance facilities at DAY. • Rehabilitate the holding bay when it reaches its useful life. • Continue to maintain the deicing lagoons and catch basins. • Add additional fuel tanks/tankers if demand persists within the planning period. • Perform routine maintenance and/or electrical equipment replacement as demand is persists within the planning period. • Upgrade constant current regulators within the planning period if demand persists. • Explore multiple MRO facility development at the former Emery cargo ramp. • Regularly check and test security protocols and correct potential security breaches. • Actively update the existing WHA plan as needed.
GENERAL AVIATION FACILITIES	• Perform periodic pavement maintenance on general aviation aprons. • Rehabilitate aprons adjacent to the FBOs in the mid to long-term. • Construct additional hangars at DAY as demand is warranted. • Maintain the parking lots within the general aviation areas as needed. • Recommend maximizing parking spaces by clearing objects from the parking lots.
MISCELLANEOUS	• Obstructions that were identified above the threshold siting surface should be planned for removal or mitigation.

Source: Passero Associates

Chapter 5:

Alternative Identification And Analysis

This section of the Master Plan presents a comparison of airport development alternatives that meet aviation needs over the 20-year planning period, while satisfying the ultimate development goals for Dayton International Airport and the Sponsor.

The goal of this chapter is to identify a preferred alternative, which will be the main driver of the future projects identified on the Airport Layout Plan (ALP).

Airport facilities in this chapter will be organized as follows, highlighted in the scope of service:

- No Action ("Do Nothing") Alternative
- Airside Development Alternatives
  - Overall Airfield Geometry Analysis
  - De-coupling of Runway 18-36 and 6L-24R Alternatives
  - Runway 6L Extension Alternatives
  - Declared Distances Alternatives
  - Runway Protection Zone and Roadway Alignment Alternatives
  - Alternative Obstruction Analysis
- Terminal Apron Geometry Analysis
- Landside Development Alternatives
  - Cargo Facilities Alternatives
  - Commercial Development Analysis
- Preferred Development Alternatives

5.1 Airside Development Alternatives

Airside or Airfield facilities are the operational focal point of an Airport. More specifically, the runway and taxiway systems of an airfield generally require the greatest commitment of land area and often have the greatest influence on the identification and development of related airport facilities.

The following sections outline a variety of development options, necessary facilities, and spatial requirements to facilitate safe and improved airport operations.

Based on facility needs outlined in Chapter 4, some airfield improvements are required at the Airport to meet FAA design and safety standards and to ensure compliance with federal grant assurances.

The sections that follow will identify development alternatives to address airfield needs. It should be noted that not all airfield needs require consideration of airport development alternatives, as some of these needs will simply be addressed and corrected.

5.1.1 The No Action (or "Do Nothing") Alternative

As a baseline comparison, the No Action alternative is presented for consideration. This alternative is presented to maintain the airport within its' existing state of development. Therefore, no new (or improved) facilities are proposed for DAY in this alternative and the existing facilities would be maintained in their current location. Potential benefits and impacts are:

Benefits:

- *Development costs limited to future rehabilitation and maintenance costs.*

Impacts:

- *Runway 6L-24R and 18-36 safety area overlap will still exist.*
- *Airfield geometries do not meet the current FAA guidelines.*
- *The designate "hotspot" at Runway 18-36 and Taxiway H remain.*
- *Declared distances for Runway 6R-24L not updated, ROFA not standard.*

5.1.2 Overall Airfield Geometry Analysis

Proper airfield geometry is a primary contributing factor to reducing potential for runway incursions that are caused by lack of pilot situational awareness. As discussed in Chapter 4, DAY has airfield geometries that do not meet current FAA design standards. To eliminate an increased risk for runway incursions, providing taxi path routes that avoid wide expanses of pavement and do not directly connect an apron to a runway; parallel taxiway adjacent to apron pavement; acute angles at intersecting taxiways were examined as part of the overall airfield geometry analysis. Similarly addressing the area identified as a hot spot, which is the intersection of Runway 36/Taxiway H.

Areas that were examined specifically included: entrance taxiways intersecting runways at other than a right angle; complex runway/taxiway intersections; and direct access risk from apron to runway. Addressing these issues will minimize the risk for runway incursions.

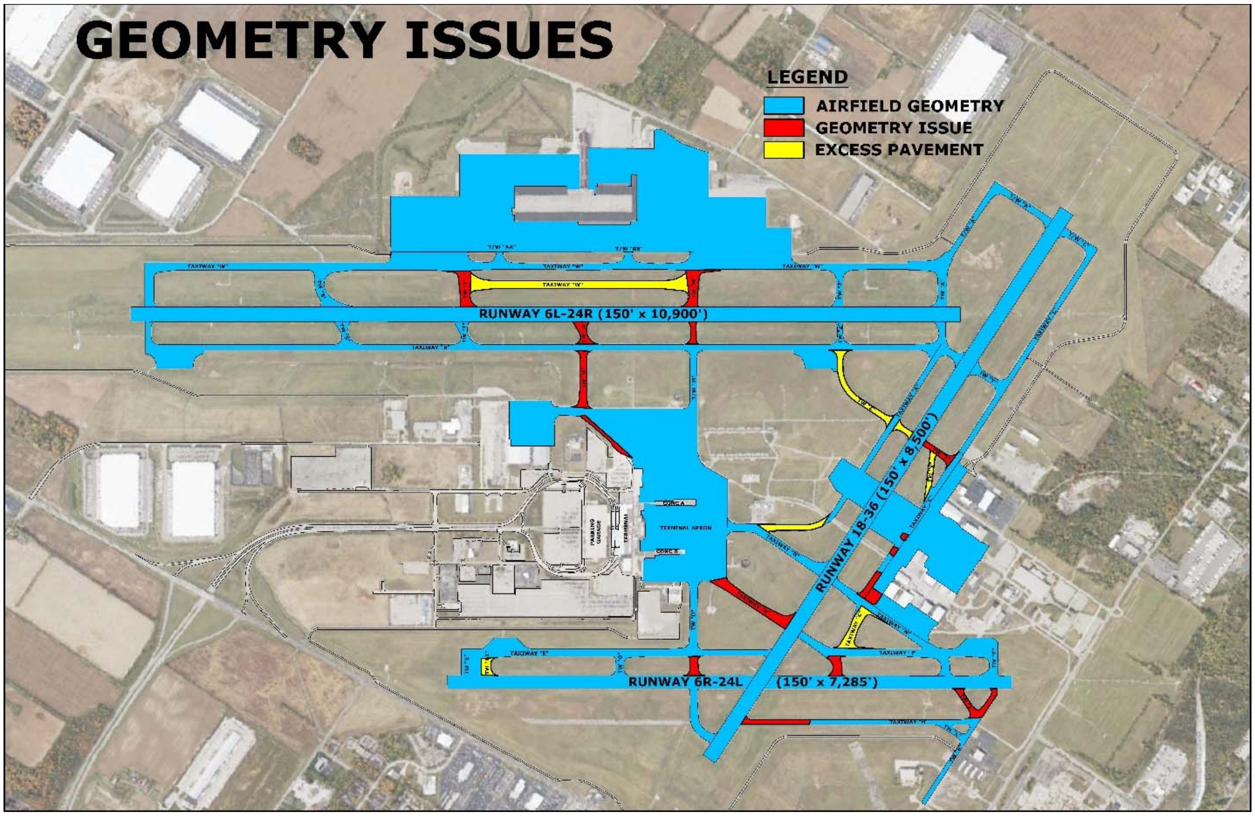
Standard practices include:

- Consider hotspot mitigation
  - Runway 18-36 and Taxiway H
- Consider short stub taxiways
  - General aviation apron and Taxiway C
- Consider direct taxiing access to runways from ramp areas:
  - Taxiway M direct connection from Taxiway R to Runway 6L-24R
  - Taxiway U direct connection from Taxiway E to Runway 6L-24R
  - Taxiway T from cargo apron to Runway 6L-24R
  - Taxiway M from cargo apron to Runway6L-24R
  - Taxiway D from Terminal Ramp to Runway 6R-24L
  - Taxiway B from Terminal Ramp to Runway 18-36
  - Taxiway Z from General Aviation ramp to Runway 18-36
- Consider aligning taxiway entering runway ends
  - Taxiway K to Runway 24L
  - Taxiway J from Transient Parking to Runway 6R-24L
  - Taxiway D at Runway 36
- Consider non-standard marking and/or signage placement
  - Taxiway C at Taxiway N
- Consider more than three-node taxiway intersections
  - Taxiway B and Taxiway C and Taxiway F
- Consider taxiway intersection runways at other than a right angle
  - Taxiway E at Runway 18-36
- Consider line of sight from the air traffic control tower to the airfield

  - Taxiway U from the terminal apron to Taxiway R has a line-of-sight issue for the air traffic control tower, who are unable to see a portion of the terminal apron and Taxiway U because of the cab base on the air traffic control tower.
- Consider Y shaped taxiways
  - Taxiway H, J and K
- Consider removing excess pavement
  - Taxiway W (infield) between Taxiway U and M;
  - Taxiway V between the general aviation ramp and Taxiway Z
  - Connector Taxiway E1
  - Taxiway Z from Taxiway R to Taxiway A
  - Taxiway A at Taxiway N

Figure 5-1 graphically represents the findings of airfield geometry that does not meet current design standards.

