The Village of East Troy

EAST TROY
Municipal Airport Master Plan

Draft Final

Draft Final

AIRPORT MASTER PLAN

FOR

East Troy Municipal Airport
East Troy, Wisconsin

PREPARED FOR

The Village of East Troy

BY

Coffman Associates
Airport Consultants

May 2025

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Introduction

The Village of East Troy

Introduction

WHAT IS A MASTER PLAN?

The Federal Aviation Administration (FAA) recommends that airports update their long-term planning documents every seven to 10 years, or as necessary to address local changes at the airport. The previous airport layout plan (ALP) for East Troy Municipal Airport (57C) was completed in 1998 and updated in 2001. The Village of East Troy, the sponsor of the airport, has received a grant from the Wisconsin Department of Transportation (WisDOT) Bureau of Aeronautics (BOA)[1] to complete an airport master plan, which will provide an updated ALP drawing set.

The village is responsible for funding capital improvements at the airport and obtaining FAA Airport Improvement Program (AIP) and WisDOT-BOA development grants. In addition, the village oversees facility enhancements and infrastructure development conducted by private entities at the airport. The master plan provides guidance for future development and justification for projects for which the airport may receive funding through an updated capital improvement program (CIP) by demonstrating the future investment required by the village, the FAA, and the BOA.

The airport master plan follows a systematic approach outlined by the FAA to identify airport needs in advance of the actual need for improvements. This ensures the village can coordinate environmental reviews, project approvals, design, financing, and construction to minimize the negative effects of maintaining and operating inadequate or insufficient facilities.

[1] WisDOT participates in the State Block Grant Program, which administers federal grants from the Airport Improvement Program (AIP) for the FAA.

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

The preparation of this study is evidence that the village recognizes the importance of the airport to the surrounding region, as well as the associated challenges inherent in providing for its unique operating and improvement needs. The cost of maintaining an airport is an investment that yields impressive benefits to the local community. With a sound and realistic master plan, the airport can maintain its role as an important link to the regional, state, and national air transportation systems. Moreover, the plan will aid in supporting decisions for directing limited and valuable village resources for future airport development. Ultimately, the continued investments in the airport will allow the village to reap the economic benefits generated by historical investments.

AN AIRPORT MASTER PLAN IS…

- A comprehensive, long-range study of the airport and all air and landside components that describes plans to meet FAA safety standards and future aviation demand.
- Required by the FAA to be conducted every 7-10 years to ensure plans are up to date and reflect current conditions and FAA regulations.
- Funded 90% by a BOA apportionment grant, derived from FAA discretionary funds allocated to the BOA. The remaining 10% is split between the State of Wisconsin and the Village of East Troy.
- A local document that will ultimately be presented for approval from the Village of East Troy. The FAA approves only two elements of the master plan: the aviation demand forecasts and the ALP drawing set.
- An opportunity for airport stakeholders and the public to engage with airport staff regarding issues related to the airport, its current and future operations, and environmental and socioeconomic impacts. Two public information workshops will be conducted during the master plan process to facilitate this public outreach effort.

AN AIRPORT MASTER PLAN IS *NOT*…

- A guarantee that the airport will proceed with any planned projects. Master plans are guides that help airport staff plan for future development; however, the need/demand for certain projects might never materialize.
- A guarantee that the Village of East Troy, the BOA, or the FAA will fund any planned projects. Project funding is considered on a case-by-case basis and requires appropriate need and demand. Certain projects may require the completion of a benefit-cost analysis.
- A binding or static plan. Elements of the master plan may be updated to reflect changes in aviation activity at the airport, economic conditions of the region, or the goals of the Village of East Troy.
- Environmental clearance for specific projects. The master plan includes an environmental overview, which identifies potential environmental sensitivities, per the *National Environmental Policy Act of 1969* (NEPA) guidelines. Most planned projects will require a separate environmental study prior to construction.

WHO IS PREPARING THE MASTER PLAN?

The village has contracted with Coffman Associates, Inc. to undertake the airport master plan. Coffman Associates is an airport planning and consulting firm that specializes in master planning and environmental studies. Coffman Associates will lead the planning team, with support from the following firms:

- Strand Associates – Engineering support
- Martinez Geospatial – Aerial photography and geographic information system (GIS) products to meet FAA 5300-18B requirements for Airports GIS data submittal
- Becher-Hoppe Associates – Ground and physical survey elements to meet FAA 5300-18B requirements for Airports GIS data submittal

The airport master plan is being prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13B, *Airport Design*, and AC 150/5070-6B, *Airport Master Plans* (as amended). The plan will be closely coordinated with other planning studies relevant to the area and with aviation plans developed by the FAA and BOA. The plan will also be coordinated with the Village of East Troy and other local and regional agencies, as appropriate.

GOALS AND OBJECTIVES

The primary goal of this master plan is to develop and maintain a financially feasible long-term development program that will satisfy the aviation demand of the region; be compatible with community development, other transportation modes, and the environment; and enhance employment and revenue for the local area. Accomplishing this goal requires an evaluation of the existing airport to decide what actions should be taken to maintain a safe, adequate, and reliable facility.

Specific objectives of the study include the following:

- Conduct a thorough inventory of facilities, including the runway safety areas (RSAs) for both runways (Runway 8-26 and Runway 18-36) to populate the data required for Appendix A of FAA Order 5200.8;
- Complete an environmental study that includes inventory, nearby sensitivities and noise-sensitive receptors, and an overview with consideration of future impacts based on the recommended plan;
- Outline existing and project future aviation demand of 57C based aircraft and annualized aircraft operations by type;
- Analyze current aircraft operations to determine appropriate critical aircraft and associated planning design standards for current and ultimate planning horizons;
- Consider future terminal building and hangar conditions (expand/modify/replace/etc.);
- Include requisite safety areas and setbacks in the analysis, based on critical aircraft and aviation user needs, because the airport has limited property and is constrained;

- Conduct an analysis of airfield geometry, including the direct access taxiway to Runway 8 (among other issues);
- Consider construction of additional hangars;
- Consider larger apron area(s);
- Develop future layout, as determined via the planning process;
- Create a development strategy that includes expanded hangar and apron development to support existing and anticipated based aircraft and itinerant operations;
- Develop a 20-year capital improvement plan, including a recommended phasing plan;
- Provide strategies to protect the airport from encroachment and incompatible land uses;
- Implement an obstruction mitigation plan, as necessary;
- Conduct initial environmental planning analyses, including coordination with key agencies (specifically the Wisconsin Department of Natural Resources [DNR]);
- Include public outreach and involvement throughout the study process;
- Review and recommend updates of the airport's rates and charges; and
- Complete the planning process as a collaborative measure that is inclusive of key stakeholders and the public.

BASELINE ASSUMPTIONS

A long-range planning study requires several baseline assumptions, which will be used throughout this analysis. The baseline assumptions for this study are as follows:

- East Troy Municipal Airport will continue to operate as a local general aviation airport through the 20-year planning period;
- The airport will continue to accommodate general aviation tenants, as well as itinerant and/or local aircraft operations by air taxi, general aviation, and military operators;
- The aviation industry will develop through the planning period as projected by the FAA (specifics of projected changes in national aviation industries are described in Chapter Two – Forecasts);
- The socioeconomic characteristics of the region will generally change as forecast (see Chapter Two); and
- A federal and state airport improvement program will be in place through the planning period to assist in funding future capital development needs.

MASTER PLAN ELEMENTS AND PROCESS

The master plan includes eight elements that are intended to assist in the evaluation of future facility needs and provide the supporting rationale for their implementation. **Exhibit i** provides a graphical depiction of the process involved in the study.

Element 1 – Study Initiation and Organization includes the development of the scope of services and schedule, as well as the establishment of a planning advisory committee (PAC). Study materials will be assembled in a phase report format. General background information will be established that includes outlining the goals and objectives to be accomplished during the master plan. A project-specific website will also be developed to house draft materials and allow for the receipt of comments.

Element 2 – Inventory of Existing Conditions focuses on collecting and assembling relevant data pertaining to the airport and the area it serves. Information on existing facilities and operations is collected. Local economic and demographic data are collected to define the local growth trends, and environmental information is gathered to identify potential environmental sensitivities that might affect future improvements. Planning studies that may have relevance to the master plan are also collected.

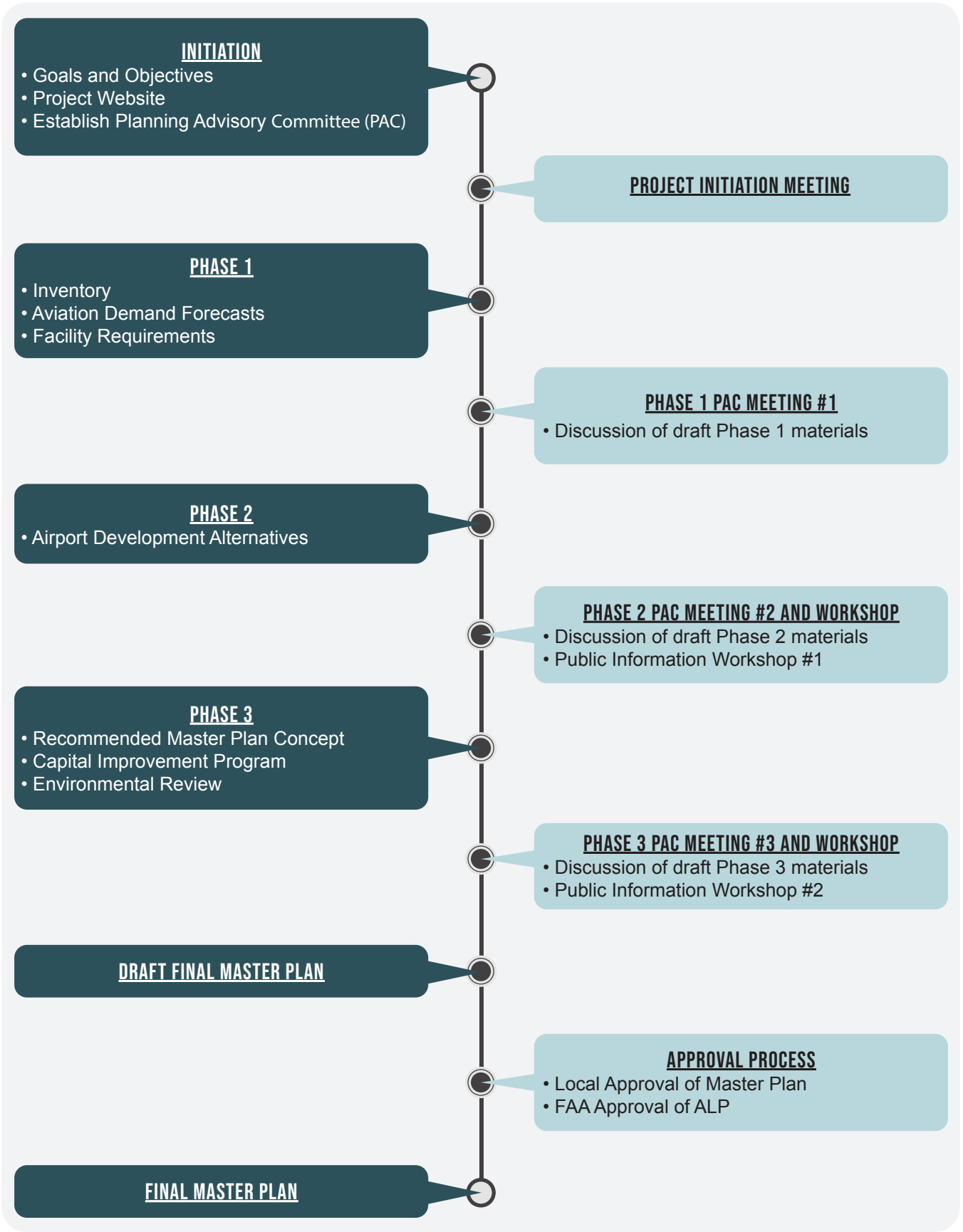
Element 3 – Forecasts examines the potential aviation demand at the airport. The analysis utilizes local socioeconomic information and national air transportation trends to quantify the levels of aviation activity that can reasonably be expected to occur at East Troy Municipal Airport over a 20-year period. Existing and ultimate critical aircraft are also established to determine future planning design standards, based on AC 150/5000-17, *Critical Aircraft and Regular Use Determination*. The results of this effort are used to determine the types and sizes of facilities that will be required to meet the projected aviation demand at the airport through the planning period. This element is one of two elements that are submitted to the BOA for approval.

Element 4 – Airport Facility Requirements Analysis determines the available capacities of various facilities at the airport, whether they conform with FAA/BOA standards, and what facility updates or new facilities will be needed to comply with FAA/BOA requirements and/or the projected 20-year demand.

Element 5 – Airport Development Alternatives considers a variety of solutions to accommodate projected airside and landside facility needs through the long-term planning period. An analysis is completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development.

Element 6 – Recommended Plan and Land Use Compatibility provides a graphic and narrative description of the recommended plan for the use, development, and operation of the airport. This plan forms the basis of the ALP drawing set. Existing zoning ordinances and other land use management documentation will be reviewed and summarized, and land use management techniques in the airport vicinity will be outlined. This element also includes the formulation of an environmental overview and recycling plan.

Element 7 – Financial Management and Development Program includes a 20-year capital improvement program (CIP). The CIP will be established to define the schedules, costs, and funding sources for the recommended development projects.


INITIATION
• Goals and Objectives
• Project Website
• Establish Planning Advisory Committee (PAC)
PROJECT INITIATION MEETING
PHASE 1
• Inventory
• Aviation Demand Forecasts
• Facility Requirements
PHASE 1 PAC MEETING #1
• Discussion of draft Phase 1 materials
PHASE 2
• Airport Development Alternatives
PHASE 2 PAC MEETING #2 AND WORKSHOP
• Discussion of draft Phase 2 materials
• Public Information Workshop #1
PHASE 3
• Recommended Master Plan Concept
• Capital Improvement Program
• Environmental Review
PHASE 3 PAC MEETING #3 AND WORKSHOP
• Discussion of draft Phase 3 materials
• Public Information Workshop #2
DRAFT FINAL MASTER PLAN
APPROVAL PROCESS
• Local Approval of Master Plan
• FAA Approval of ALP
FINAL MASTER PLAN

Element 8 – Final Reports and Approvals provides documents that depict the findings of the study effort and present the study and its recommendations to appropriate local organizations. The final document incorporates the revisions to previous working papers prepared under earlier elements into a usable master plan document.

COORDINATION AND OUTREACH

The East Troy Municipal Airport master plan is of interest to many within the local community and region, including local citizens, local businesses, community organizations, village officials, airport users/tenants, and aviation organizations. As a component of the regional, state, and national aviation systems, the airport is important to state and federal agencies responsible for overseeing the air transportation system.

To assist in the development of the master plan, a PAC has been established to act in an advisory role during the preparation of the study. Committee members are scheduled to meet three times at designated points during the study to review study materials and provide comments to help ensure the development of a realistic, viable plan.

Draft materials will be prepared at various milestones in the planning process. The phase report process allows for timely input and review during each step in the master plan to ensure all issues are fully addressed as the recommended program develops.