Figure 5-1: Airfield Geometry



To remediate the above-mentioned geometry issues, some steps can be undertaken to meet design standards, regardless of the runway configurations, while some are part of a runway alternative, will be identified below, and discussed in the next section.

- Hotspot: Remove Taxiway H direct connection to Runway 18-36 – alternatives are provided in the Runway alternatives section
- Short stub taxiways – separate Taxiway C away from the general aviation apron

- Direct taxiing access to runways from ramp areas:
  - Remove Taxiway M direct connection from Taxiway R to Runway 6L-24R
  - Remove Taxiway U direct connection from Taxiway E to Runway 6L-24R
  - Construct new connector taxiway between Taxiway M and Taxiway U
  - Paint an island on Taxiway W at Taxiway T and Taxiway M to force a turn onto connector taxiway
  - Remove Taxiway D between Taxiway E and Runway 6R-24L
  - Taxiway B from Terminal Ramp to Runway 18-36 – alternatives are provided in the Runway alternatives section
  - Taxiway Z from General Aviation ramp to Runway 18-36 – realignment of Taxiway C will separate the direct connection
- Consider aligning taxiway entering runway ends
  - Realign Taxiway K to Runway 24L to 90 degree turn
  - Remove Taxiway J
  - Realign Taxiway D to Runway 36 for proper alignment
- Consider non-standard marking and/or signage placement
  - Realign Taxiway C at Taxiway N allowing sufficient room for proper signage
- Consider more than three-node taxiway intersections
  - Realign Taxiway C to form right angle, extend to Taxiway H
- Consider taxiway intersection runways at other than a right angle
  - Taxiway E at Runway 18-36 - alternatives are provided in the Runway alternatives section
- Consider line of sight from the air traffic control tower to the airfield
  - Realign Taxiway U to the east to provide line of sight from the air traffic control tower.
- Consider Y shaped taxiways
  - Remove Taxiway J, realign Taxiway K to Runway 24L
- Consider removing excess pavement
  - Remove Taxiway W (infield) between Taxiway U and M;
  - Remove Taxiway V between the general aviation ramp and Taxiway Z
  - Remove Connector Taxiway E1
  - Taxiway Z from Taxiway R to Taxiway A - alternatives are provided in the Runway alternatives section
  - Taxiway A at Taxiway N - alternatives are provided in the Runway alternatives section

5.1.3 Runway Alternatives

Three alternatives were reviewed with Airport staff, with a brief description for each below, and the presentation found in **Appendix L.** This section examines the following elements to culminate in a preferred runway alternative. Key elements of the alternatives were to address geometry issues, and eliminate overlapping Runway Safety Areas (RSA). Per AC 5300-13B, the recommended practice is to "*configure runway ends for the optimum condition of independent RSAs*." When RSAs overlap they introduce safety risks and potential operational limitations. As is the case for Runway 18-36 and Runway 6L-24R, the RSA's overlap. To meet this objective the following alternatives were examined.

The alternatives were prepared based on the following considerations:

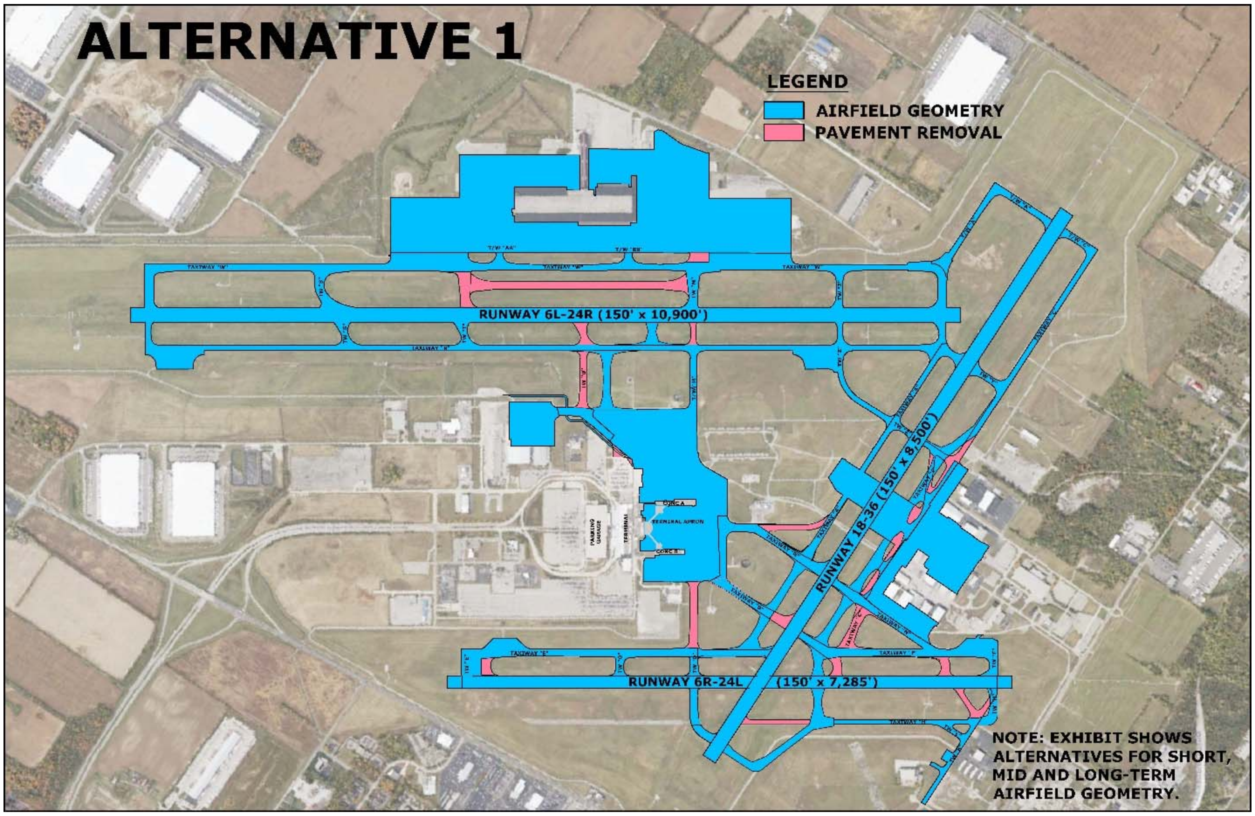
- **Alternative 1**: Maintaining the runway configuration and only addressing pavement geometry issues identified in the previous chapter.
- **Alternative 2**: De-couple Runway 18-36 and 6L-24R to eliminate overlapping RSA, and address geometry issues.
- **Alternative 3**: De-couple Runway 18-36 and 6L-24R and 6R-24L to eliminate overlapping RSA, and address geometry issues.

Each alternative will be described with the key elements included within the alternative, followed by a graphic representation of the alternative. The alternatives provide a complete picture, since the individual components are connected action, meaning that what happens to one runway end will impact the taxiways that connect to that runway, along with the relocation of NAVAIDs and need for new instrument approach procedures. Following the third alternative further descriptions of each element are provided.

Alternative 1

This alternative maintains the runways in their existing configurations. **Figure 5-2** graphic provides a complete picture of this alternative.

Figure 5-2: Alternative 1

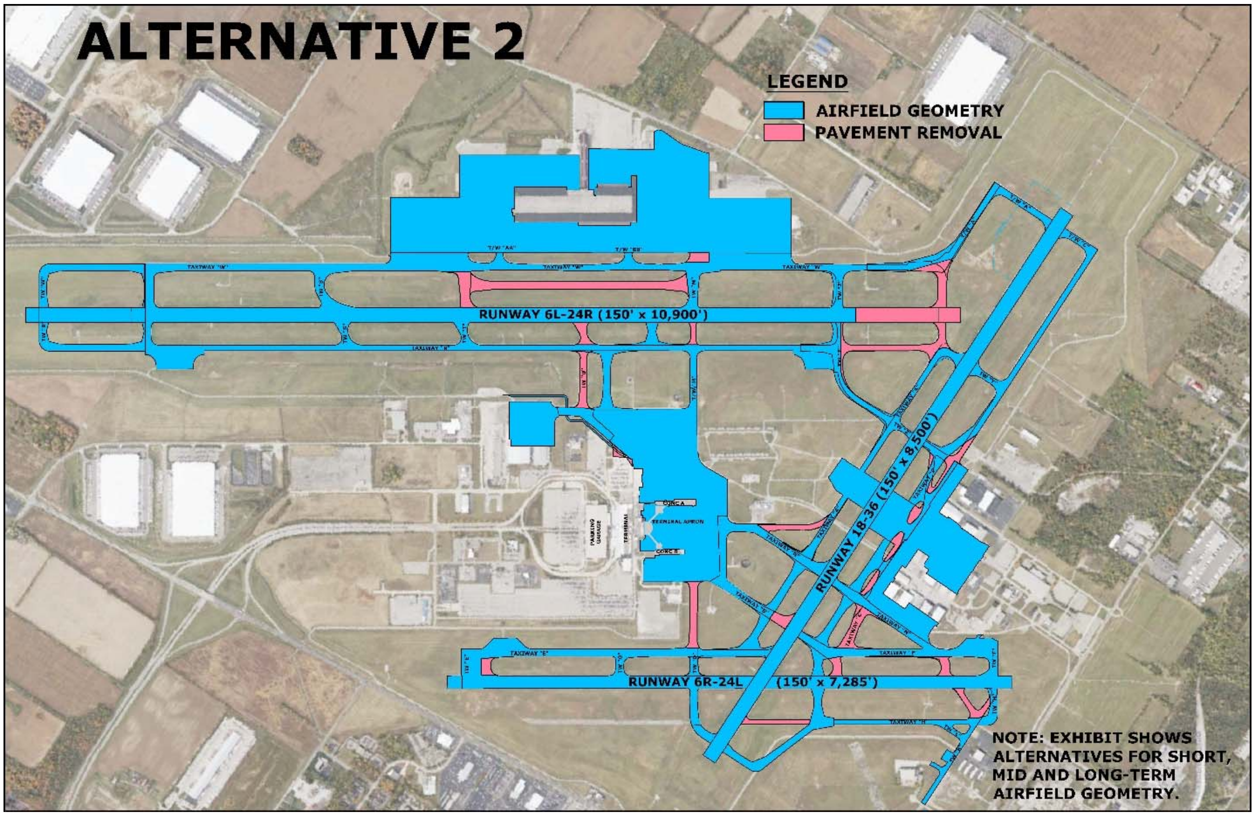


Elements of this alternative include:

- Maintains the existing runway lengths
- Removal of Taxiway U (direct connection from apron to Runway, and line of sight issue from ATCT)
- Constructing new Taxiway U
- Remove Taxiway M connector between Twy R and Runway 6L-24R, construct new connector
- Removal of Taxiway A curve
- Extend parallel Twy A to Taxiway E
- Remove connector Taxiway B from extended Taxiway A to Runway 18-36
- Removal of pavement to eliminate direct apron to Runway access: Taxiway D, M, N and S
- Removal of excess partial parallel Taxiway W, between Taxiway M and S
- Removal of Twy Y
- Removal of connector E1
- Removal of Taxiway J
- Removal of Taxiway K and realign to Runway 24L runway end
- Realignment of Taxiway C, closer offset to Runway 18-36 to separate the apron and taxiway
- Realignment of Taxiway C, right angle to Runway 6R-24L
- Removal of Taxiway H at Runway 36 intersection (hotspot), from relocated Taxiway C to Runway 36
- New connector to Runway 36 end (eliminate hotspot)

Alternative 2
This alternative maintains the runways in their existing configurations. The **Figure 5-3** graphic provides a complete picture of this alternative.

Figure 5-3: Alternative 2



Elements of this alternative include:

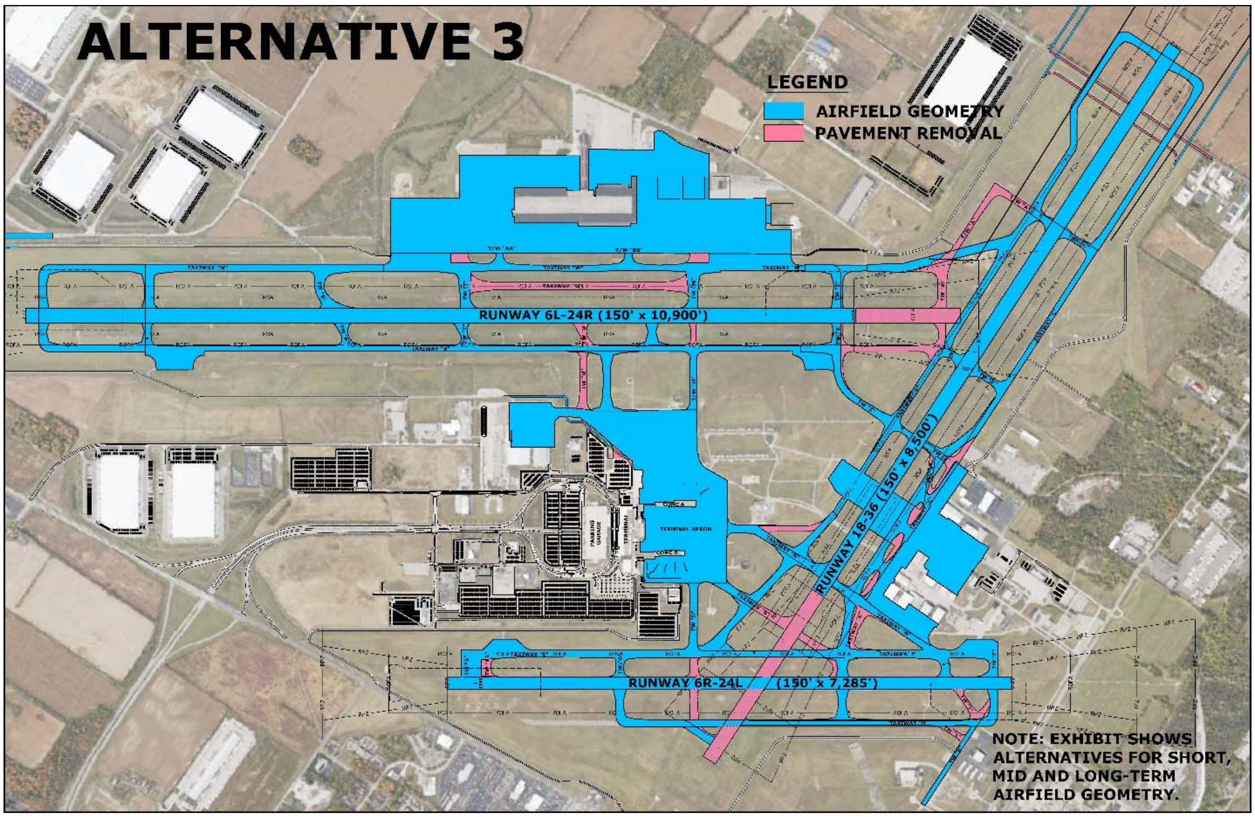
- Decoupling Runway 6L-24R and 18-36, placing pavement removal length onto Runway 6L, remove runway and portions to Taxiway A, off Runway 24R end and partial parallel Taxiway R
- Maintain runway lengths
- Removal of Taxiway U (direct connection from apron to Runway, and line of sight issue from ATCT)
- Constructing new Taxiway U
- Removal of connector Taxiway M, construct new connector Taxiway
- Removal of partial Taxiway A, extend parallel Twy A to Taxiway E
- Removal of pavement to eliminate direct apron to Runway access: Taxiway D, M, N, S
- Removal of excess partial parallel Taxiway W, between Taxiway M and S
- Removal of Taxiway A curve
- Removal of connector Taxiway B between Taxiway A and Runway 18-36
- Removal of Twy Y
- Removal of connector E1

- Removal of Taxiway J
- Removal of Taxiway K and realign to Runway 24L runway end
- Realignment of Taxiway C, closer offset to Runway 18-36 to separate the apron and taxiway
- Realignment of Taxiway C, right angle to Runway 6R-24L
- New connector to Runway 36 end (eliminate hotspot)
- Removal of Taxiway H at Runway 36 end (hotspot) at relocated Taxiway C

Alternative 3

This alternative maintains the runways in their existing configurations. The **Figure 5-4** graphic provides a complete picture of this alternative. This alternative provides the long-term development plan for the airport after decoupling both Runway 6L-24R and 6R-24L from Runway 18-36.