Two open-house public information workshops will also be conducted as part of the study coordination and outreach efforts. Workshops are designed to allow all interested persons to become informed and provide input concerning the master plan process. Notices of meeting times and locations will be advertised through local media outlets, and all draft reports, meeting notices, and materials will be made available to the public on the project website at https://easttroy.airportstudy.net.

SWOT ANALYSIS

A SWOT analysis is a strategic business planning technique used to identify **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats associated with an action or plan. The SWOT analysis involves identifying an action, objective, or element, and then identifying the internal and external forces that positively and negatively impact that action, objective, or element in a given environment. A SWOT analysis will be conducted with the PAC and a summary of this exercise and discussion will be included below.

SWOT DEFINITIONS

This SWOT analysis groups information into two categories:

- **Internal –** attributes of the airport and market area that may be considered strengths or weaknesses for the action, objective, or element
- **External –** attributes of the aviation industry that may be opportunities or threats for the action, objective, or element

The SWOT analysis further categorizes information into one of the following:

- **Strengths –** internal attributes of the airport that are helpful to achieving the action, objective, or element
- **Weaknesses –** internal attributes of the airport that are harmful to achieving the action, objective, or element
- **Opportunities –** external attributes of the industry that are helpful to achieving the action, objective, or element
- **Threats –** external attributes of the industry that are harmful to achieving the action, objective, or element

It is important to note that some attributes may fit into multiple categories. An attribute might be considered both a strength and a weakness, depending on the perspective of the person or entity describing it.

Chapter One

Inventory

The Village of East Troy

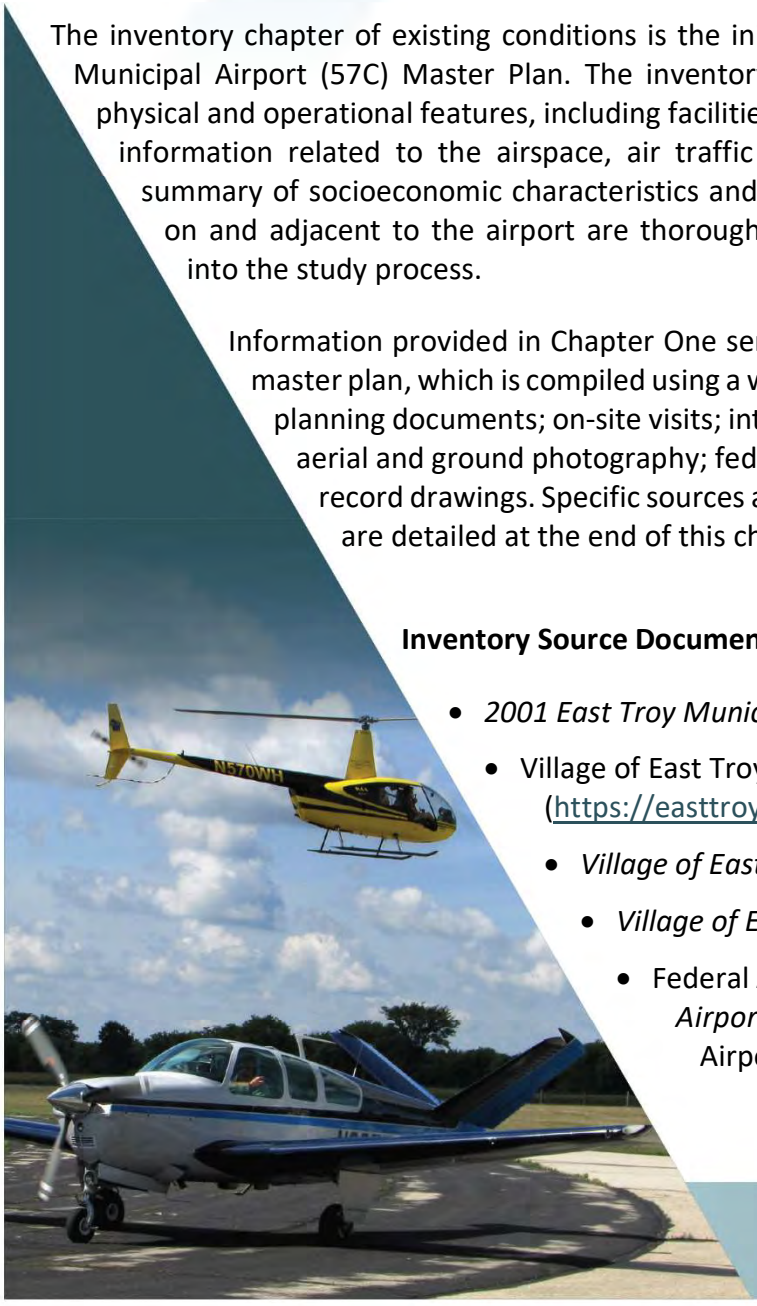
Chapter 1
Inventory

The inventory chapter of existing conditions is the initial step in the preparation of the East Troy Municipal Airport (57C) Master Plan. The inventory will serve as an overview of the airport's physical and operational features, including facilities, users, and activity levels, as well as specific information related to the airspace, air traffic activity, and role of the airport. Finally, a summary of socioeconomic characteristics and review of existing environmental conditions on and adjacent to the airport are thoroughly detailed, which will provide further input into the study process.

Information provided in Chapter One serves as the baseline for the remainder of the master plan, which is compiled using a wide variety of resources, including: applicable planning documents; on-site visits; interviews with airport staff, tenants, and users; aerial and ground photography; federal, state, and local publications; and project record drawings. Specific sources are listed below, and environmental resources are detailed at the end of this chapter.

Inventory Source Documents:

- *2001 East Troy Municipal Airport Layout Plan*
- Village of East Troy's airport website (https://easttroywi.gov/airport)
- *Village of East Troy Municipal Code*, 2015
- *Village of East Troy Comprehensive Plan: 2020-2040*
- Federal Aviation Administration (FAA) Form 5010, *Airport Master Record*, for East Troy Municipal Airport



The Village of East Troy

AIRPORT SETTING AND BACKGROUND

LOCALE

The Village of East Troy is located in Walworth County in southeast Wisconsin, approximately 30 miles southwest of Milwaukee. The Village of East Troy is located along I-43 between Milwaukee and lake resort communities, such as Lake Geneva. The area is characterized by natural features, such as Kettle Moraine State Forest to the northeast, as well as numerous lakes and other geologic features caused by the last Ice Age. The village is ideally located in proximity to the greater Milwaukee area and the urbanizing communities to the northeast, which have experienced strong growth since the construction of I-43. Enhanced regional access and ample local natural amenities make the Village of East Troy and surrounding area an attractive place to live and work. Major employment industries in the area include manufacturing, educational services, healthcare, retail, finance, and insurance.

East Troy Municipal Airport is situated within the village boundaries on the northeast edge of town. The airport encompasses approximately 214 acres and sits at an elevation of 860.2 feet above mean sea level (MSL). The surrounding major surface roadways include I-43, which runs northeast/southwest on the south side of the village, and Wisconsin Highway 20 (WIS 20), which borders the airport's south side and connects to County Highway L. From County Highway L, the airport entrance road and South Road provide access to airport property. **Exhibit 1A** depicts the airport in its regional setting.

AIRPORT ADMINISTRATION

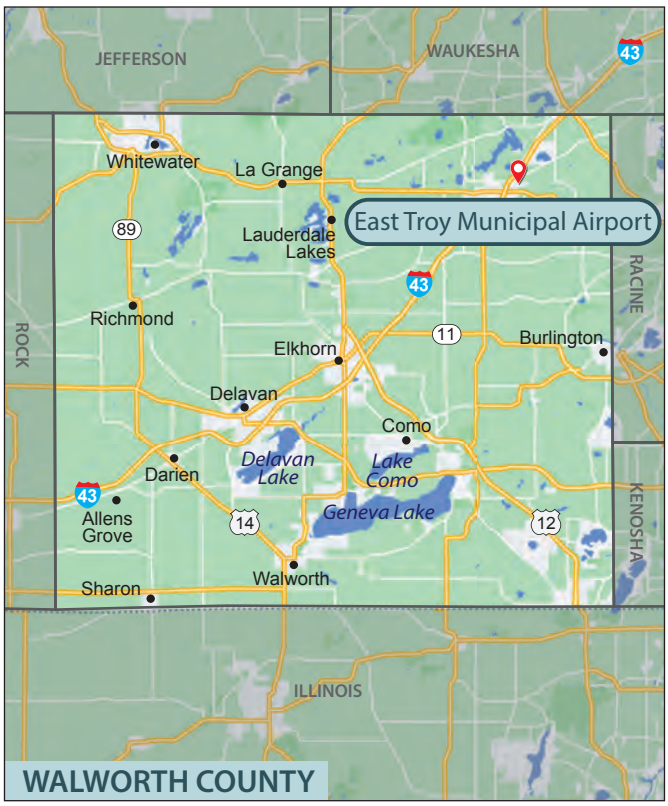
East Troy Municipal Airport is owned and operated by the Village of East Troy. An airport advisory committee, which consists of six members (including one trustee/chairperson), is responsible for operational and fiscal oversight of the airport. The committee meets on a monthly basis at the fixed base operator (FBO) building at the airport and maintains meeting minutes for public record. Advisory committee members serve two-year terms. An airport manager provides day-to-day oversight and maintenance of the airport and also serves on the airport advisory committee. The airport is staffed via the airport manager Monday through Friday from 7:30 a.m. to 3:00 p.m.

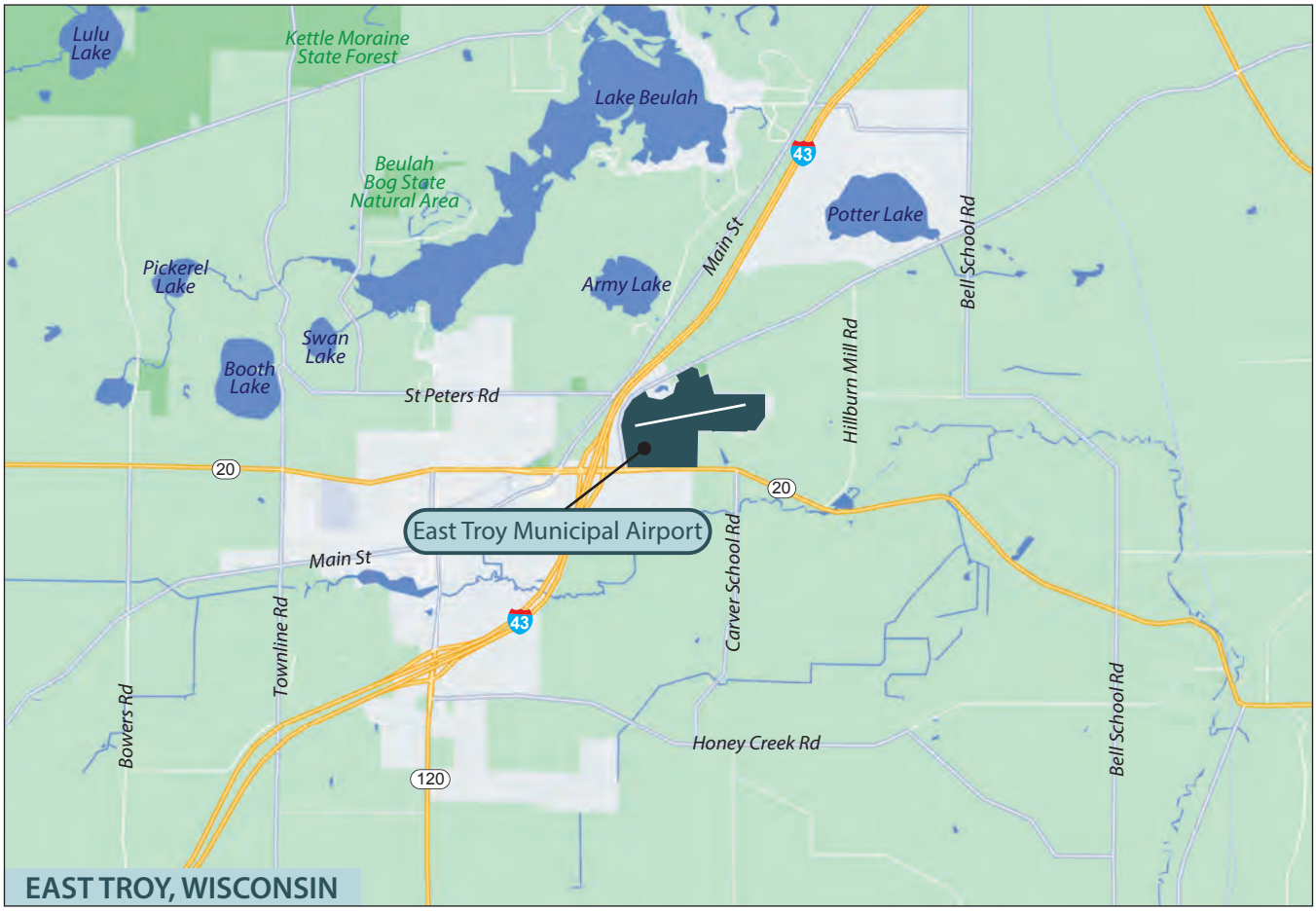
CLIMATE

Climate and local weather conditions are an important consideration in the master planning process, as they can significantly impact an airport's operations. For example, high surface temperatures and humidity increase runway length requirements, and runway orientation is dependent on predominant wind patterns for the area. Cloud cover percentages and frequency of other climatic conditions also determine the need for navigational aids and lighting.

East Troy experiences a humid continental climate with four distinct seasons. Winters are severe, while summers are generally warm. The weather is generally humid and there is no dry season. **Figure 1A** displays local weather patterns. The nearest available weather data came from the City of Burlington, located approximately 10 miles away. July has the highest average maximum temperature, 81 degrees Fahrenheit (°F), while January is the coldest month, with an average minimum temperature of 11.5°F.


Superior
MINNESOTA
MICHIGAN
Hayward
Rhinelander
Merrill
Marinette
94
Eau Claire
Green Bay
Appleton
43
Oshkosh
Sheboygan
90
La Crosse
East Troy Municipal Airport
Madison
Milwaukee
Janesville
IOWA
ILLINOIS
WISCONSIN


JEFFERSON
WAUKESHA
43
Whitewater
La Grange
89
Lauderdale Lakes
East Troy Municipal Airport
RACINE
43
Richmond
ROCK
11
Elkhorn
Burlington
Delavan
Como
Darien
Delavan Lake
Lake Como
43
Allens Grove
14
Geneva Lake
12
KENOSHA
Walworth
Sharon
ILLINOIS
WALWORTH COUNTY


Lulu Lake
Kettle Moraine State Forest
Lake Beulah
Beulah Bog State Natural Area
43
Potter Lake
Main St
Bell School Rd
Pickerel Lake
Army Lake
Swan Lake
Booth Lake
St Peters Rd
Hillburn Mill Rd
20
20
East Troy Municipal Airport
Main St
Carver School Rd
43
Townline Rd
Bowers Rd
Honey Creek Rd
Bell School Rd
120
EAST TROY, WISCONSIN

Annual rainfall totals 35.3 inches and is most plentiful during the summer; June is the rainiest month, averaging 4.5 inches. Annual snowfall totals 37.7 inches, and January averages the most snow at 12.1 inches.

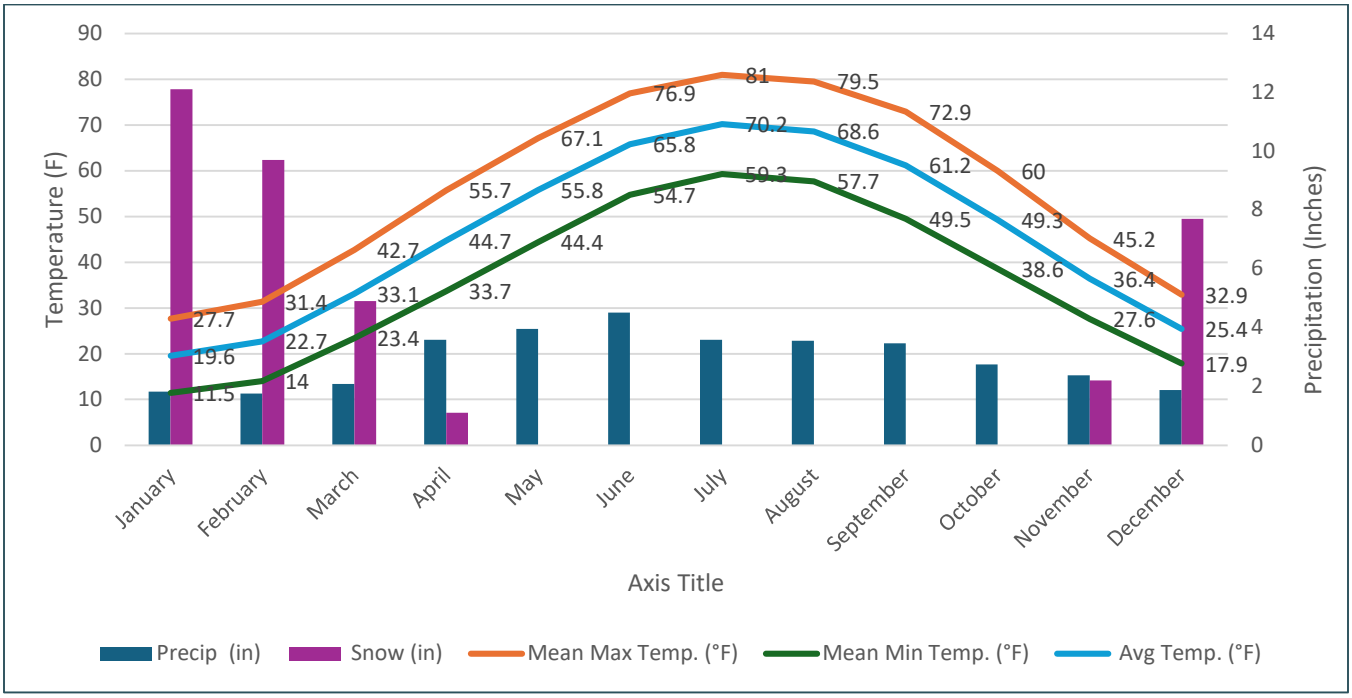


Figure 1A – Local Weather Patterns

Table 1A indicates that visual meteorological conditions (VMC) occur 87.65 percent of the time. When under VMC, pilots can operate using visual flight rules (VFR) and are responsible for maintaining proper separation from objects and other aircraft. Instrument meteorological conditions (IMC) account for all weather conditions less than VMC that still allow for aircraft to safely operate under instrument flight rules (IFR). Under IFR, pilots rely on instruments in the aircraft to accomplish navigation. IMC occur 7.46 percent of the time. Less than IMC, or poor visibility conditions (PVC), are present 4.89 percent of the time. These weather conditions are lower than instrument approach minimums, making the airport inaccessible to most air traffic.

TABLE 1A | Weather Conditions

Condition	Cloud Ceiling	Visibility	Percent of Total
VMC	≥ 1,000' AGL	≥ 3 statute miles	89.73%
IMC	≥ 500' AGL and < 1,000' AGL	≥ 1 to < 3 statute miles	6.59%
PVC	< 500' AGL	< 1 statute mile	3.68%

VMC = visual meteorological conditions
IMC = instrument meteorological conditions
PVC = poor visibility conditions
AGL = above ground level

Station ID: Burlington Municipal Airport, WI, US, observations from 1/1/2014 through 12/31/2023

CAPITAL IMPROVEMENT HISTORY

Significant improvements have been made to the airport since its establishment. To assist in funding capital improvements, the FAA and Wisconsin Department of Transportation (WisDOT) Bureau of Aeronautics (BOA) have provided funding assistance to East Troy Municipal Airport primarily through the Airport Improvement Program (AIP). Airport improvement funds are collected through user fees, additional taxes on airline airfares, and aviation fuel taxes. As airports grow and safety standards change over time, funding is needed to maintain a safe and efficient airport environment. The *Airport and Airway Development and Revenue Act of 1970* established the Aviation Trust Fund, which funds the AIP. Wisconsin is a member of the FAA's Block Grant Program, giving the WisDOT-BOA the responsibility (among other responsibilities) for administering AIP grants to reliever and general aviation airports, including East Troy Municipal Airport. **Table 1B** summarizes approximately $7.4 million in federal grant-aided capital improvement projects undertaken at the airport since 1987. State grant history is also included and totals more than $17,600, with an additional $424,751 in state funds to match the AIP grants. These funds have included a variety of airport improvement projects, as listed in the table.

TABLE 1B | Grant History

FY	Grant Number	Project Description	TOTAL COST	FAA	State	Local
AIP (Federal Aid) Projects						
1987	AIP-01	Land Acquisition; Construct Runway 8-26; Construct Taxiways; Reconstruct/Expand Apron; Install MIRLs on Runway & Segmented Circle	**$1,084,183**	$967,639	$58,272	$58,272
1988	AIP-02	Land Acquisition; Construct Runway 8-26; Construct Taxiways; Reconstruct/Expand Apron; Install MIRLs on Runway & Segmented Circle	**$569,116**	$492,608	$38,254	$38,254
1991	AIP-03	Construct Parallel Taxiway to Runway 8-26 & Hangar Taxiway; Install Taxiway Lights & Signs	**$433,257**	$389,883	$21,687	$21,687
2002	AIP-04	Construct Hangar Complex, Including Taxiways and Access Road	**$412,407**	$214,444	$98,981	$98,981
2006	AIP-05	Install Fuel System and Expand Apron	**$445,223**	$419,628	$12,798	$12,798
2007	AIP-06	Expand Aircraft Apron with Tiedowns	**$323,897**	$307,702	$8,097	$8,097
2010	AIP-07	South Aircraft Hangar Expansion, Phase II; PAPI Lighting for Runway 26*	**$77,391***	$74,393*	$1,499*	$1,499*
2012	AIP-08	Construction: Runway 8-26 Reconstruction; Crackfilling Runway 8-26, Tree Clearing Equipment; SRE Front 3-Point Hitch; AWOS	**$1,002,627**	$921,466	$40,581	$40,581
2012	AIP-09	Purchase SRE	**$172,549**	$163,921	$4,314	$4,314
2016	AIP-10	Rehab Parallel Taxiway, Ramp, Hangar Taxilanes, Access Road, and Parking Lot	**$1,831,941**	$1,626,043	$102,949	$102,949
2018	AIP-11	Airfield Lighting	**$669,672**	$602,796	$33,438	$33,438
2020	AIP-12	CARES / CRRSAA / APRA Operations and Maintenance Reimbursements	**$75,000**	$75,000	–	–
2023	AIP-13	Conduct Airport Master Plan; ALP Update	**$334,290***	$326,527*	$3,881*	$3,881*
		Subtotals – Federal Grants	**$7,431,553**	**$6,582,051**	**$424,751**	**$424,751**
SAP (State Aid) Projects						
2021	SAP-52	Reimburse Fuel System Card Reader Upgrade	$17,644	–	$14,115	$3,529
		Subtotals – State Grants	**$17,644**	**–**	**$14,115**	**$3,529**
		TOTAL GRANT FUNDS	**$7,449,197**	**$6,582,051**	**$438,867**	**$428,280**

*In progress – estimated amounts

Source: WisDOT BOA records

THE AIRPORT'S SYSTEM ROLE

Airport planning takes place at the local, state, and national levels, each of which has a different emphasis and purpose.

- **Local |** East Troy Municipal Airport has an approved airport layout plan (ALP), which was completed in 1998 and last updated in 2001.
- **State |** East Troy Municipal Airport is included within the *State Airport System Plan 2030*.
- **National |** East Troy Municipal Airport is included in the *National Plan of Integrated Airport Systems* (NPIAS), which categorizes overall airport roles and responsibilities based on input from local and state planning efforts (i.e., master plans and state system plans).

LOCAL AIRPORT PLANNING

1998 Airport Layout Plan | The *1998 Airport Layout Plan* provided a 20-year airport development vision. The ALP drawing set has since been updated in 2001. The primary recommendations included:

- Extending Runway 8-26 to 4,500-feet;
- Extending Taxiway A;
- Paving Runway 18-36;
- Constructing a parallel taxiway serving Runway 18-36;
- Acquiring property for approach protection; and
- Adding landside facilities (aprons/taxilanes/hangars) on the north and south sides of Runway 8-26.

STATE AIRPORT PLANNING

The primary planning document for the State of Wisconsin is the *State Airport System Plan 2030*, which was adopted in 2015. The system plan provides an inventory and evaluation of all public-use airports in the state, with a focus on keeping Wisconsin's airports highly advanced, safe, and responsive to the public's needs. East Troy Municipal Airport is classified as a large general aviation (GA) airport within the system plan. The system plan's definition of a large GA community airport is one that "supports all GA aircraft that include daily operations of all types of business jets. These airports generally serve as domestic transportation centers and may support international business activity."

FEDERAL AIRPORT PLANNING

Many of the nation's existing airports were either initially constructed by the federal government, or their development and maintenance was partially funded through various federal grant-in-aid programs to local communities; therefore, the system of airports that exists today is mostly due to federal policy that promotes the development of civil aviation. As part of a continuing effort to develop a national airport system, U.S. Congress has maintained a national plan for the development and maintenance of airports.

The FAA maintains a database of airports that are eligible for AIP funding and are for public use, called the *National Plan of Integrated Airport Systems* (NPIAS). The NPIAS is published and used by the FAA in administering the AIP, which is the source of federal funds for airport improvement projects across the country. An airport must be included in the NPIAS to be eligible for federal funding assistance through the AIP.

The current plan is the NPIAS 2023-2027, which identified 3,287 existing public-use airports and eight proposed nonprimary airports (anticipated to open by 2027) that are deemed important to national air transportation. The plan estimates that approximately $62.4 billion in AIP-eligible airport projects will require financial assistance between 2023 and 2027, which is an increase of almost $19 billion from the estimate identified in the previous NPIAS report.

The NPIAS categorizes airports by the types of activities that take place, including commercial service, cargo service, reliever operations, and general aviation. East Troy Municipal Airport is currently classified as a Local GA airport in the NPIAS. These airports are critical components of the national GA system and account for 36 percent of all NPIAS airports. They are typically located near population centers, have moderate levels of activity, and often accommodate flight training and emergency services. Local GA airports average approximately 33 based propeller-driven aircraft (no jets) at their facilities.

AIRPORT FACILITIES AND SERVICES

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

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

AIRSIDE FACILITIES

Runways

As depicted on **Exhibit 1B**, East Troy Municipal Airport has a crosswind runway system. The runways and their features are detailed below.

Runway 8-26 | Runway 8-26 is the airport's primary runway, measuring 3,900 feet long by 75 feet wide. The runway is oriented east/west and is constructed of asphalt, which is reported to be in good condition. Runway 8-26 has a weight-bearing capacity of 12,000 pounds for aircraft with a single wheel (S) landing gear configuration. The runway's weight-bearing capacity for dual wheel aircraft (D) and dual tandem wheel aircraft (2D) is not reported. Both runway ends are equipped with non-precision markings, which support the global positioning system (GPS) approaches that are available to each runway end. The runway generally slopes down from the Runway 8 end at a longitudinal gradient of 0.45 percent.

Runway 18-36 | Runway 18-36 is oriented north/south and serves as the crosswind runway. It is 2,446 feet long and 75 feet wide and is a turf runway that is reported to be in fair condition. The runway ends and edges are marked with yellow cones and the runway is not served by instrument approach procedures. The longitudinal gradient is 0.42 percent, generally sloping downward from the Runway 18 end.

Taxiways

The taxiway system at East Troy Municipal Airport is identified on **Exhibit 1B**. A quasi-parallel taxiway, Taxiway A, serves Runway 8-26, extending from the Runway 8 threshold for approximately 1,900 feet before slightly angling toward the Runway 26 threshold. The south side of Runway 8-26 is served by partial parallel Taxiway B, which provides access to several hangar facilities. Three connector taxiways provide entry/exit points from Runway 8-26 to Taxiway A, while two entry/exit points provide access to partial parallel Taxiway B on the south side of the runway. Taxiway A is 35 feet wide and maintains a separation of approximately 330 feet from runway centerline to taxiway centerline at its widest point. At the Runway 26 threshold, the runway to taxiway centerline separation reduces to 240 feet, which is the narrowest point.

Partial parallel Taxiway B serves the hangar facilities on the south side of Runway 8-26, maintains a runway centerline to taxiway centerline separation of 350 feet, and is 25 feet wide.

Airfield Lighting

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

Rotating Beacon

Airport Identification Lighting

The location of the airport at night is universally identified by a rotating beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The beacon operates from sunset to sunrise and is located on the north side of the airport property near the airport entrance road and public parking area.

Pavement Edge Lighting

Pavement edge lighting defines the lateral limits of the pavement to ensure safe operations at night and/or during times of low visibility, and to help maintain safe and efficient access to and from the runway and aircraft

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

RUNWAY				
Runway Designation	8	26	18	36
Length	3,900'		2,446'	
Width	75'		75'	
End Elevation	842.7'	860.2'	838.5'	828.2'
Gradient	0.45%		0.42%	
Surface Material	Asphalt		Turf	
Markings	Non-precision		Edge Markers	
Lighting	MIRL		None	
Load Bearing Strength - S	12,000 lbs.		NA	
Visual Approach Aids	PAPI-2 (left) REILs	PAPI-2 (left) REILs	None None	
Instrument Approach Procedures	LPV GPS &VOR/DME		None	
Traffic Pattern	Left	Left	Left	Left

TAXIWAYS	
Lighting	MITL (Taxiway A&B; entry/exit)
Surface Material	Asphalt
Taxiway Width	Taxiway A & Connectors - 35' Taxiway B & Connectors - 25'

WEATHER AND NAVIGATIONAL AIDS
AWOS
Lighted Wind Cone, Supplemental Windcones
Airport Beacon

LEGEND

- Airport Property Line
- A — Taxiway Designation

Rotating Beacon
Turf Landing Area Markers
Supplemental Wind Cone
PAPI-2
REILs
Runway 8-26 (3,900' x 75')
330'
240'
35'
25'
350'
Wind Tee and Lighted Wind Cone
Turf Runway 18-36 (2,446' x 75')
Turf Landing Area Markers
PAPI-2
REILs
Supplemental Wind Cone
AWOS
L
Main St
43
20
N
0
600
SCALE IN FEET

Photo: Martinez Geospatial 5/27/24

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parking areas. Runway 8-26 is equipped with medium intensity runway lighting (MIRL) and threshold lights, which emit green light outward from the runway and emit red light toward the runway. The green lights indicate the landing threshold for arriving aircraft and the red lights indicate the end of the runway for departing or landing aircraft. Taxiway A, Taxiway B, and associated entrance/exit taxiways at the airport are equipped with medium intensity taxiway lighting (MITL). All edge lights are mounted on frangible bases approximately one foot off the ground.