Figure 5-4: Alternative 3



Elements of this alternative include:

- Decoupling both Runway 6L-24R and 6R-24L from Runway 18-36, placing pavement removal length from the decoupled end onto the opposite end of the runway
- Remove runway and portions to Taxiway A, off Runway 24R end and partial parallel Taxiway R
- Maintain runway lengths
- Realign Taxiway A from new Runway 18 end to Taxiway E
- Removal of Taxiway U (direct connection from apron to Runway, and line of sight issue from ATCT)

- Constructing new Taxiway U
- Removal of Taxiway M connector between Taxiway R and Runway 6L-24R, construct new connector taxiway
- Removal of partial Taxiway A curve
- Removal of partial Taxiway B from Taxiway A to Taxiway E
- Removal of pavement Taxiway D from Taxiway E to new Taxiway H
- Construct new partial parallel Taxiway H (west side) from Taxiway G to Runway 36 end
- Extend Taxiway H to form partial parallel Taxiway H south side of Runway 6R-24L, after decoupling , remove perpendicular connector to existing Runway 36 end
- Eliminate direct apron to Runway access: Taxiway M, S
- Removal of excess partial parallel Taxiway W, between Taxiway M and S
- Removal of Taxiway Y
- Removal of connector E1
- Removal of Taxiways J and L
- Removal of Taxiway K and realign to Runway 24L runway end
- Realignment of Taxiway C, closer offset to Runway 18-36 to separate the apron and taxiway
- Realignment of Taxiway C, right angle to Runway 6R-24L
- New connector to Runway 36 end (eliminate hotspot)

5.1.3.1 De-coupling Runway 18-36 and 6L-24R Alternatives

Prior to the start of this master plan, the Sponsor and the FAA discussed the issue of overlapping safety areas on Runways 18-36 and 6L-24R. De-coupling, or providing independent runway safety areas, results in the need to relocate the Runway 24R end. Since runway length is needed for the critical aircraft operations, the loss of pavement on the Runway 24R end would be recouped on the Runway 6L end. Connected actions included examining the taxiways that connect to the runway; airspace, which will ultimately dictate where the runway threshold needs to be located; runway safety area lengths beyond the extended Runway 6L end, and relocation of roadways.

- Taxiway A, which connects to the current runway 24R end would no longer serve Runway 24R end of runway. Taxiway A however also provides access to Runway 18 end. This taxiway location was examined against the end around taxiway standards, and visual screening criteria. Airspace was also examined against an aircraft tail on Runway 18-36. This analysis resulted in the need to shift the Runway 24R end further southwest.
- Taxiway Z would provide access to the relocating Runway 24R end, with a slight shift.
- Existing Taxiway A off the new Runway 24R end would be removed.
- Taxiway R from Taxiway Z to Taxiway A would be removed
- Realignment of the approach lighting system would be required
- The existing instrument approaches to both Runway ends would be required to be updated with the relocation of the thresholds.
- Beyond the extended Runway 6L end, impacts Dog Leg Road, which would require relocation. This relocation does not impact the gas line servicing the area, as this was considered when the gas line was relocated, and the future lands for the RPZ would end prior to National Drive, within lands that the airport has control over.

5.1.3.2 De-coupling Runway 18-36 and 6R-24L Alternatives

As stated earlier in this report there is a hotspot at the intersection of Runway 18-36 and Taxiway H, whereby pilots may make an incorrect turn on Runway 6R-24L instead of Taxiway H. Similarly, during the Facilities section it was identified that there is incompatible land uses within the RPZ for RDC C-III. The intersection of the runways is about 1,000 feet from the Runway 36 end. The intersection of Taxiway E and Runway 18-36 is not at the standard angles for intersecting runways.

Reviewing airspace, shifting the Runway 36 end to clear aircraft operating on Runway 6R-24L, Runway 26 threshold is relocated to Taxiway N, with the loss of pavement extended on the Runway 36 end. As the sponsor seeks to retain the runway lengths at their existing lengths, the connected actions with this alternative are highlighted below:

- Remove Taxiway D from Taxiway E to Runway 36 end
- Extend Taxiway C to Taxiway H, outside of the RPZ, and remove Taxiway H from intersection with Runway 36 to new Taxiway C
- Extend parallel Taxiway A straight south to Taxiway E, outside of the RPZ limits. Remove Taxiway B from new Taxiway A to Runway 18-36. Remove Taxiway A from Taxiway N to intersection with new Taxiway A
- Extend Taxiway A parallel to Runway 18 end, outside the Runway 24R ROFA lengths and clear of airspace to Runway 24R threshold.
- Remove existing Taxiway A that connects from Taxiway W to Runway 18 end
- Extend Taxiway W to new parallel Taxiway A outside of the Runway 24R RPZ

5.1.3.3 Runway 6L Extension Alternative

As an element of the 18-36/6L-24R de-coupling alternative, the runway length would be shortened to 9,500 feet, less than the minimum required 10,400 feet and recommended 10,900 feet, that the sponsor wishes to maintain. The runway shift of about 1,400 feet would be relocated to the Runway 6L end to maintain the existing runway length of 10,900 feet. This extension would cause the NAVAIDS to be relocated and a new instrument approach procedures would need to be written for both runway ends.

5.1.3.4 Runway 18 Extension Alternative

As an element of the 18-36/6R-24L de-coupling alternative, the runway length would be shortened to 5,802 feet, less than the minimum required 8,200 feet and recommended 8,502 feet. The runway shift of about 2,700 feet would be relocated to the Runway 36 end to maintain the existing runway length of 8,501 feet. This extension would cause the NAVAIDS to be relocated and a new instrument approach procedures would need to be written for the approach to Runway 36 and 18.

5.1.3.5 Runway Protection Zone and Roadway Alignment Alternatives

The purpose of the runway protection zones (RPZs) is a protection zone that serves to enhance the protection of people and property on the ground. Airport owner control of these lands is recommended to clear the RPZ areas of incompatible objects and activities. It is recommended Based on the FAA's memorandum on RPZ guidance – *Interim Guidance on Land Uses Within a Runway Protection Zone* – RPZs should remain clear of incompatible land uses such as buildings of congregation, transportation facilities, fuel storage facilities, etc. should not be located within RPZs. However, it should be noted that existing transportation facilities such as public roadways are present at DAY, and the FAA memorandum states that existing non-compatible land uses within RPZs would not necessarily warrant an alternative, and that the Sponsors should work with the FAA to mitigate risks.

This section discusses the impacts to the RPZ for each runway end, based on the decoupling mentioned above.

Runway 24R – the shifted RPZ would be on airport property and no land acquisition is required.

Runway 6L – the shifted RPZ would remain on airport owned property. Dog Leg Road would need to be re-rerouted, following the gas line that was re-routed in the past. The re-routed Dog Leg Road would likely empty out onto West National Road, at a new signaled intersection. The airport perimeter road will be realigned on airport property.

Runway 24L – the existing RPZ extends over North Dixie Road, and includes Northwoods Blvd. The airport owns the lands within the RPZ. The airport perimeter road will be realigned near Taxiway H.

Runway 6R – the existing RPZ extends over West National Drive. The airport maintains control over the lands within the RPZ.

Runway 18 – the existing RPZ extends over Lightner Road. The airport maintains control over the lands within the RPZ. The shifted RPZ would extend onto lands that are controlled by the airport. No additional land acquisition is necessary. The airport perimeter road will be realigned on airport property.

Runway 36 – the existing RPZ extends over West National Drive which the airport does not have an easement over, under RDC C-III standards. The shifted RPZ would be on airport property and not require any land acquisition.

5.1.3.6 Alternative Obstruction Analysis

An obstruction analysis was completed as part of this Master Plan. Trees that are identified are recommended for removal. Obstructions, other than trees, that affect approaches/departures to a runway are evaluated for changes that may be required to the runway thresholds. During the analysis there are no penetrations, other than trees, to approach surfaces that would require the threshold to be displaced.

It is noted that the airport wishes to show a proposed runway length off the Runway 24L end for the sole purpose of maintain airspace clearance from incompatible land use.

5.1.3.7 Declared Distance Alternatives

With the possibility of a runway extension and/or decoupling identified in the previous sub-sections, declaring distances for a each runway is shown. Declared distances examine each runway end independently to obtain the most usable runway length available, and results in declaring and reporting the TORA, TODA, ASDA and LDA for each operational direction.
It is noted that the FAA does not recommend reducing the TORA on runways to mitigate incompatible land uses in the Departure RPZ.

Runway 6L-24R
With the decoupling of Runway 6L-24R, and the extension to 10,901 feet, the Departure Surface, RSA, ROFA, Approach surface and approach RPZ were reviewed. There are no departure surface penetrations to either runway end that are not trees, which can be mitigated. There is 1,000’ beyond each runway end

that meets the RSA/ROFA criteria. As such, the 600 feet prior to threshold is met as well. Therefore, the declared distances for proposed Runway 6L-24R are as follows:

Runway	TORA	TODA	ASDA	LDA
6L	10,901'	10,901'	10,901'	10,901'
24R	10,901'	10,901'	10,901'	10,901'

Runway 6R-24L

Runway 6R-24L length is not changing on the proposed Airport Layout; however, there will be declared distances proposed. As stated in Chapter 4 the airport fence, North Dixie Drive, and West National Road poses a conflict to the declared distances for both ends of the runway. However, to declare the distances based on locating the approach RPZs away from North Dixie Drive and West National Road would reduce the useable runway to less than 5,000 feet. Therefore, declared distances were proposed to address the FAA's ROFA/RSA clearing standards prior to each runway threshold, and off both runway ends. Due to the location of the fence prior to each runway threshold (i.e., 484 feet prior to Runway 6R and 339 feet prior to Runway 24L), the proposed declared distances are as follows:

Runway	TORA	TODA	ASDA	LDA
6R	7,285'	7,285'	6,946'	6,830'
24L	7,285'	7,285'	6,769'	6,769'

Runway 18-36

With the decoupling of Runway 6R-24L and 18-36, and extension to 8502 feet, the Departure Surface, RSA, ROFA, approach surface and approach RPZ were reviewed. There are no departure surface penetrations to either runway end that are not trees, which can be mitigated. There is 1,000' beyond each runway end that meets the RSA/ROFA criteria. As such, the 600 feet prior to threshold is met as well. Therefore, the declared distances are as follows:

Runway	TORA	TODA	ASDA	LDA
18	8,502'	8,502'	8,502'	8,502'
36	8,502'	8,502'	8,502'	8,502'

5.1.4 Taxiway Alternatives

This section presents alternatives for the taxiway system at DAY that are correlated with the Runway alternatives.