Visual Approach Aids

Visual approach aids are installed at airports to assist pilots in determining the correct descent path to the runway end during landing. Runway 8-26 is equipped with a two-box precision approach path indicator (PAPI-2) system on each runway end. The PAPIs are installed on the left side of the runway and have been set at the standard 3.00-degree glide path. PAPIs have an effective visual range of three miles during the day and 20 miles at night. There are no visual approach aids serving Runway 18-36.

PAPI-2 on Approach to Runway 8

Runway end identification lights (REILs) provide a visual identification of the runway end for landing aircraft. The REILs consist of two synchronized flashing lights, located laterally on each side of the runway end, facing the approaching aircraft. These flashing lights can be seen day or night for up to 20 miles, depending on visibility conditions. Runway 8-26 is equipped with REILs on both ends. While Runway 18-36 does not have REILs, it is marked with yellow cones to establish the runway end points.

Airfield Signage, REILs, and Threshold Lighting

Pilot-Controlled Lighting

During nighttime hours, a pilot can use the pilot-controlled lighting (PCL) system to activate and increase the intensity of the airfield lights and visual approach aids from their aircraft through a series of clicks of their radio transmitter, using the common traffic advisory frequency (CTAF) (123.0 MHz).

Airfield Signage and Markings

Airfield identification signs assist pilots in identifying runways, taxiway routes, holding positions, and critical areas. East Troy Municipal Airport is equipped with lighted runway and taxiway designations and routing/directional signage.

Pavement markings aid in the movement of aircraft along surfaces at the airport and identify closed or hazardous areas. The airport provides and maintains marking systems in accordance with Advisory Circular 150/5340-1, *Standards for Airport Marking*. As mentioned previously, Runway 8-26 is equipped with non-precision markings that include the runway centerline, designation, threshold markings, and aiming points. Turf Runway 18-36 has endpoint and edge markings denoted by yellow cones, as previously mentioned.

Taxiway Lighting and Yellow Runway Edge Markers

All taxiways at the airport are marked with yellow centerline, holding position markings, and leadoff lines on normally used exits. Centerline markings assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway edges. Aircraft holding positions are marked at each runway/taxiway intersection. All taxiways serving Runway 8-26 are marked with holding positions located 200 to 215 feet from the runway centerline. At the intersection of Runway 18-36, Taxiway A has holding positions located approximately 122 feet from the centerline when measuring from the nearest point of the hold position.

Navigational Aids and Instrument Approach Procedures

Navigational aids are electronic devices that transmit radio frequencies which pilots in properly equipped aircraft can translate into point-to-point guidance and position information. In general, the very high frequency omnidirectional range (VOR) provides azimuth readings to pilots of properly equipped aircraft, transmitting a radio signal at every degree to provide 360 individual navigational courses. Distance measuring equipment (DME) is frequently combined with a VOR facility (VOR/DME) to provide distance, as well as direction, information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The nearest radio navigational aid is the Badger VOR/DME, located 19.6 nautical miles (nm) northeast.

A non-directional beacon (NDB) is a radio transmitter that is used as an aviation or marine navigational aid at a known location. The signal transmitted does not include *inherent* directional information, in contrast to other navigational aids, such as a VOR. NDB signals follow the curvature of the Earth, so they can be received at much greater distances at lower altitudes, which is a major advantage over VOR. The Rock River NDB, located 27.1 nm to the northwest, is the only NDB in the vicinity of East Troy Municipal Airport. NDBs are generally being phased out of use by the FAA.

The global positioning system (GPS) is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from an NDB or VOR in that it does not require pilots to navigate using a specific facility, and pilots using GPS can directly navigate to any airport in the country. GPS uses satellites placed in orbit around the earth to transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information.

Instrument approach procedures assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. They are categorized as either precision, approach with vertical guidance (APV), or non-precision. Precision instrument approach aids provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway with a height above threshold (HATh) lower than 250 feet and visibility lower than ¾-mile. APVs also provide course alignment and vertical guidance but have HAThs of 250 feet or more and visibility minimums of ¾-mile or greater. Non-precision instrument approaches provide only course alignment information with no vertical guidance.

Approach minimums are published for different aircraft categories and consist of a minimum decision altitude and required visibility. (Aircraft categories are described in greater detail in Chapter Two.) According to Title 14 Code of Federal Regulations (CFR) 91.175, a pilot must be able to make a safe landing and have the runway in sight, and the visibility requirement be met. For a precision approach or approach with vertical guidance, the decision altitude (DA) is the point at which the pilot must meet all three criteria for landing; otherwise, they cannot land using the published instrument approach. For a non-precision approach, the minimum descent altitude (MDA) is a specified altitude at which the required visual reference must be made or a missed approach must be initiated.

At East Troy Municipal Airport, GPS provides a localizer performance (LP) approach to Runway 8 and a localizer performance with vertical guidance (LPV) to Runway 26. Each approach is provided via an area navigation (RNAV) GPS. Additionally, the airport is served by a VOR/DME circling approach. **Table 1C** details the instrument approach procedures at East Troy Municipal Airport.

TABLE 1C | Instrument Approach Procedures

	WEATHER MINIMUMS BY AIRCRAFT TYPE			
	Category A	Category B	Category C	Category D
RNAV (GPS) Rwy 8				
LP MDA	1,240' / 1-mile		NA	
LNAV MDA	1,280' / 1-mile		NA	
RNAV (GPS) Rwy 26				
LPV DA	1,110' / 1-mile		NA	
LNAV/VNAV DA	1,161' / 1-mile		NA	
LNAV MDA	1,260' / 1-mile		NA	
VOR/DME-A				
Circling	1,340' / 1-mile		NA	

xxx' / x-mile = decision altitude/visibility minimum

Aircraft categories are based on the approach speed of aircraft, which is determined as 1.3 times the stall speed in landing configuration, as follows:

- Category A: 0-90 knots (e.g., Cessna 172)
- Category B: 91-120 knots (e.g., Beechcraft KingAir)
- Category C: 121-140 knots (e.g., Canadair Challenger, Boeing 737)
- Category D: 141-166 knots (e.g., Gulfstream IV, Boeing MD-88)
- Category E: Greater than 166 knots (e.g., certain large military or cargo aircraft)

Source: AirNav (https://www.airnav.com/airport/57C)

WEATHER AND COMMUNICATION

East Troy Municipal Airport is served by an automated weather observing system (AWOS-3). The system updates weather observations every minute, continuously reporting changes that can be accessed via radio frequency 118.125 megahertz (MHz) or by calling (262) 642-1845. The AWOS reports cloud ceiling,

visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), lightning detection, and density altitude (airfield elevation corrected for temperature). The AWOS is located on the southeast side of the airport property adjacent the Runway 26 threshold.

East Troy Municipal Airport also has a lighted wind cone and lighted wind tee located near the Runway 8 threshold on the south side of the runway. The wind cone informs pilots of the wind direction and speed, while the wind tee indicates wind direction only. Multiple supplemental wind cones are also located on the airfield.

Lighted Wind Cone and Wind Tee

AREA AIRSPACE AND AIR TRAFFIC CONTROL

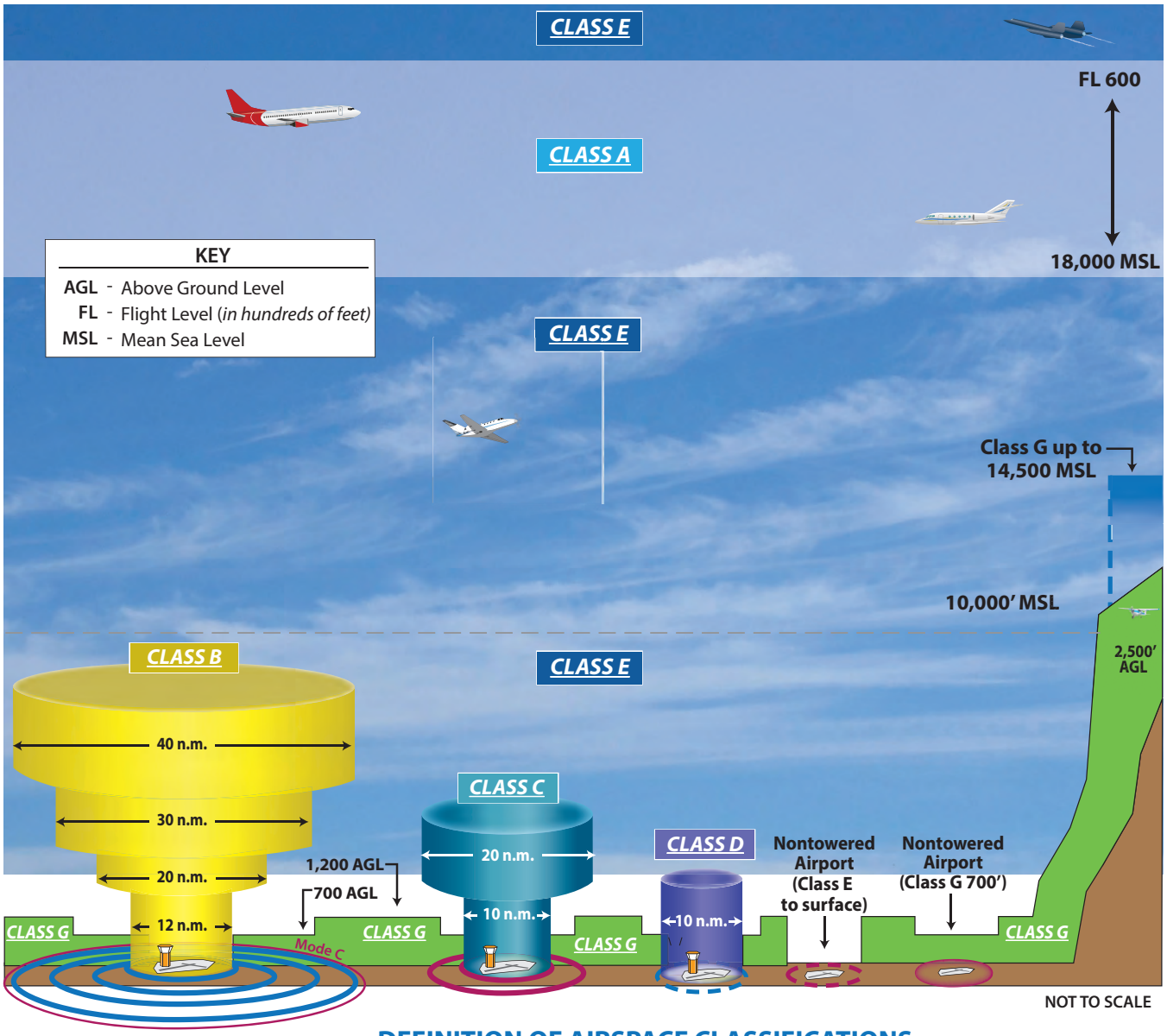
The *FAA Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the U.S. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground, in addition to establishing a safe and efficient airspace environment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

AIRSPACE STRUCTURE

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

Class A Airspace | Class A airspace includes all airspace from 18,000 feet MSL to flight level (FL) 600 (approximately 60,000 feet MSL) over the contiguous 48 states and Alaska. This airspace is designated in 14 CFR Part 71.33 for positive control of aircraft. All aircraft must be on an IFR clearance to operate within Class A airspace.

Class B Airspace | Class B airspace has been designated around some of the country's major airports, such as Chicago O'Hare International Airport (ORD), to separate all aircraft within a specified radius of the primary airport. Each Class B airspace is specifically tailored for its primary airport. This airspace is the most restrictive controlled airspace routinely encountered by pilots operating under VFR in an uncontrolled environment. In order to fly within Class B airspace, an aircraft must be equipped with special



DEFINITION OF AIRSPACE CLASSIFICATIONS

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

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

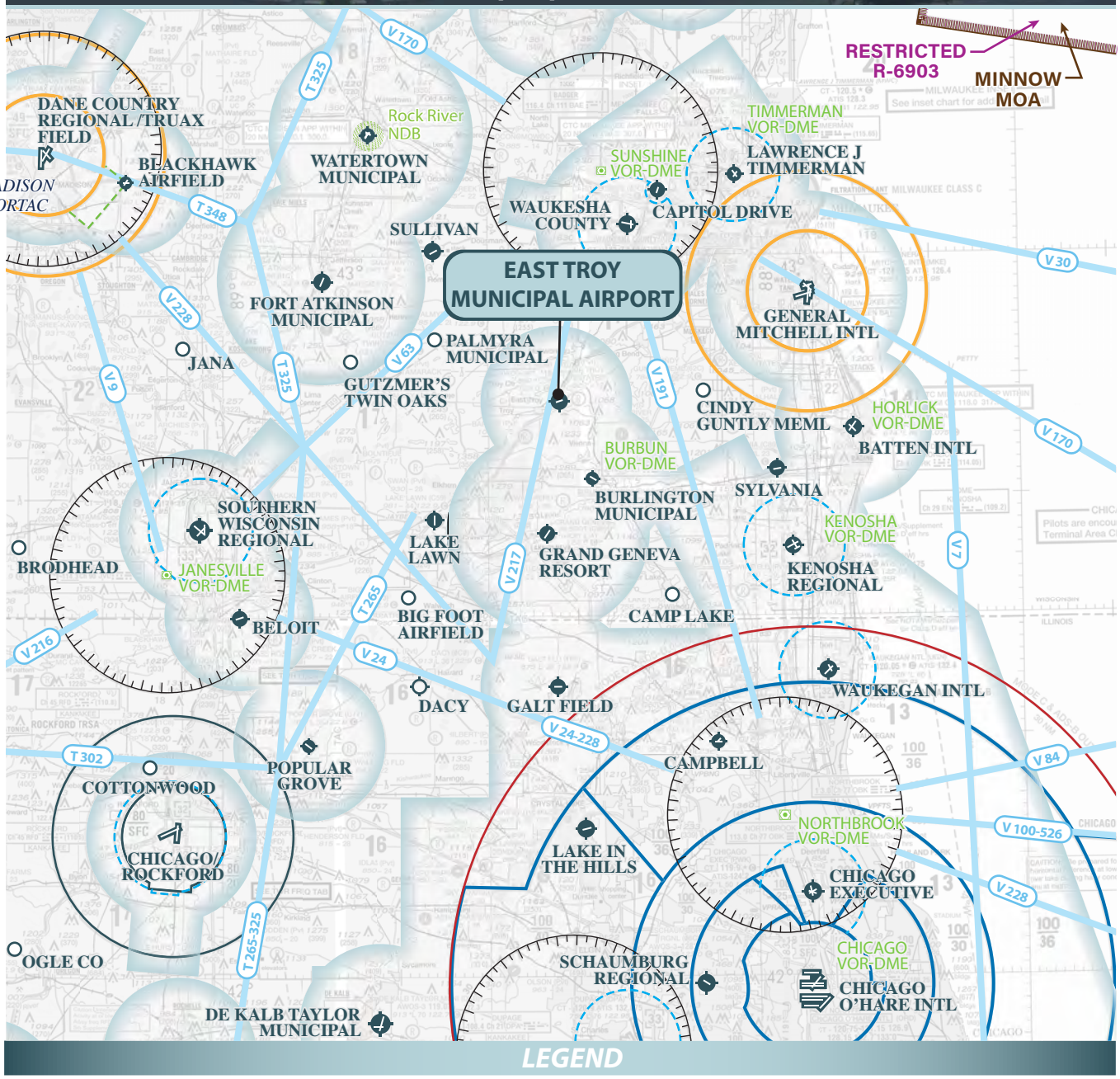
CLASS C Think C - Mode C. Mode C transponder required. ATC communication required. Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.