5.1.4.1 Parallel Taxiways to Runway 6L-24R

With the shift in Runway 6L-24R, Taxiway R and Taxiway W are extended appropriately to provide parallel taxiways to the extended Runway 6L end. Taxiway W would be extended to new parallel A to new Runway 18 end. Taxiway R between Taxiway Z and new parallel Taxiway A will be removed.

5.1.4.2 Parallel Taxiway to Runway 18-36

The extension of Taxiway A midfield to Taxiway E is included to provide a more direct parallel access to the runway at 400 foot offset from runway centerline. Taxiway A is extended parallel to the extended Runway 18, offset to about 700 feet from runway centerline to clear the glideslope critical area. Extend Taxiway C to Runway 18 end. Realign Taxiway C closer to the runway, while maintaining 400 feet runway centerline/taxiway centerline separation to allow for non-movement islands in the general aviation apron area. Extend Taxiway C to the south, realigned to intersect Runway 6R-24L at the right angles, and extend to Taxiway H. In the short term, extend through to existing Runway 36 end to eliminate the hot spot provide right angle entrance to Runway 36 on the east side.

5.1.4.3 Parallel Taxiways to Runway 6R-24L

When Runway 6R-24L and Runway 18-36 are decoupled Taxiways E and F could be connected to provide full length parallel taxiway to Runway 6R-24L.

5.1.5 Cargo Development Alternatives

DAY has a large cargo apron on the northwest side of the airport that has been unused since Emery vacated service at the airport. The old terminal building is currently used for logistical trucking operations and fenced off from the airfield. In 2022 Sierra Nevada Corporation completed a large maintenance hangar in the northeast corner of the apron. It is anticipated that development in this area will continue to attract large corporation/maintenance-repair-overhaul (MRO) facilities. The existing apron and utility infrastructure are attractants to many companies, thereby reducing their development cost.

Figure 5-5 shows the airside and landside lands available for development areas around DAY, while **Table 5-1** lists the acres available.

Figure 5-5 Aeronautical and Non-Aeronautical Lands Available for Development

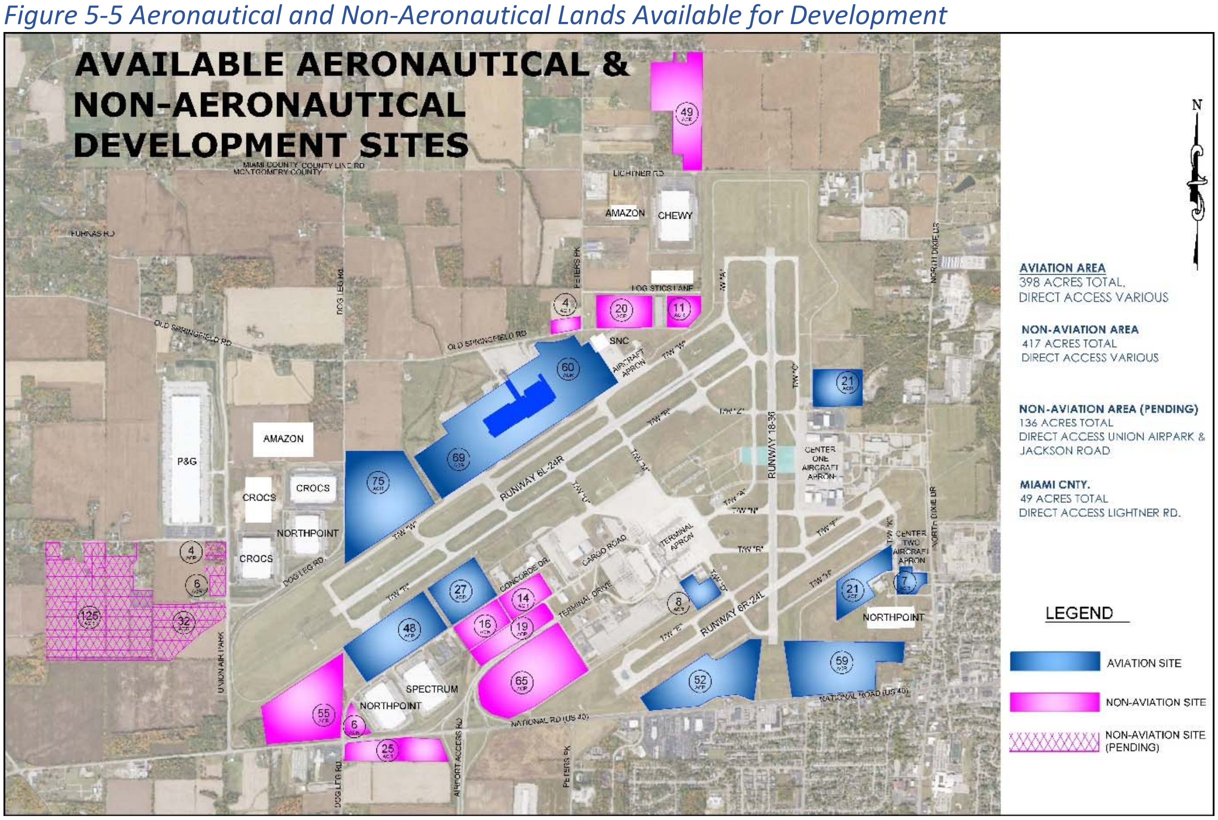


Table 5-1: Developable Lands Available at DAY

Use	Access	Acres
Aeronautical Use	Airside	398 +/- acres
Non-Aeronautical Use	Landside	417 +/- acres
Non-aeronautical Use (pending)	Union Airpark & Jackson Road	136 +/- acres
Non-aeronautical	Lightner Road	40 +/- acres

5.1.5.1 Landside Development Alternatives

The airport servs as a vital transportation asset to the region. Outside of the important airside elements, DAY has an abundance (i.e., 176 +/1-acres) that is available for development. The manufacturing sector is booming in DAY, especially adjacent to the airport vicinity, and is prime for non-aeronautical development. These non-aero developments could help promote job growth in the area; thus, potentially increasing aviation activity at DAY.

Figure 5-6 shows the lands that have been developed around DAY to date.

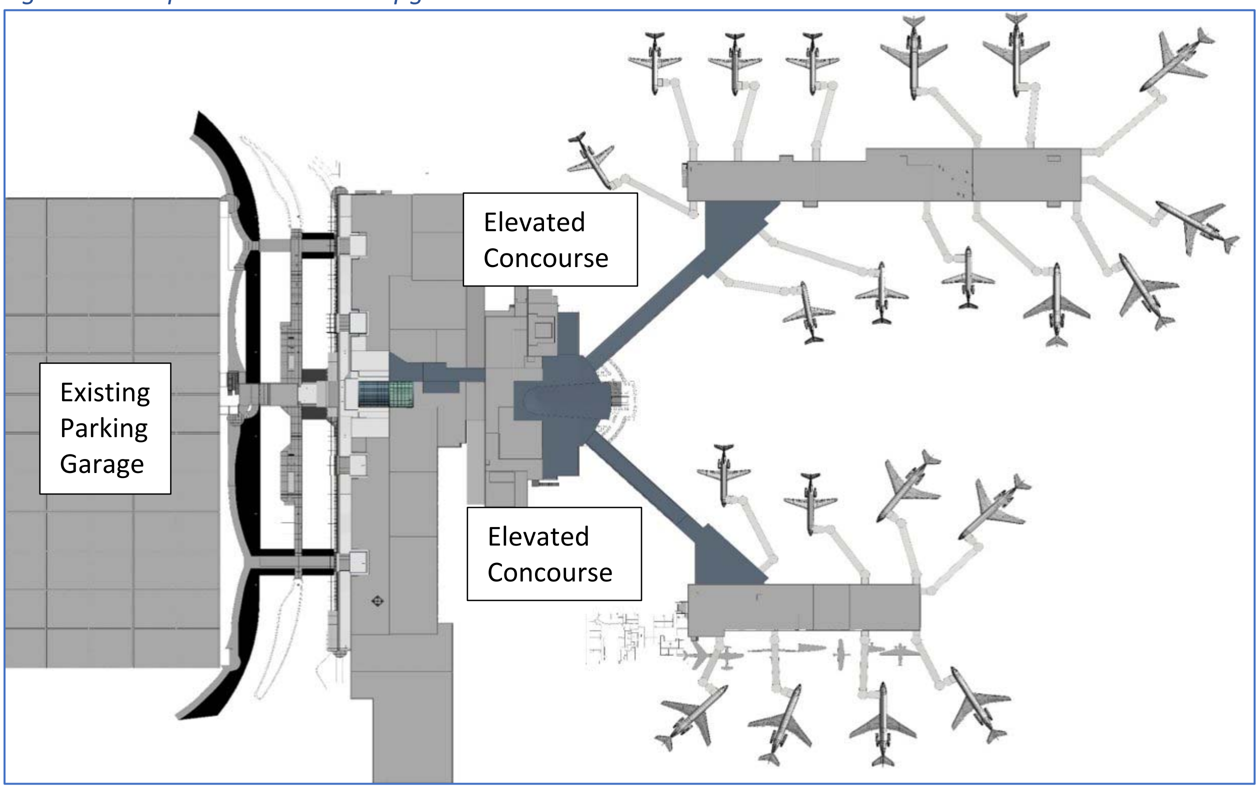
Figure 5-6 Existing Landside Development around DAY