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

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

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

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



LEGEND

- Airport with other than hard-surfaced runway
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Compass Rose
- Non-directional Radio Beacon (NDB)
- VOR-DME
- Military Operations Area (MOA)
- Prohibited, Restricted, and Warning Areas
- Class B Airspace
- Class C Airspace
- Class D Airspace
- Class E (sfc) Airspace with floor 700 ft. above surface that laterally abuts 1200 ft. or higher Class E airspace
- Class E Airspace
- Terminal Radar Service Area (TRSA)
- Victor Airways
- Mode C

Source:
Chicago Sectional Chart,
US Department of Commerce,
National Oceanic and Atmospheric
Administration, January 25, 2024

radio and navigation equipment and must obtain clearance from air traffic control. A pilot is required to have at least a private pilot certificate or be a student pilot who has met the requirements of Federal Aviation Regulation (FAR) Part 61.95, which requires special ground and flight training for Class B airspace. Aircraft are also required to utilize a Mode C transponder within a 30-nm range of the center of the Class B airspace. A Mode C transponder allows the airport traffic control tower (ATCT) to track the location and altitude of the aircraft. East Troy Municipal Airport is located approximately 38 nm from ORD's Class B airspace.

Class C Airspace | The FAA has established Class C airspace at approximately 120 airports around the country that have significant levels of IFR traffic. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. To fly inside Class C airspace, an aircraft must have a two-way radio and an encoding transponder and must have established communication with the air traffic control (ATC) facility. Aircraft may fly below the floor of the Class C airspace or above the Class C airspace ceiling without establishing communication with ATC. The nearest Class C airspace to East Troy Municipal Airport surrounds General Mitchell International Airport (MKE) in Milwaukee, approximately 23 nm to the northeast.

Class D Airspace | Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nm from the airport, extending from the surface up to a designated vertical limit, which is typically set at approximately 2,500 feet above the airport elevation. Aircraft operators planning to operate within Class D airspace are required to contact air traffic control prior to entering or departing the airspace and must maintain contact while within the controlled airspace to land or to transverse the area. The nearest Class D airspace surrounds Waukesha County Airport (UES), approximately 16 nm north-northeast of East Troy Municipal Airport.

Class E Airspace | Class E airspace consists of controlled airspace designed to contain IFR operations near an airport and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with ATC when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communication with ATC facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist. East Troy Municipal Airport is in Class E airspace, the surface of which begins at 700 feet above ground level (AGL). The airspace below 700 feet AGL surrounding the airport is Class G airspace.

Class G Airspace | Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlying Class E airspace (700 feet AGL).

While aircraft may technically operate within Class G airspace without any contact with ATC, it is unlikely that many aircraft will operate this low to the ground. Furthermore, federal regulations specify minimum altitudes for flight. FAR Part 91.119*, Minimum Safe Altitudes*, generally states that, except when necessary for takeoff or landing, pilots must not operate aircraft over any congested area of a city, town, or settlement, or over any open-air assembly of persons, at an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

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

Victor Airways | For aircraft arriving or departing the regional area using VOR facilities, a system of federal airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace that are eight miles wide, extend upward from 1,200 feet AGL to 18,000 feet MSL, and extend between VOR navigational facilities. Victor Airways near East Troy Municipal Airport are identified on **Exhibit 1D**.

Alert Areas / Military Operations Areas (MOAs) & Military Training Routes (MTRs) / Restricted Areas | Alert areas, MOAs, MTRs, and restricted areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training, military operations/activities, or unusual types of aerial activity. Pilots should exercise caution near and within these areas. All activity within these areas, if granted by the controlling agency, should be conducted in accordance with regulations and without waiver; pilots of participating aircraft and pilots transitioning the area are equally responsible for collision avoidance. The MOA nearest to the airport is the Minnow MOA, which is 50 nm to the northeast. A restricted area (R-6903) used for combat readiness training is co-located within the Minnow MOA.

Wilderness Areas | When operating near designated wilderness areas, aircraft are required to maintain a minimum altitude of 2,000 feet above the surface of designated National Park areas, including wilderness areas and designated breeding grounds. FAA AC 91-36C defines the surface as the highest terrain within 2,000 feet laterally of the route of flight or the uppermost rim of a canyon or valley. There are currently no wilderness areas established within the immediate vicinity of East Troy Municipal Airport.

AIRSPACE CONTROL

The FAA has established 21 Air Route Traffic Control Centers (ARTCCs) throughout the continental U.S. to control aircraft operating under IFR within controlled airspace and while enroute. An ARTCC assigns specific routes and altitudes along federal airways to maintain separation and orderly traffic flow. The Chicago Center ARTCC controls IFR airspace enroute to and from East Troy Municipal Airport at altitudes greater than 10,000 feet AGL.

Flight Service Stations (FSS) are air traffic facilities that provide pilot briefings, flight plan processing, inflight radio communications, search and rescue (SAR) services, and assistance to lost aircraft and aircraft in emergency situations. Flight Service Stations also relay ATC clearances, process Notices to Air Missions (NOTAMs), and broadcast aviation meteorological and aeronautical information. The Green Bay FSS is the nearest FSS to East Troy Municipal Airport.

LOCAL OPERATING PROCEDURES

The traffic pattern at the airport is maintained to provide the safest and most efficient use of the airspace. At East Troy Municipal Airport, all runways use a left-hand traffic pattern, which means aircraft conduct left-hand turns within the traffic pattern when operating on the runway. The typical traffic pattern altitude is 500 feet AGL for rotorcraft; between 800 and 1,000 feet AGL for piston aircraft; and 1,500 feet AGL for turbine aircraft. It should be noted that the airport has noise abatement procedures in effect. Pilots departing on Runway 26 are instructed to turn left, following I-43, after departure to avoid flight over the village. Pilots are also instructed to avoid flying to the west and northwest of the airport.

REGIONAL AIRPORTS

A review of other public-use airports that are identified within the NPIAS and located within a 30-nm radius of East Troy Municipal Airport was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at East Troy Municipal Airport. **Table 1D** provides basic-level information on the public-use airports within the vicinity of East Troy Municipal Airport.

TABLE 1D | Regional NPIAS Airports within 30 Nautical Miles – East Troy Municipal Airport

Airport	nm/Direction from 57C[1]	FAA Service Level[2]	Towered[1]	Based Aircraft[3]	2023 Annual Operations[4]	Longest Runway[1]	Visibility Minimum[1]
East Troy Municipal Airport	**-**	**GA**	**No**	**78[5]**	**41,000**	**3,900'**	**1-mile**
Burlington Municipal Airport	7.1 nm SSE	GA	No	107	54,900	4,300'	1-mile
Palmyra Municipal Airport	11.3 nm WNW	GA	No	54	14,000	2,800'	None
Waukesha County Airport	15.8 nm NNE	GA	Yes	210	61,471	5,849'	½-mile
Capital Drive Airport	19.5 nm NNE	GA	No	116	13,010	3,387'	None
Fort Atkinson Municipal Airport	22.0 nm WNW	GA	No	23	10,900	3,800'	1-mile
General Mitchell International Airport	22.8 nm ENE	Commercial	Yes	83	88,902	9,990'	CAT I
Kenosha Regional Airport	23.0 nm ESE	GA	Yes	222	59,998	6,600'	½-mile
Galt Field Airport	23.7 nm S	GA	No	32	40,000	2,802'	1-mile
Lawrence J Timmerman Airport	24.0 nm NE	GA	Yes	90	27,266	4,107'	1-mile
Batten International Airport	24.7 nm E	GA	No	76	47,000	6,574'	¾-mile
Dacy Airport	26.3 nm SSW	GA	No	34	20,000	3,589'	None
Watertown Municipal Airport	27.1 nm NW	GA	No	60	58,000	4,429'	1-mile

GA = general aviation
nm = nautical miles

Sources: [1]Airnav.com; [2]FAA NPIAS; [3]Basedaircraft.com; [4]ADIP; [5]57C Based Aircraft Airport Records

LANDSIDE FACILITIES

TERMINAL/AIRPORT OPERATIONS OFFICE

The terminal building at East Troy Municipal Airport is located on the north side of the airfield, adjacent to the aircraft apron area. The terminal facility is adjoined to a larger facility, with a combined square footprint of 5,400 square feet (sf). The terminal facility itself comprises approximately 1,200 sf of the whole structure. The terminal features a comfortable lobby, a pilots' lounge, a snooze room, and restrooms.

FIXED BASE OPERATOR AND AVIATION BUSINESSES

The Village of East Troy currently manages the fixed base operator (FBO), which operates within the terminal building. The FBO provides daily on-site management, when open, as well as aviation fuel, aircraft ground handling, aircraft parking, and hangar leasing. In addition to the FBO, several other businesses operate on the airport. Existing businesses located on the airport include:

Terminal Building

- Tab Air – aircraft maintenance and repair
- MF Helicopters – agricultural spraying, aerial photography, flight instruction, search and rescue
- Wisconsin Flight Sports LLC – powered paragliding instruction
- RECON Helicopters – agricultural spraying, helicopter maintenance
- Skydive Milwaukee/Sky Knights (operates through the fence) – parachute club and instruction

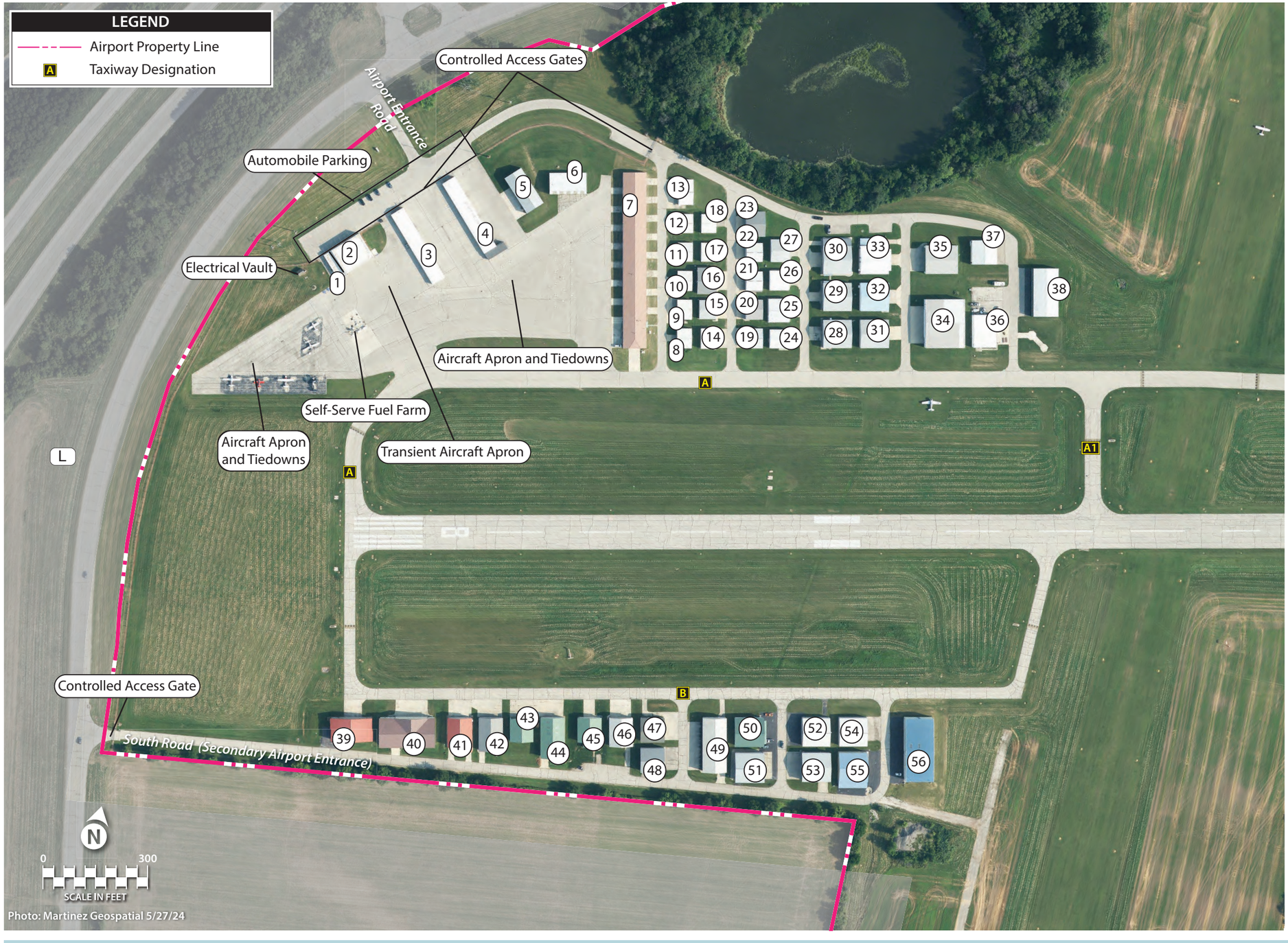
AIRCRAFT HANGAR FACILITIES

Existing hangar facilities at East Troy Municipal Airport are primarily located on the west side of the airport, on the north and south sides of Runway 8-26, as shown on **Exhibit 1E**. These aircraft storage facilities consist of T-hangars, which are designed to accommodate individual smaller aircraft, and executive box hangars, which can accommodate larger aircraft and typically range in size from 2,500 sf to 10,000 sf. There are no conventional hangars on the airport; conventional hangars are typically greater than 10,000 sf in size and are used to store larger aircraft, including jets.

There are two village-owned T-hangar facilities, which offer 12 individual storage units and comprise approximately 10,500 sf of storage space. There is also one other 16-unit T-hangar facility, which totals approximately 19,000 sf. Additionally, there are 51 executive box hangars, which range in size from 1,200 sf to 8,925 sf and have a combined storage capacity of approximately 158,700 sf.

T-Hangars

EAST TROY MUNICIPAL AIRPORT MASTER PLAN



Bldg #	Building Type	Size (sf)
1	FBO Building	1,200
2	SRE/Airport Maintenance	4,200
3	6-Unit T-Hangar	5,250
4	6-Unit T-Hangar	5,250
5	Executive Box Hangar	3,600
6	Executive Box Hangar	3,200
7	16-Unit T-Hangar	19,000
8	Executive Box Hangar	1,200
9	Executive Box Hangar	1,200
10	Executive Box Hangar	1,200
11	Executive Box Hangar	1,200
12	Executive Box Hangar	1,200
13	Executive Box Hangar	1,650
14	Executive Box Hangar	1,200
15	Executive Box Hangar	1,400
16	Executive Box Hangar	2,200
17	Executive Box Hangar	1,200
18	Executive Box Hangar	1,200
19	Executive Box Hangar	1,400
20	Executive Box Hangar	1,400
21	Executive Box Hangar	1,400
22	Executive Box Hangar	1,400
23	Executive Box Hangar	2,200
24	Executive Box Hangar	1,600
25	Executive Box Hangar	2,250
26	Executive Box Hangar	1,600
27	Executive Box Hangar	2,000
28	Executive Box Hangar	3,600
29	Executive Box Hangar	3,600
30	Executive Box Hangar	4,500
31	Executive Box Hangar	3,600
32	Executive Box Hangar	3,600
33	Executive Box Hangar	4,500
34	Executive Box Hangar	8,925
35	Executive Box Hangar	4,200
36	Executive Box Hangar	3,500
37	Executive Box Hangar	2,750
38	Executive Box Hangar	5,775
39	Executive Box Hangar	4,500
40	Executive Box Hangar	7,800
41	Executive Box Hangar	3,850
42	Executive Box Hangar	3,500
43	Executive Box Hangar	2,500
44	Executive Box Hangar	4,250
45	Executive Box Hangar	2,500
46	Executive Box Hangar	3,000
47	Executive Box Hangar	2,500
48	Executive Box Hangar	2,500
49	Executive Box Hangar	5,750
50	Executive Box Hangar	3,600
51	Executive Box Hangar	3,600
52	Executive Box Hangar	3,600
53	Executive Box Hangar	3,600
54	Executive Box Hangar	3,600
55	Executive Box Hangar	4,500
56	Executive Box Hangar	8,100

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Executive Box Hangars

AIRCRAFT PARKING APRONS

The aircraft parking apron at East Troy Municipal Airport is located on the northwest side of the airfield, adjacent to the FBO building and T-hangars. Together, the aircraft apron and movement area encompass approximately 16,400 square yards (sy) of pavement, including 20 marked parking positions for fixed-wing aircraft. It should be noted that this area includes the self-service fueling facility and fueling apron. The aircraft apron and movement area are identified on **Exhibit 1E**.

VEHICLE PARKING

There is one public vehicle parking lot at East Troy Municipal Airport. The parking lot adjacent to the FBO building contains 50 parking spaces, plus two accessible parking spaces. Tenants of the box/T-hangar facilities on the airport are authorized to pass through secured gates with their vehicles; as such, most of these facilities do not have separate vehicle parking areas.

SUPPORT FACILITIES

Firefighting Services

As a general aviation airport, East Troy Municipal Airport is not required to maintain on-site aircraft rescue and firefighting (ARFF) equipment or services. Firefighting services are provided by the East Troy Fire Department, which operates from a station located at 8406 County Highway ES, directly west of the airport.

Fuel Storage

Fuel storage facilities at East Troy Municipal Airport are located on the northeast side of the airport on the apron fronting the FBO terminal building, as shown on **Exhibit 1E**. There are three underground tanks: one for 100LL fuel, one for Jet A fuel, and one for auto fuel (which some aircraft are certificated to use). The 100LL and Jet A tanks have a 12,000-gallon capacity, while the auto fuel tank has a 5,000-gallon capacity. All fuel tanks are owned and operated by the Village of East Troy. Each fuel type is dispensed via a self-service pump on the FBO terminal apron that is equipped with a credit card reader.

Fuel Farm

Airport Maintenance Facilities

Airport maintenance and snow removal equipment (SRE) are stored in the building adjoined to the FBO/terminal facility on the airport's northeast side (see Building #2 on **Exhibit 1E**). This equipment includes a snow blower, a sweeper, a New Holland tractor with a plow attachment, and a front-end loader with a snow pusher box. Other equipment includes a Toro mower with a 10-foot deck, as well as various maintenance tools and small equipment.

PERIMETER FENCING

The airfield perimeter is surrounded by four-foot chain-link fencing to mitigate inadvertent/unauthorized entry of persons or vehicles. Three motorized horizontal gates allow access to landside areas for authorized personnel only. Two of these gates are located on the northeast side of the airport, and the third is located on the south side, providing access to private hangars. Multiple pedestrian gates also provide access to various points on the airport.

Controlled Access Gate

UTILITIES

The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport property, as well as the land immediately adjacent to the facility. Of primary concern in the inventory investigation is the availability of water, gas, sewer, electricity, and communications services. Existing providers are detailed below.

- Electric/Gas – Wisconsin Public Service
- Water – Private well
- Solid Waste Disposal – John's Disposal
- Communications – Brightspeed Internet

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic information related to the approximate airport service area is an important consideration in the master planning process and provides an understanding of the demographic disposition of its contributing area. The service area for East Troy Municipal Airport encompasses an approximately 30-mile radius around the airport. The next chapter – Forecasts – will provide a detailed analysis and will identify the specific airport service area based on the following general socioeconomic characteristics.

The historical demographic trends in population, employment, and income provide insight into the long-term socioeconomic condition of the region. This information is essential in determining aviation service level requirements and forecasting aviation demand elements for airports. Aviation forecasts are

typically related to the population base and economic strength of the region, as well as the region's ability to attract, sustain, and expand a strong economic base now and in the future. The historical population, employment, and income data in this section were gathered from the following sources:

- **Wisconsin Department of Administration |** Population for the Village of East Troy and Walworth County were obtained from the Wisconsin Department of Administration. The Wisconsin Department of Administration Demographic Services Center annually produces population estimates for Wisconsin counties and municipalities. The estimates are based on the prior census and analysis of contemporary data including housing units, dormitory and institutional population, and other indicators of population change.

- **Woods & Poole |** Population, employment, and income figures were obtained from Woods & Poole Economics' *Complete Economic and Demographic Data Source* (2023). Woods & Poole utilizes information from the U.S. Census Bureau, as well as other national and state organizations, for historical data and future projections. Woods & Poole is an FAA-approved source for socioeconomic data.

- **U.S. Census Bureau |** Historical employment data were also obtained from the U.S. Census Bureau.

POPULATION

Population is a key socioeconomic factor to consider when planning for future airport needs. Historical and forecast population trends provide an indication of the region's potential to sustain growth in aviation activity. Population data for the Village of East Troy, Walworth County, the Milwaukee-Racine-Waukesha Combined Statistical Area (CSA), the State of Wisconsin, and the United States are discussed to provide past and present population metrics of the region the airport serves. The Village of East Troy's population experienced growth between the years 2010 and 2023, with the addition of 773 people, which represents a compound annual growth rate (CAGR) of 1.19 percent. Walworth County, which incorporates the Village of East Troy, experienced population growth from 2010 to 2023 at a 0.25 percent CAGR. Since 2010, the Milwaukee-Racine-Waukesha CSA population has grown at a CAGR of 0.05 percent, which is a significantly lower rate than that of the Village of East Troy (1.19 percent) over the same period. The State of Wisconsin and United States have increased in overall population at a rate of 0.28 and 0.58 percent CAGR, respectively. **Table 1E** presents historical population statistics since 2010.

TABLE 1E | Population Statistics

	2010	2015	2020	2023	CAGR
Village of East Troy[1]	4,281	4,341	4,687	5,054	1.19%
Walworth County[1]	102,228	102,469	105,230	105,926	0.25%
Milwaukee-Racine-Waukesha CSA[2]	2,026,760	2,047,957	2,052,781	2,040,295	0.05%
Wisconsin[2]	5,690,538	5,794,758	5,896,271	5,914,521	0.28%
United States[2]	309,327,089	321,753,440	331,511,512	335,546,979	0.58%

CAGR = compound annual growth rate

Sources: [1]Wisconsin Department of Administration (January 2023); [2]Woods & Poole (2023)

EMPLOYMENT

Analysis of an area's employment base can provide valuable insight into the overall economic character and sustainability of the region. Some indicators of economic health include availability of jobs, variety of employment types and opportunities, and wage rates provided by local employers. Employment data are based on the number of employees in the region.

Table 1F presents historical employment data for the Village of East Troy, Walworth County, the Milwaukee-Racine-Waukesha CSA, the State of Wisconsin, and the United States since 2010. Total employment in the Village of East Troy has grown at a CAGR of 0.32 percent since 2010. Walworth County has experienced employment growth at a CAGR of 1.02 percent since 2010. The Milwaukee-Racine-Waukesha CSA and the State of Wisconsin's have experienced lower employment growth rates, with a CAGR of 0.72 and 0.79 percent, respectively. United States employment has experienced growth at a CAGR of 1.46 percent since 2010.

TABLE 1F | Employment Statistics

	2010	2015	2020	2023	CAGR
Village of East Troy[1]	2,550	2,047	2,433	2,666*	0.32%
Walworth County[2]	52,670	56,806	56,629	60,688	1.02%
Milwaukee-Racine-Waukesha CSA[2]	1,213,170	1,279,641	1,255,818	1,341,376	0.72%
Wisconsin[2]	3,426,438	3,624,580	3,582,635	3,825,426	0.79%
United States[2]	172,901,666	190,325,771	195,301,627	211,873,718	1.46%

*This value has been interpolated from the U.S. Census Bureau's 2022 *American Community Survey*.
CAGR = compound annual growth rate

Sources: [1]U.S. Census Bureau, American Community Survey (2022); [2]Woods & Poole (2023)

PER CAPITA PERSONAL INCOME

Table 1G presents per capita personal income (PCPI) for Walworth County, the Milwaukee-Racine-Waukesha CSA, the State of Wisconsin, and the United States. PCPI is determined by dividing the total economic output by total population. For the PCPI to grow, income must significantly outpace population growth. Walworth County's PCPI has experienced the highest growth rate when compared to the State of Wisconsin and the United States, with a growth rate of 4.34 percent from 2010 to 2023. The Milwaukee-Racine-Waukesha CSA experienced the lowest growth, at 3.74 percent CAGR. Over the same time period, PCPI in the State of Wisconsin has experienced a CAGR of 3.77 percent, while the United States has experienced a greater increase in PCPI, with a CAGR of 4.03 percent over this period.

TABLE 1G | Per Capita Personal Income

	2010	2015	2020	2023	CAGR
Walworth County	35,701	44,334	55,093	64,723	4.34%
Milwaukee-Racine-Waukesha CSA	42,048	49,535	59,152	70,336	3.74%
Wisconsin	39,185	46,543	55,904	65,748	3.77%
United States	40,690	48,737	59,763	70,727	4.03%

CAGR = compound annual growth rate

Source: Woods & Poole (2023)

ENVIRONMENTAL INVENTORY

The purpose of the following environmental inventory is to identify potential environmental sensitivities that should be considered when planning future improvements at the airport. Research was performed for each of the 14 environmental impact categories described within FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures.*

- Air Quality
- Biological Resources (including fish, wildlife, and plants)
- Climate
- Coastal Resources
- *Department of Transportation Act*, Section 4(f)
- Farmlands
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Compatible Land Use
- Socioeconomics, Environmental Justice, and Children's Health and Safety Risks
- Visual Effects (including light emissions)
- Water Resources (including wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers)

AIR QUALITY

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

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

The airport is in East Troy, in Walworth County, Wisconsin. Walworth County is in attainment for all federal criteria pollutants[1] and is in maintenance for one-hour ozone (1979).

[1] U.S. EPA, Green Book, Wisconsin Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants (https://www3.epa.gov/airquality/greenbook/anayo_wi.html), as of April 30, 2024

BIOLOGICAL RESOURCES

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

The U.S. Fish and Wildlife Service (USFWS) is charged with overseeing the requirements of the federal *Endangered Species Act* (ESA), specifically Section 7, which sets forth requirements for a consultation to determine if a proposed action may affect a federally endangered or threatened species. If an agency determines that an action may affect a federally endangered or threatened species, Section 7(a)(2) requires the agency to consult with the USFWS. If a species has been listed as a candidate species, Section 7(a)(4) requires that each agency must confer with the USFWS on any action that is likely to jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area. The USFWS Information for Planning and Consultation (IPaC) resource list describes species and habitat protected under the ESA within the vicinity of the airport. (**Table 1H**).

TABLE 1H | Species Protected Under ESA Section 7 with Potential to Occur at the Airport

Common Name (*Scientific Name*)	Federal Status	Habitat and Range	Potential for Occurrence
Mammals			
northern long-eared bat (*Myotis septentrionalis*)	Endangered	Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They can be found in areas that consist of various-sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, this species has been spotted hibernating most often in small crevices or cracks. During the summer and portions of the fall and spring, northern long-eared bats may be found roosting individually or in colonies underneath bark, in cavities or crevices of both live trees and snags (or dead trees). Males and nonreproductive females may also roost in cooler places, like caves and mines. This species can also be found – although less commonly – roosting in structures, such as barns and sheds. This species uses forested areas for foraging and commuting between summer and winter habitat, not only for roosting. The northern long-eared bat can be found in the eastern and midwestern regions of the U.S.	**May occur.** The airport and land in proximity to the airport contain trees that could be used for roosting habitat.
Birds			
whooping crane (*Grus americana*)	Proposed Experimental, Non-Essential	A migratory species that has been observed in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, open ponds, shallow bays, salt marshes, wet meadows and rivers, and pastures and agricultural fields.	**May occur.** The airport contains a freshwater pond along the northern boundary that could be used as potential habitat.
Reptiles			
eastern massasauga (rattlesnake) (*Sistrurus catenatus*)	Threatened	Eastern massasaugas inhabit wet prairies, marshes, and low areas along rivers and lakes. During the winter, this species hibernates in burrows, logs, and tree roots.	**Unlikely to occur.** Suitable habitat is not present at the airport.

Continues on next page.

TABLE 1H | Species Protected Under ESA Section 7 with Potential to Occur at the Airport (continued)

Insects			
monarch butterfly (*Danaus plexippus*)	Proposed Threatened	A migratory species found in a variety of habitats. The monarch butterfly requires milkweed (Asclepias spp.) for breeding. In the United States, migrating monarch butterflies often occur near water sources (e.g., rivers, creeks, riparian corridors, roadside ditches, and irrigated gardens).	**May occur.** Wisconsin is home to several species of milkweed, and the airport property may contain flowering plants that could provide monarchs with habitat for foraging.
rusty patched bumble bee (*Bombus affinis*)	Endangered	This species has been observed in a variety of habitats, including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens. Rusty patched bumble bees require habitats that support food sources, including nectar and pollen from a variety of floral resources, as well as undisturbed nesting sites.	**Unknown.** A biological survey is needed to determine the presence of this species.
western regal fritillary (*Argynnis idalia occidentalis*)	Proposed Threatened	This species lives in tall-grass prairie and other habitats that provide open and sunny locations (i.e., meadows, marshes, wet fields, and mountain pastures).	**May Occur.** The airport is near open fields that could provide suitable habitat for this species.
Flowering Plants			
eastern prairie fringed orchid (*Platanthera leucophaea*)	Threatened	The eastern prairie fringed orchid can be found in a variety of habitats, from mesic prairie to wetlands. This species requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment.	**May occur.** The airport contains wetlands that could be used for potential habitat.