It is anticipated that the non-aeronautical development will be in line with the existing development occurring around the airport today – warehousing and logistical operations.

5.1.5.2 Terminal and Apron Geometry Analysis

The airport is undertaking terminal building improvements, including improvements to the concourses, which impact the terminal apron. LWC Incorporated has designed the terminal improvements, as shown in **Figure 5-7** as sourced from the Terminal Master Plan. The terminal/concourse connectors are proposed to be elevated and more direct to each of the concourses. These changes will introduce two additional gate positions. The terminal apron geometry is changing as the airport undertakes improvements to the concourse connectors. The apron reconfiguration will consider the fleet changes that are occurring within the industry as the smaller regional jets are being replaced by larger regional jets, along with the introduction of the low-cost carrier. The concourse changes are pending funding, and once complete the existing pavement markings will be removed in accordance with FAA AC 150/5340-1, Standards for Airport Markings.

Figure 5-7 Proposed Concourse Upgrades



5.2 Preferred Alternative

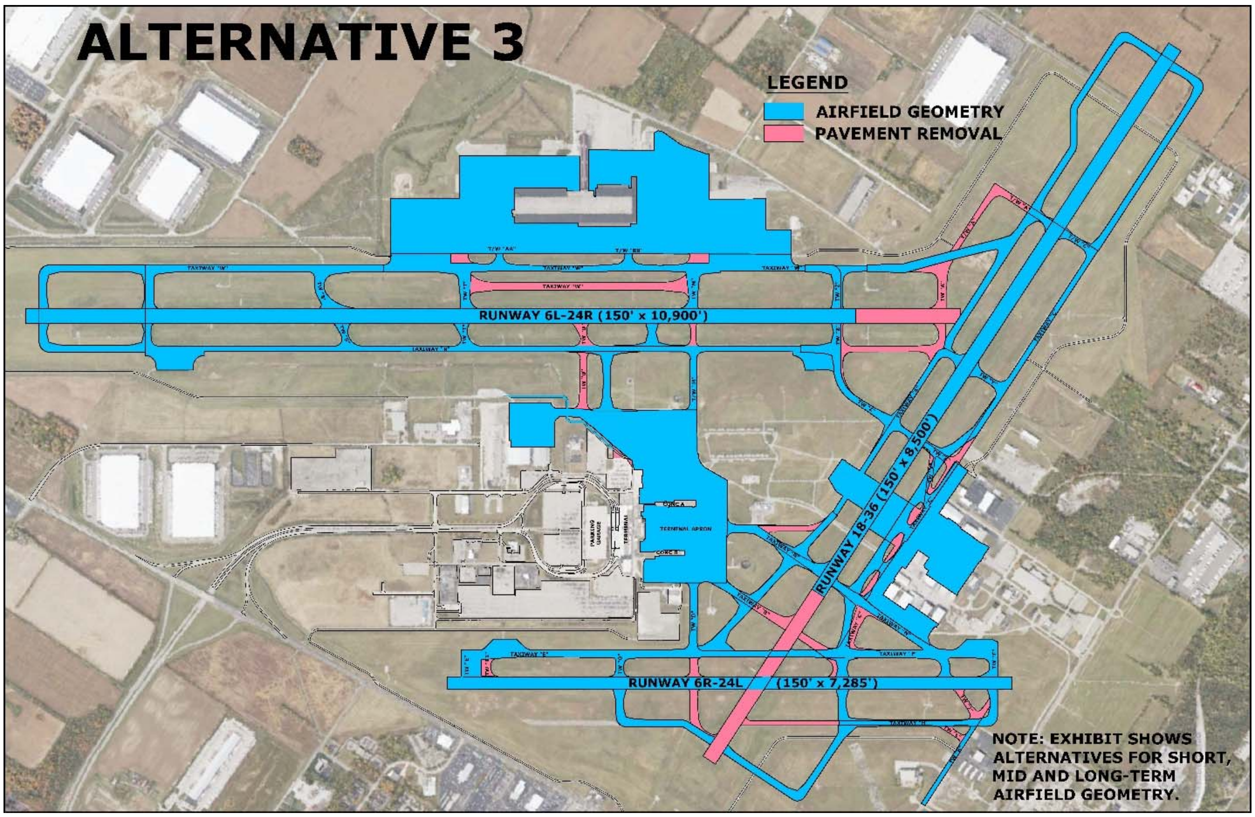
Working with the Sponsor in exploring various alternatives, as presented in **Appendix L** a preferred alternative was identified. The preferred alternative was presented to the public on December 14.
As identified earlier in this chapter, the key findings of the preferred alternative include:

- Decoupling Runway 18-36 and Runway 6L-24R
- Decoupling Runway 18-36 and Runway 6R-24L
- Removing excess pavement, and direct access points from apron to runways

- Painting islands at Taxiway W and Taxiway M and Taxiway W and Taxiway T
- Extend parallel Taxiway A north to shifted Runway 18 end, and south to Taxiway E
- Extend parallel Taxiway C north to shifted Runway 18, and re-align south to Taxiway H and provide access to Runway 36 end
- Realign Taxiway U
- Realign Taxiway K to Runway 24L end

Figure 5-8 shows the lands that have been developed around DAY to date.

Figure 5-8 Preferred Alternative



Chapter 6:
Airport Layout Plan Set

This chapter describes the Airport Layout Plan (ALP) drawing set developed for the 20-year planning period. These plans identify areas needed for aviation related development during and beyond the planning horizon. The plan will also serve as a reference for the Sponsor to evaluate existing and/or future obstruction disposition in conjunction with Federal Aviation Administration (FAA/) criteria. The ALP set presented becomes the official development plans for the Airport, which may be amended over time to reflect changes in the airfield environment or the demand affecting future facilities.
The ALP set consist of 24 separate drawing sheets which were prepared in AutoCAD to graphically depict the existing conditions, recommended airfield improvements, imaginary surfaces, and the layout of future facilities. This ALP set is compliant with all pertinent criteria established by the FAA in Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*¸ and AC 150/5300-13B, *Airport Design*. Specifically, this drawing set includes:

- Title Sheet
- Data Sheet
- Existing ALP
- Future ALP
- Airport Airspace Drawing
- Runway 6L-24R Inner Approach Surface (2 sheets)
- Runway 6R-24L Inner Approach Surface (2 sheets)
- Runway 18-36 Inner Approach Surface (2 sheets)
- Runway 6L-24R Departure Surface
- Runway 6R-24L Departure Surface
- Runway 18-36 Departure Surface
- Terminal Area Plan
- Land Use Plan
- Exhibit A Property Map
- Exhibit A Property Map Enlarged (4 sheets)
- Exhibit A Property Tables (3 sheets)

An 11” x 17” size ALP drawing set is included in **Appendix M**.

Please note that the ALP drawings included in this chapter have been scaled to fit; therefore, the ALP drawings are not to true scale, and measurements must NOT be taken from the ALP sheets included in this narrative report. Measurements must only be taken from the full-sized (22” x 34”) ALP set that will be provided concurrently with this report.

6.1 Title Sheet

The Title Sheet serves as an introduction to the ALP set. This sheet includes the name of the Airport, a location map, vicinity map, and an index of drawings included in the ALP set.