*USFWS Status Definitions

Endangered: an animal or plant species that is in danger of extinction throughout all or a significant portion of its range.

Threatened: an animal or plant species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Proposed Threatened: an animal or plant species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed threatened species are not protected by the take prohibitions of section 9 of the ESA.

Proposed Experimental Population, Non-Essential: a population that is proposed or established within its historical range under Section 10(j) of the ESA to aid recovery of the species. A non-essential population is not necessary for the continued existence of a species.

Source: USFWS IPaC (https://ipac.ecosphere.fws.gov/); USFWS (https://www.fws.gov/species)

The State of Wisconsin passed a state endangered species law in 1972. This law was established and defined in Chapter NR 29.604, Wis. Adm. Code. Through the Wisconsin Department of Natural Resources (DNR), the state outlined rules and regulations that identified which species were to be protected under the state's endangered species law.

Species identified for Walworth County on the Wisconsin DNR's *Wisconsin Endangered and Threatened Species Laws & List* that are state listed, but not federally listed, are listed below.

Amphibians

- Blanchard's cricket frog (*Acris blanchardi*) – state endangered

Clams

- ellipse (*Venustaconcha ellipsiformis*) – state threatened

- rainbow shell (*villosa iris*) – state endangered
- slippershell mussel (*Alasmidonta viridis*) – state threatened

Birds

- Acadian flycatcher (*Empidonax virescens*) – state threatened
- black tern (Chlidonias niger) – state endangered
- cerulean warbler (*Setophaga cerulea*) – state threatened
- great egret (*Ardea alba*) – state threatened
- Henslow's sparrow (Centronyx henslowii) – state threatened
- hooded warbler (*Setophaga citrina*) – state threatened
- Kentucky warbler (Geothlypis Formosa) – state threatened
- red-shouldered hawk (*Buteo lineatus*) – state threatened
- worm-eating warbler (Helimitheros vermivorum) – state endangered
- upland sandpiper (*Bartramia longicauda*) – state threatened
- yellow-throated warbler (*Setophaga dominica*) – state endangered

Fish

- gravel chub (*Erimystax x-punctatus*) – state endangered
- Ozark minnow (*Notropis nubilus*) – state threatened
- pugnose shiner (*Notropis anogenus*) – state threatened
- starhead topminnow (*Fundulus dispar*) – state endangered

Insects

- red-railed prairie leafhopper (*Aflexia rubranura*) – state endangered
- silphium borer moth (*Papaipema silphia*) – state endangered
- spatterdock darner (Rhionaeschna mutat) – state threatened
- swamp metalmark (*Calephelis muticum*) – state endangered

Mammals

- big brown bat (*Eptesicus fuscus*) – state threatened
- little brown bat (*Myotis lucifugus*) – state threatened

Plants

- beaked spike-rush (*Eleocharis rostellata*) – state threatened
- dwarf milkweed (*Asclepias ovalifolia*) – state threatened
- false asphodel (*Triantha glutinosa*) – state threatened
- hairy wild petunia (*Ruellia humilis*) – state endangered
- hemlock-parsley (*Conioselinum chinense*) – state endangered

- Hill's thistle (*Cirsium hillii*) – state threatened
- forked aster (*Eurybia furcate*) – state threatened
- mat muhly (*Muhlenbergia richardsonis*) – state endangered
- pale green orchid (*Platanthera flava var. herbiola*) – state threatened
- prairie milkweed (*Asclepias sullivantii)* – state threatened
- purple milkweed (*Asclepias purpurascens*) – state endangered
- rough rattlesnake-root (*Prenanthes aspera*) – state endangered
- round-fruited St. John's wort (*Hypericum sphaerocarpum*) – state endangered
- seaside crowfoot (*Ranunculus cymbalaria*) – state threatened
- tufted bulrush (*Trichophorum cespitosum*) – state threatened
- wild hyacinth (Camassia scilloides) – state endangered
- white lady's-slipper (*Cypripedium candidum*) – state threatened
- wooly milkweed (*Asclepias lanuginose*) – state threatened

Reptiles

- queensnake (*Regina septemvittata*) – state endangered

Section 3 of the ESA is used to protect critical habitat areas. Designated critical habitat areas are geographically defined and have been determined to be essential to the recovery of a specific species. There is no federally designated critical habitat at the airport.

The federal *Migratory Bird Treaty Act (MBTA)* protects migratory birds and their eggs, nests, and feathers. Potential impacts to species protected under the MBTA are evaluated by the USFWS, in consultation with other federal agencies. Habitat for migratory birds may occur if bushes or other ground nesting substrate is present. The typical breeding season for migratory birds that would be present is from March to August.

CLIMATE

Increasing concentrations of greenhouse gases (GHGs) can affect global climate by trapping heat in Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming with concurrent impacts, including warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation events. Climate change is a global phenomenon that can also have local impacts. GHGs – such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and O_3 – are both naturally occurring and anthropogenic (human-made). Research has established a direct correlation between fuel combustion and GHG emissions. GHGs from human-made sources include CO_2, CH_4, N_2O, hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.

The U.S. EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2021* shows that total U.S. emissions have decreased by two percent from 1990 to 2021, down from a high 15.8 percent above 1990

levels in 2007. During 2020 to 2021, the U.S. saw an increase in economic activity, which was driven by businesses and persons rebounding after the COVID-19 pandemic. This resulted in an increase in total U.S. GHG emissions, of which CO_2 emissions accounted for the majority.

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

Information regarding the climate for the airport and surrounding environments, including wind, temperature, and precipitation, can be found earlier in this airport master plan.

The State of Wisconsin released the *Governor's Task Force on Climate Change Report* in December 2020. The plan includes policy recommendations to help the state meet its goals of reducing GHG emissions 26 to 28 percent below 2005 levels by 2025 and achieving 100 percent carbon-free electricity by 2050. Key aspects of the plan include creating the Office of Environmental Justice, expanding *Focus on Energy* program funding, supporting electric vehicle infrastructure, and avoiding all new fossil fuel infrastructure. Prior to the 2020 climate change report, Wisconsin released a climate action plan in 2008.[3]

COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the *Coastal Barriers Resource Act,* the *Coastal Zone Management Act,* and Executive Order (E.O.) 13089, *Coral Reef Protection.*

The airport is not located within a coastal zone. The closest National Marine Sanctuary is the Thunder Bay National Marine Sanctuary, located 279 miles away.

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

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

[2] U.S EPA, Inventory of U.S. Greenhouse Gases: Chapter 3, Energy (https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021) includes consumption of jet fuel and aviation gasoline but does not include emissions from international aviation, i.e., international bunker fuels (https://unfccc.int/topics/mitigation/workstreams/emissions-from-international-transport-bunker-fuels).

[3] U.S. State Climate Action Plans (https://www.c2es.org/document/climate-action-plans/)

[4] 49 U.S. Code § 303 – Policy on lands, wildlife and waterfowl refuges, and historic sites

School playgrounds or athletic fields may also be considered a Section 4(f) resource if the recreational facilities at the school are readily available to the public. There are no public schools located within one mile of the airport.

Table 1J and **Exhibit 1F** identify potential Section 4(f) resources within one mile of the airport.

TABLE 1J | U.S. Dept. of Transportation Section 4(f) Resources Within One Mile of the Vicinity of the Airport

Place	Location	Distance from Airport (miles)	Direction from Airport
Public Recreational Facilities			
East Troy Dog Park	2015 Energy Dr, East Troy, WI	0.85 miles	Southwest

Source: Google Earth Aerial Pro Imagery, accessed February 2024

There are no National Register of Historic Places (NRHP)-listed resources within one mile of the airport.

There are no waterfowl and wildlife refuges within one mile of the airport. The nearest wilderness and national recreation areas are listed below:

- Nearest wilderness area: Nordhouse Dune Wilderness, located 131 miles from the airport.
- Nearest national recreation area: Mississippi National River and Recreation area, located 253 miles from the airport.

Thus, there is one known potential Section 4(f) resource (East Troy Dog Park) located within one mile of the airport.

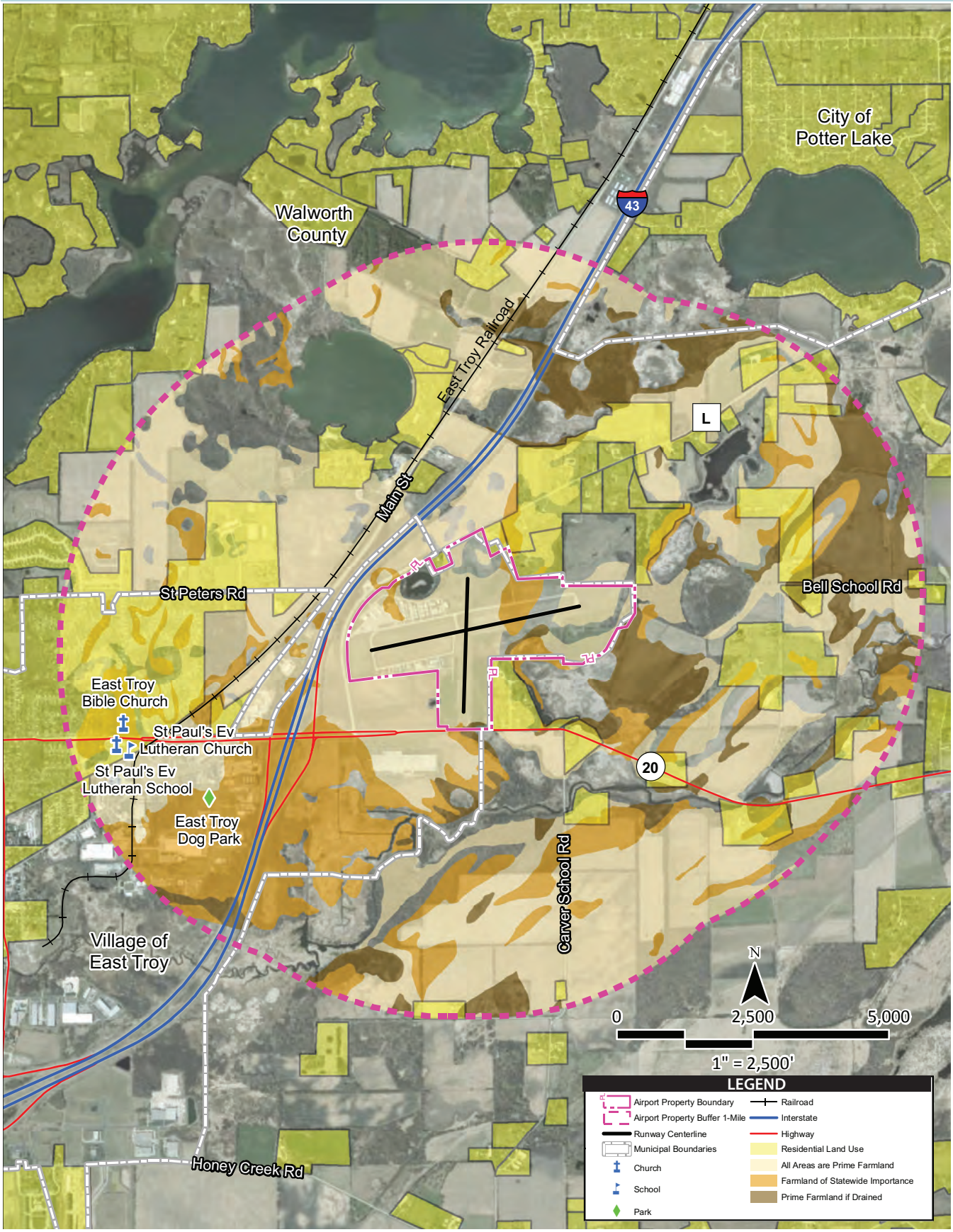
FARMLANDS

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

The airport is located outside of a designated urbanized area boundary; thus, the FPPA would apply.[5] The USDA Natural Resources Conservation Service (NRCS) Web Soil Survey shows the types of soils on and adjacent to the airport, along with their farmland classifications. The airport contains soils that are classified as the following ratings:

- Not prime farmland
- Farmland of statewide importance
- All areas are prime farmland
- Prime farmland if drained

[5] EPA EJScreen (https://ejscreen.epa.gov/mapper/), December 2022



Source: ESRI Basemap Imagery (2022),Walworth County Data Portal, USDA, National Wetlands, Coffman Associates Analysis

Exhibit 1F - SENSITIVE LAND USES WITHIN ONE MILE OF THE AIRPORT

- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Coordination would be warranted with the USDA if development were to occur on soils that have been identified as farmland of statewide importance, prime farmland if drained, all areas are prime farmland, or prime farmland if drained and either protected from flooding or not frequently flooded during the growing season (**Exhibit 1F**). **Table 1K** describes the farmland classifications, based on the soil within the airport's boundaries.

TABLE 1K | Summary by Map Unit – Walworth County, Wisconsin (WI127)

Web Soil Survey Symbol	Soil Type	Farmland Rating
Ac	Adrian muck, 0 to 2 percent slopes	Not prime farmland
CeB2	Casco loam, 2 to 6 percent slopes, eroded	Farmland of statewide importance
CeC2	Casco loam, 6 to 12 percent slopes, eroded	Not prime farmland
CeD2	Casco loam, 12 to 20 percent slopes, eroded	Not prime farmland
CkD2	Casco-Fox loams, 12 to 20 percent slopes, eroded	Not prime farmland
CrD2	Casco-Rodman complex, 12 to 20 percent slopes, eroded	Not prime farmland
FmB	Fox sandy loam, 2 to 6 percent slopes	All areas are prime farmland
FmC2	Fox sandy loam, 6 to 12 percent slopes, eroded	Farmland of statewide importance
FoB	Fox loam, 2 to 6 percent slopes	All areas are prime farmland
FoC2	Fox loam, 6 to 12 percent slopes, eroded	Farmland of statewide importance
FsA	Fox silt loam, 0 to 2 percent slopes	All areas are prime farmland
FsB	Fox silt loam, 2 to 6 percent slopes	All areas are prime farmland
Ht	Houghton muck, 0 to 2 percent slopes	Farmland of statewide importance
JuA	Juneau silt loam, 1 to 3 percent slopes	All areas are prime farmland
Mf	Marsh	Not prime farmland
MmA	Matherton silt loam, 1 to 3 percent slopes	Prime farmland if drained
RaA	Radford silt loam, 0 to 3 percent slopes	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
RsF	Rodman-Casco complex, 30 to 45 percent slopes	Not prime farmland
WeA	Warsaw loam, 0 to 2 percent slopes	All areas are prime farmland
WhA	Warsaw silt loam, 0 to 2 percent slopes	All areas are prime farmland
WhB	Warsaw silt loam, 2 to 6 percent slopes	All areas are prime farmland

Source: USDA-NRCS Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources.