6.2 Data Sheet

The Data Sheet is typically included in an ALP set when adequate space is not available on the ALP sheet to include all the necessary tabular information about the Airport and its facilities, as was the case for this project. The Data Sheet includes a variety of information relative to the Airport and its runways, taxiways, instrument approach capabilities, as well as operational conditions.

6.3 Existing ALP

The existing facilities sheet identifies airport facilities as they existed during the course of this planning study (2021-2022). This sheet identifies airfield pavement, markings, buildings, and safety areas, and was used to identify the Airport's ability to meet design standards for existing conditions (A/B-I-S).

6.4 Future ALP

The future ALP is the primary planning document for the Airport and is a graphic representation, to scale, of existing and proposed Airport facilities, their location, dimensional and clearance data, and the overall infrastructure of DAY including the runway, taxiway and apron. Once approved by FDOT, the ALP becomes the official guidance for the Sponsor on how to manage the development of the Airport while meeting state and federal obligations.

6.5 Airport Airspace Drawing

Federal Aviation Regulations (FAR) Part 77, *"Objects Affecting Navigable Airspace,"* prescribes airspace standards which establish criteria for evaluating navigable airspace. Airport imaginary surfaces are established relative to the Airport and its runways. The size of each imaginary surface is based on the runway category with respect to existing and proposed visual, non-precision, or precision instrument approaches for that runway. The space and dimensions of the respective approach surfaces are determined by the most demanding, existing or proposed, approach for each runway. The imaginary surfaces definitions include:

Primary Surface

The primary surface is a rectangular area symmetrically located about the runway centerline and extending a distance of 200 feet beyond each runway end. The elevation of the primary surface is the same elevation as the nearest point of the runway.

Horizontal Surface

The horizontal surface is an oval shaped area situated 150 feet above the published airport elevation (i.e., 1,009.1'+150' = **1,159.1' MSL**). Its dimensions are determined by 10,000-foot arcs. These arcs are centered about the midpoint of each end of the primary surface and are connected by lines of tangent to enclose the limits of the horizontal surface.

Conical Surface

The conical surface is a sloped area originating at the edge of the horizontal surface and extending outward and upward at a slope of 20:1 for a horizontal distance of 4,000 feet.

Transitional Surfaces

These surfaces extend outward and upward at right angles to the runway centerline and centerline extended at a slope of 7:1 from the sides of the primary surface as well as from the sides of the approach surface.

Approach Surfaces

This surface begins at the ends of the primary surface and slopes upward at a predetermined ratio while at the same time flaring out horizontally. The width and elevation of the inner ends conform to that of the primary surface, while the slope, length, and outer width are determined by the runway service category and existing or proposed instrument approach capabilities.

Analysis of the Part 77 surfaces surrounding the Airport was based upon data obtained from Woolpert's survey completed in 2020.

6.6 Approach Surface Drawings

The approach plan and profile drawings display the existing and future approach surface configurations and their interaction with airport and off-airport environs. The extended runway centerline ground profiles and the critical point profiles are shown for terrain clearance purposes. Obstructions are identified and tabulated with potential mitigation alternatives. These drawings are supplemental to the Part 77 Airspace Surface drawings. There are two inner portions of the approach surface drawings for the DAY ALP.

6.7 Departure Surface Drawings

This drawing depicts the plan and profile view of the existing and future departure procedures. While like the approach surface drawings, this drawing illustrates the plan and profile view of the departure surfaces of the runway ends with instrument approach procedures (i.e., Runways 6L, 24R, 6R, 24L, 15, and 36). Therefore, departure procedures are required off each runway end at DAY.

6.8 Terminal Area Plans

The Terminal Area Plans (TAP) present enlarged areas of the ALP and illustrate existing and proposed building and apron facilities in greater detail. The Terminal Area Plan generally seeks to present a detailed view of the terminal building and aircraft parking aprons.

6.9 Land Use Plan

The purpose of the existing land use plan is to identify the land uses currently surrounding DAY to inform discussion about airport growth and development as well as the growth and development of properties surrounding the Airport. Therefore, the ultimate goal of the Land Use Plan is to identify compatible and non-compatible land uses adjacent to DAY in order to identify potential easements or acquisitions.

6.10 Exhibit A Property Map (9 Sheets)

The Exhibit "A" Airport Property Inventory Map is intended to depict the areas of existing airport sponsor ownership and areas proposed for ownership or release. The map also depicts airfield safety surfaces (e.g., ROFA, RSA, RPZs, etc.). Parcels are shown for depiction purposes only and this map is not intended to be used for survey or land acquisition purposes.

The Sponsor of DAY has acquired and transferred various parcels throughout the completion of this master plan. These parcels are identified on the Exhibit A.

Chapter 7:

Airport Development Program Implementation Plan

This chapter presents the short term through long-term physical development program necessary to accommodate the forecast aviation need at DAY as well as other major capital improvements identified within the master plan. The airport's short term through long-term development program, made up of capital projects recommended in this document, is referred to as the "Program" in this chapter. The Program is subject to any number of future variables. The Master Plan proposes a conceptual physical plan that can accommodate forecast growth in aircraft operations, passenger enplanements, cargo volume, and other aviation related demands, such as needed building improvements and other major infrastructure. If the growth does not occur as forecast or if the growth occurs in different areas than forecast, changes to the phasing plan would be necessary.

Elements of the Program can be accelerated or deferred as needed to meet operational requirements, financial considerations, or fluctuations in forecast activity levels. The expectation is that future capital projects will be constructed only when demand exists, and financial resources are available to fund the cost of construction. The key factor ensuring the financial feasibility of the Program is the assumption that future capital projects will only be constructed on an incremental basis as needs clearly dictate.

As determined during the forecasting phase of this Master Plan, the Program is divided into three (3) major planning development phases, which follow the Short Term (Years 1-5), Intermediate Term (Years 6-10), and Long Term (Years 11-20) planning milestones and will be implemented based on specific Planning Activity Levels (PALs). Table 7-1 presents the actual base year total operations and enplanement counts and projected counts throughout each PAL.

Table 7-1: Planning Activity Levels (PALs)

Planning Activity Level (PALs)			
Phase	**Year**	**Aircraft Operations (Overall)**	**Passenger Enplanements**
Base	2021	36,452	433,751
Short-Term	2022-2026	43,713	913,094
Intermediate	2027-2031	44,909	936,142
Long-Term	2032-2041	47,781	970,401

Source: Master Plan Preferred Forecast (FAA Approved)

7.1 Phase 1 Program Development

The following projects are included in the Phase 1 timeframe (2021-2026). Although PAL 1 encompasses 2021-2026, two years within PAL 1 have been completed. Meaning two years have passed since the approval of the forecast provided in Chapter 3. This is not atypical in the master planning process as active projects must continue for airports to operate efficiently. Therefore, for the purposes of the continuing Program at DAY, the years included in Phase 1 will be 2023-2026.

The actual projects that were completed at DAY in 2021 and 2022 (base years) are described in the section below.

7.1.1 Base Years

As with any master planning project, activities and projects that were either under way or planned at the beginning of the planning process continue forward without delay. As such, the Airport completed the following projects (Phase 1A) in 2021 and 2022 using FAA AIP Entitlement and Discretionary funds. These projects included:

- Public Circulation Enhancement Project (Design and Construction, 2021 Grant), which included upgrades and enhancements to the existing Passenger Screening/ Checkpoint and Re-composure area, widening of the checkpoint, upgraded lighting and flooring throughout the area, as well as new finishes in Concourse A, including new Windows, Carpeting, seating and lighting.
- Terminal Apron Reconstruction – Phase 4 (Design and Construction, 2021 and 2022 Grant respectively), which included removal and replacement of the central terminal apron pavement (PCC pavement) between Concourse A and Concourse B, associated utility replacements, as well as new pavement markings, including aircraft gate markings, painted access road, and restricted areas.

7.1.2 Terminal Building Projects

The terminal building projects consist of two programs – Dayton Airport Terminal Modernization Program (ATMP) and the Passenger Loading Bridge Replacement Program. Both programs are described below.

Dayton Airport Terminal Modernization Program (ATMP)

The ATMP is a multi-phased program focused on Concourse Access and Enhancements, Concourse A & B Modernization, creation of a central Concessions area, demolition of Existing Connector walkways, centralization of Police and IT offices to a more accessible location, as well as Modernized central mechanical and electrical plant to create greater sustainability, greater efficiencies, longevity and modernization of aging systems.

Passenger Loading Bridge Replacement Program

All existing bridges and related appurtenances were installed between 2004 and 2006 have exceeded the useful life. A phased program to replace these loading bridges is planned and will utilize Federal Infrastructure Funds.

Upgrades /Improvements to the Airfield Lighting Vault – including updates to vault equipment, standby emergency generator, and associated building improvements.

7.1.3 Airfield Capital Projects

The airfield capital projects consist of taxiway and runway projects and are described below.

Taxiway "L","J" & "K" Reconfiguration (Center 2 Area)

The existing intersection configuration is a safety concern for both the Airport Operator as well as the FAA 139 Inspector due to the outdated geometry and multi-node configuration. As such a new configuration is being proposed, which would meet current standards/criteria in order to eliminate these concerns.

6R/24L Runway Signage and Marking Improvements (Declared Distances)

This project will include relocation of distance remaining signs, markings and other equipment impacted by the updated master plan.

Reconstruct/Realign TW "A" and Remove TW "D" North, "A" and "B"

This project includes construction of a parallel taxiway (to complete full length) along the west side of RW 18-36. This would also include realignment of TW "D" as well as TW's "B" and "N".

Rehabilitate Taxiway "W" including Lighting & Markings (Phases 1 & 2)

including improvements to fully reactivate the northeastern portion initially, followed by full length to the southwest in order to open the entire north airfield cargo area for future redevelopment, including new additional MRO hangar facilities and other aviation use developments.

7.2 Phase 2 Program

The following projects are anticipated to be undertaken during the Phase 2 timeframe (2027-2031).

7.2.1 Airfield Capital Projects

The sections below provide the airfield capital projects at DAY.

Taxiways "R" Reconstruction & Associated Connector ("S", "T", "U", "M")

The existing pavement condition continues to deteriorate since its' last rehabilitation nearly 15 years ago. Additionally, connector taxiways (S, T, U, and M) will need to be updated to comply with current standards and criteria for geometry, location (distance from end/midpoint of Runway), and ultimately reconstructed to address deteriorating pavement conditions.

Terminal Apron Reconstruction

The Airport is currently in its' fourth phase (of seven) to reconstruct the PCC Terminal Apron pavement surrounding the Terminal Concourses and associated aircraft gate parking locations, as well as the main Terminal Building. This has been a multi-year /multi-phased project. The Airport proposes completing the remaining 3 phases of the Terminal Apron reconstruction project, including the De-Ice pads located along the north and east sides of the Terminal Apron.

Reconstruct/Realign TW "C" and Remove Existing TW "C"

The reconstruction and realignment of TW "C" is recommended to allow sufficient clearance and taxiing efficiency both along the Center 1 GA Aircraft parking apron area as well as south through the intersection of TW "N". Additional signage and green islands will provide clearer delineation between apron and TW "C" as well as the associated intersection.

Reconstruct/Realign TW "H"

The existing TW "H" currently does not terminate/intersect RW 18-36 at the south end of the Runway pavement, per current standards/requirements. It is proposed that a portion of the TW "H" be reconstructed and realigned to meet current standards.

Taxiway "U" Relocation

As reported by the FAA ATCT representatives, there is currently a line-of-sight issue where TW "U" meets the north edge of the main Terminal Apron. As such, it is recommended that TW "U" be relocated slightly to the east to address the line-of-sight issue at this transition from AOA Movement Area (Taxiway) to AOA Non-Movement Area (Apron).

Corporate Hangar Facilities

Additional corporate hangar facilities will be provided in the southeast section of the airport near the Center 1 complex. These facilities will be developed as need arises.

MRO Hangar Facilities

Additional Maintenance /Repair /Operations (or MRO) Hangars are anticipated along the north side of the airfield based on recent tenant discussions and requests to expand operations. As such, room for future expansions have been allocated on the updated Airport Layout Plan to accommodate both this and other interests in developing additional aircraft MRO facilities around the Airport.

7.2.2 Consolidated Rental Car Complex

The focus of the Phase 2 projects will be development of a consolidated rental car facility in the area west of Boeing Drive and south of Terminal Drive. This facility will encompass approximately 45 acres and be comprised of a single customer service building providing access to each of the rental car company's customer service area. A ready/return area will be located immediately adjacent to the customer service building. The 700 rental car ready/return spaces in the parking garage will be eliminated at this time. The ready/return area will be a surface lot where customers pick-up and return vehicles. In addition, service facilities for up to six rental car companies will be provided and linked to the ready/return area. The service area will house facilities for the cleaning, fueling, repair, and storage of rental car vehicles.

7.3 Phase 3 Program

The proposed Phase 3 airport development projects mainly consist of airfield runway modifications. These projects will be constructed when specific Project Action Limits are achieved, and are presented below. For now, these proposed improvements are shown in the Long-Term planning phase (2032-2041)

7.3.1 Runway 6L Extension

The main focus of the Runway 6L-24R project will be a 1,400-foot extension of Runway 6L and a relocation of 1,400-foot on the Runway 24R end to the south, to maintain the runway length of 10,900 feet. Implementation of the proposed Runway 6L extension will be based on the need for an airline operator (commercial or cargo) to require a runway length of 10,900 feet to serve a specific market destination at maximum takeoff weight. A Benefit-Cost Analysis will need to determine the number of daily operations (1 to 3) that justify the runway extension.

7.3.2 Runway 18-36 Relocation

The main focus of the Runway 18-36 project will be the shifting of Runway 18-36 to the north by 2,700 feet along its current alignment and reducing Runway 18-36 by 2,700 feet on the 18 end.

Runway 18-36 will remain at its current 8,501-foot length, and the runway is not anticipated to provide a significant increase in airfield capacity. The primary purpose of Runway 18-36 is to provide arrival and departure capacity for those times when the primary runway(s) do not meet the crosswind limitations. Additional benefits of the runway relocation include full 1,000-foot safety areas on each end, accommodate future fleet mix (commercial and cargo), reduced runway crossings (aircraft and vehicles), and reduced aircraft taxi times during arrivals and departures. Furthermore, the shifting of the Runway to the north will address the de-coupling issue identified in the original Airport Master Plan Scope development between the Airport Sponsor, the FAA, and the Planning team. Additionally, this shift to the north will also address the Land-Use compatibility issue with the current departure Runway Protection Zone (RPZ) at the south end of the field, where it crosses US Route 40 (National Road).

Implementation of this project will be based on a reduction in airline operating costs, cancelled flights, and safety of aircraft and vehicle movements. It is anticipated that this will occur when the cost of airline delays and lost revenue can justify the project cost or when operational safety becomes an issue due to runway incursions.

The addition of full ILS instrumentation on both runway ends will be sufficient to accommodate the existing and future commercial and cargo fleet mix during all weather conditions.

When Runway 18-36 is the only runway available due to crosswind limitations on the parallel 6-24 runways the following utilization of Runway 18-36 will be necessary:

- Air carrier and large commuter aircraft will use Runway 18-36
- Cargo aircraft will use Runway 18-36; and
- Other aircraft types (small commuter, general aviation) will use this Runway.

Based on recent actual data from the FAA-ATCT, Runway 18-36 was used approximately 17.7 percent of the time. Most of these operations consisted of arrivals on Runway 18 and departures on Runway 36.

Additional major airfield projects associated with the Phase 3 Program would include the relocation of Taxiway A. Currently, Taxiway A is located 400 feet west of Runway 18-36. With proposed changes to Runway 18-36, Taxiway A is proposed to be relocated as shown on the Future ALP.

7.4 Capital Development Phasing Cost

Table 7-2 presents the cost estimates for the proposed three (3) major phases of airport development. The program at DAY is subject to any number of future variables. Inflation will change actual project costs and may affect the implementation schedule over the planning horizon. The project costs are presented in constant 2022 dollars. The cost of construction itself is also subject to significant variance depending on competition for workers and material costs at the time of actual construction, as well as the changing requirements of local and FAA regulations. The construction phasing may be modified as availability of funds, as well as aviation demand influence the program. Ultimate construction of recommended capital projects should occur only after further refinement of the design and costs through architectural and engineering analyses.

Table 7-2: Dayton International Airport Master Plan Proposed Airfield Projects

CONSTRUCTION PHASING & COSTS			
Construction Projects	**Planning Activity Levels**		**Cost Estimate 2023**
	Aircraft Operations	**Passenger Enplanements**	
Total Construction Project Costs from 2021	36,452 (Actual)	433,751 (Actual)	$5,100,000.00
Total Construction Project Costs from 2022	*TBD*	*TBD*	$14,225,000.00
Sub-Total			**$19,325,000.00**
Phase 1 (2023-2026)	43,713	913,094	
Terminal Improvement Projects			78,320,000.00
Airfield Improvement Projects			23,320,000.00
Airport Access Roadway Improvements			2,860,000.00
Sub-Total			**$ 104,500,000**
Phase 2 (2027-2031)	44,909	936,142	
Terminal Improvement Projects			16,700,000.00
Airfield Improvement Projects			27,170,000.00
Sub-Total			**$ 43,870,000**
Phase 3 (2032-2041)	47,781	970,401	
Terminal Improvement Projects			16,000,000.00
Airfield Improvement Projects			12,000,000.00
Runway 24L Extension & 6R ILS Upgrade			52,500,000.00
Runway 18-36 Relocation			178,140,600.00
Sub-Total			**$ 258,640,600**
TOTAL COST			**$ 426,335,600**

Source: City of Dayton; Passero Associates