There are several recycling centers within Walworth County, Wisconsin. The recycling center closest to the airport is New Berline Recycling Center, located 2.60 miles northeast of airport property boundaries, west of S Moorland Road. The closest landfill is Emeral Park Landfill LLC more than 15 miles northeast of airport property boundaries.

National Pollutant Discharge Elimination System (NPDES) permits outline the regulatory requirements of municipal stormwater management programs and establish requirements to help protect the beneficial uses of the receiving waters. NPDES permits require permittees to develop and implement best management practices (BMPs) to control/reduce the discharge of pollutants to waters of the United States, to the maximum extent practicable (MEP). The NPDES program manages wastewater, construction, stormwater, and pretreatment.

In Wisconsin, the Wisconsin DNR regulates the discharge of pollutants to waters of the state through the Wisconsin Pollutant Discharge Elimination System (WPDES) program. WPDES general permits are issued by the DNR for specific categories of industrial, municipal, and other wastewater discharges. Permits are issued for five-year terms.[6]

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

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

The nearest tribal land to the airport is the Oneida Reservation, located 109 miles north of the airport. As mentioned above, there are no NRHP resources within one mile of the airport.

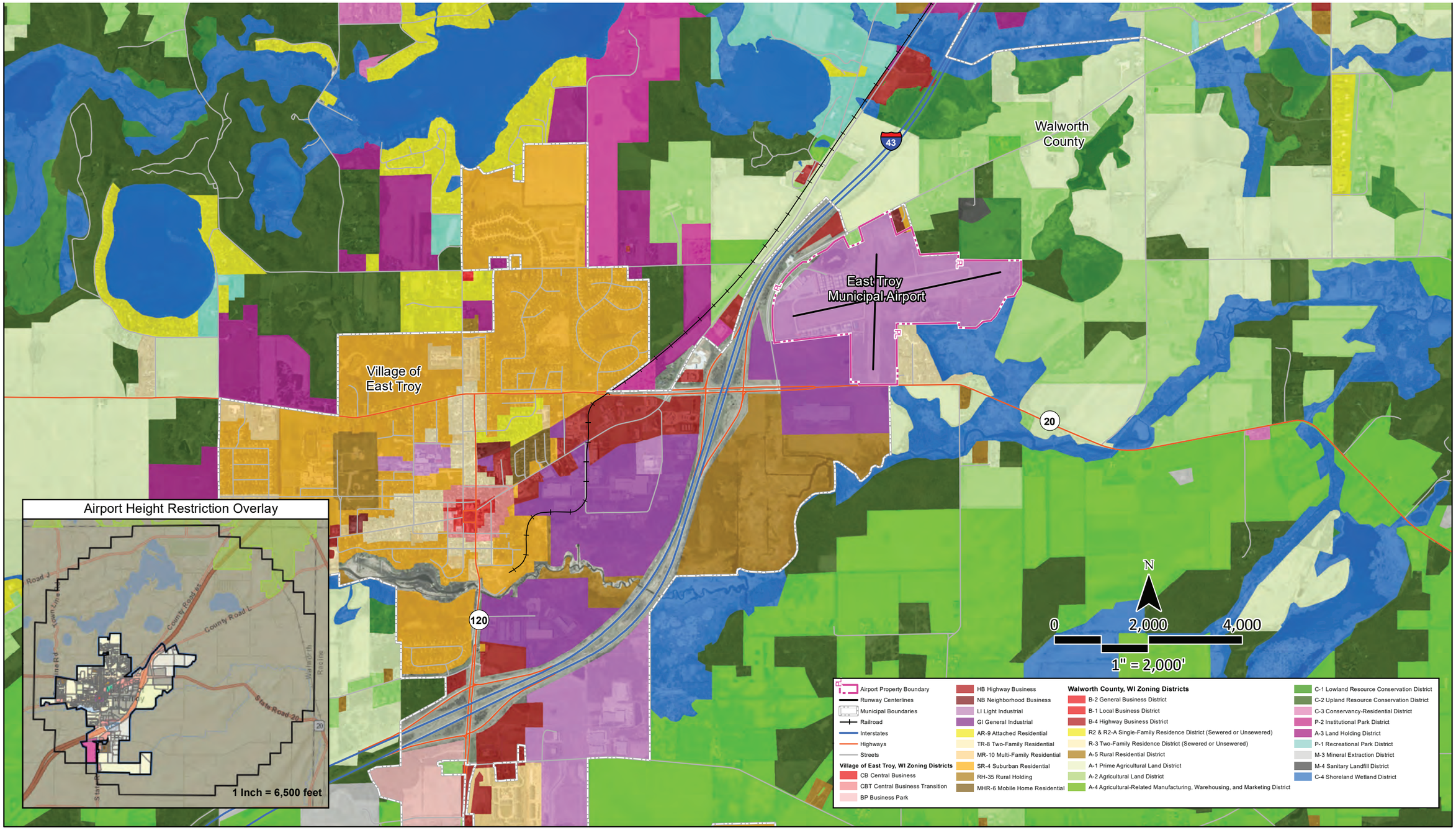
The airport was opened in June 1958, and buildings or structures of historic age (i.e., 50 years or older) may still be present within airport property. For example, there may be historic-age structures on the northwestern end of the airport, based on a review of historic aerials; however, an airport-specific cultural survey would be needed to determine if there are on-airport cultural resources eligible for listing on the NRHP.

LAND USE

Land use regulations near airports are achieved through local government codes, city policies, and plans that include airport districts and planning areas. Regulations are used to avoid land use compatibility conflict around airports. The airport is within the jurisdictional boundaries of the Village of East Troy.

According to the Village of East Troy Zoning Coding Portal, the airport is primarily zoned as Light Industrial (LI) (see **Exhibit 1G**).[7] This zoning categorization is intended to allow the following land uses: indoor industrial storage, office uses, and other associated business and support uses. Other allowable uses within this zoning designation allow for developments that are not associated with high levels of noise, odor, particulate emissions, and other potential nuisances.

[6] Wisconsin Department of Natural Resources – Wastewater (https://dnr.wisconsin.gov/topic/Wastewater/Permits.html)
[7] Village of East Troy, Zoning Code Portal, Interactive Map (https://villageofeasttroy.zoninghub.com/zoningmap.aspx), accessed April 2024



Source: ESRI Basemap Imagery (2023), Village of East Troy Zoning Hub, Walworth County Zoning, Coffman Associates Analysis

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NATURAL RESOURCES AND ENERGY SUPPLY

Evaluations of natural resources and energy supply provide an estimate of a project's consumption of natural resources. It is the policy of FAA Order 1053.1C, *Energy and Water Management Program for FAA Buildings and Facilities*, to encourage the development of facilities that exemplify the highest standards of design, including principles of sustainability.

The Wisconsin DNR is a state-level environmental organization. Its main purpose is to preserve and enhance the natural resources of Wisconsin. In partnership with individuals and outside organizations, DNR staff manage fish, wildlife, forest, park, air, and water resources, while promoting a healthy, sustainable environment and a full range of outdoor opportunities.[8]

NOISE AND NOISE-COMPATIBLE LAND USE

Federal land use compatibility guidelines are established under 14 CFR Part 150, *Airport Noise Compatibility Planning.* According to 14 CFR Part 150, residential land and schools are noise-sensitive land uses that are not considered compatible with a 65 decibel (dB) day-night average sound level (Ldn or DNL).[9] Other noise-sensitive land uses (such as religious facilities, hospitals, or nursing homes), if located within a 65 dB DNL contour, are generally compatible when an interior noise level reduction of 25 dB is incorporated into the design and construction of the structure. Special consideration should also be given to noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in 14 CFR Part 150 do not account for the value, significance, and enjoyment of the area in question.[10]

Table 1L identifies noise-sensitive land uses within one mile of the airport. These land uses are also shown on **Exhibit 1F**. The closest residential areas abut the southern boundary of the airport across from Highway 20. There are no health care facilities within one mile of the airport.

TABLE 1L | Non-Residential Noise-Sensitive Land Uses Within One Mile of the Airport

Facility	Location	Distance from Airport (miles)	Direction from Airport
Places of Worship			
St Paul's Ev. Lutheran Church	2665 North St, East Troy, WI 53120	0.90 miles	Southwest
East Troy Bible Church	2660 North St, East Troy, WI 53120	0.88 miles	Southwest
Schools			
St Paul's Ev. Lutheran School	2665 North St, East Troy, WI 53120	0.90 miles	Southwest

Sources: EPA EJScreen (https://ejscreen.epa.gov/mapper/); Google Earth Aerial Imagery (February 2024)

[8] Wisconsin Department of Natural Resources (https://dnr.wisconsin.gov/)

[9] The DNL accounts for the increased sensitivity to noise at night (10:00 p.m. to 7:00 a.m.) and is the metric preferred by the FAA, the U.S. EPA, and the U.S. Department of Housing and Urban Development as an appropriate measure of cumulative noise exposure.

[10] 49 U.S. Code § 47141 – Compatible land use planning and projects by state and local governments

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

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

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, specifically requires that a federal action causing disproportionate impacts to an environmental justice population (i.e., a low-income or minority population) be considered, as well as an evaluation of environmental health and safety risks to children. The FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts, including whether the proposed action would have the potential to:

- Induce substantial economic growth in an area, either directly or indirectly;
- Disrupt or divide the physical arrangement of an established community;
- Cause extensive relocation when sufficient replacement housing is unavailable;
- Cause extensive relocation of community business that would cause severe economic hardship for affected communities;
- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- Produce a substantial change in the community tax base.

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

Meaningful involvement ensures that:

- People have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- The public's contribution can influence the regulatory agency's decision;
- Their concerns will be considered in the decision-making process; and
- The decision-makers seek out and facilitate the involvement of those potentially affected.[11]

The closest residential areas abut the southern boundary of the airport across from Highway 20. According to the 2017-2021 five-year American Community Survey (ACS) estimates, the population within one mile of the airport is 1,529 persons; 10 percent of this population is considered low-income and five percent are people of color, as shown in **Table 1M**.

[11] U.S. EPA website – Environmental Justice (https://www.epa.gov/environmentaljustice)

TABLE 1M | Population Characteristics Within One Mile of the Airport	
Characteristic	
Total Population	1,529
Population by Race[1]	
White	95%
Black	0%
American Indian	0%
Asian	0%
Hawaiian/Pacific Islander	0%
Some Other Race	0%
Population Reporting Two or More Races	3%
Total Hispanic population **(of any race)**	1%

[1] Percentages do not add up to 100 percent. Hispanic or Latino is treated by the U.S. Census as a question separate from Race.

Source: U.S. EPA EJScreen ACS 5-Year Summary Report (2017-2021) (https://ejscreen.epa.gov/mapper/)

Children's Environmental Health and Safety | Federal agencies are directed, per E.O. 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* to make it a high priority to identify and assess environmental health and safety risks that may disproportionately impact children. Such risks include those that are attributable to products or substances that a child is likely to encounter or ingest (e.g., air, food, and water – including drinking water) or to which they may be exposed.

According to the 2017-2021 ACS estimates, 17 percent of the population within one mile of the airport are between one and 18 years old.

VISUAL EFFECTS

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

Light Emissions | A series of exterior lighting requirements are outlined in the Village of East Troy Code of Ordinances, Chapter 510-95, *Exterior Lighting Standards*; however, these requirements are applicable to private exterior lighting and do not apply to lighting located on public property (i.e., the airport). No standard ordinances have been outlined for exterior lighting on public property.[12]

Airfield lighting at the airport includes a rotating beacon, medium intensity runway lighting (MIRL) on Runway 8-26, threshold lights at each runway end, medium intensity taxiway lighting (MITL), two-box precision approach path indicator (PAPI-2) lights on Runway 8-26, and runway end identification lights (REILs) on Runway 8-26. There are no visual approach aids serving turf Runway 18-36. The airfield lights utilize pilot-controlled lighting (PCL); thus, the airfield lights are only illuminated when activated by pilots using the airport. (See the discussion of the types of airfield lighting and visual approach aids earlier in the inventory.)

[12] Village of East Troy Code of Ordinances, Chapter 510 Zoning (510-95) (https://ecode360.com/27769672#27769672), accessed April 2024

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

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

Although the airport environment is not within an urban area, it is visually characterized by buildings and streets, as well as trees and vegetated open areas. Views of the airport are accessible from surrounding roadways due to the vegetation being spread out, rather than densely grouped; however, long-range views are not readily available because of the relatively flat topography of the airport environs. North and west of the airport is Interstate 43. Land uses to northeast and south of the airport primarily consist of scattered single-family residential communities.

There are two nationally designated scenic byways and three All-American Roads in Wisconsin; however, the two scenic byways and three All-American Roads are not located in close proximity to the airport.[13]

The State of Wisconsin's Department of Transportation also recognizes rustic roads, which are lightly traveled local access roads that have outstanding natural features along their borders.[14] The Rustic Roads Program was created in 1973 to preserve identified rustic roads and their scenic qualities. There are currently 124 designated rustic roads, which span 61 counties and 750 miles. Walworth County contains six rustic roads; however, none of these roads are located near the airport.[15]

WATER RESOURCES

Wetlands | The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act* (CWA). Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction."

Wetlands exhibit three characteristics: the soils are inundated or saturated to the surface at some time during the growing season (hydrology), the soils have a population of plants that are able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and the soils are saturated enough to develop anaerobic (absent of air or oxygen) conditions during the growing season (hydric).

[13] U.S. Department of Transportation Federal Highway Administration, National Scenic Byways & All-American Roads, Wisconsin (https://fhwaapps.fhwa.dot.gov/bywaysp/States/Show/WI), accessed April 2024

[14] State of Wisconsin Department of Transportation, Rustic Roads (https://wisconsindot.gov/Pages/travel/road/rustic-roads/default.aspx), accessed April 2024

[15] Wisconsin Rustic Roads ARCGIS (https://wisdot.maps.arcgis.com/apps/webappviewer/index.html?id=8939dcac042a467d95a71b8f06a1bd2f&query=RUSTIC_ROAD_6100%2cRUSTICROADNUMBER%2c11), accessed April 2024

The USFWS manages the National Wetlands Inventory on behalf of all federal agencies. The National Wetlands Inventory identifies surface waters and wetlands in the nation. As shown on **Exhibit 1H**, within airport boundaries, there are freshwater forested shrub wetlands on the southeastern and eastern boundaries of the airport and a freshwater pond on the northern boundary of the airport[16].

Floodplains | E.O. 11988, *Floodplain Management*, directs federal agencies to take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by the floodplains. U.S. Department of Transportation (DOT) Order 5650.2, *Floodplain Management and Protection*, implements the guidelines contained in E.O. 11988.

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

Under E.O. 13690 and its guidelines, one of several approaches should be used to identify floodplains and their risks to critical[17] or non-critical federally funded actions:

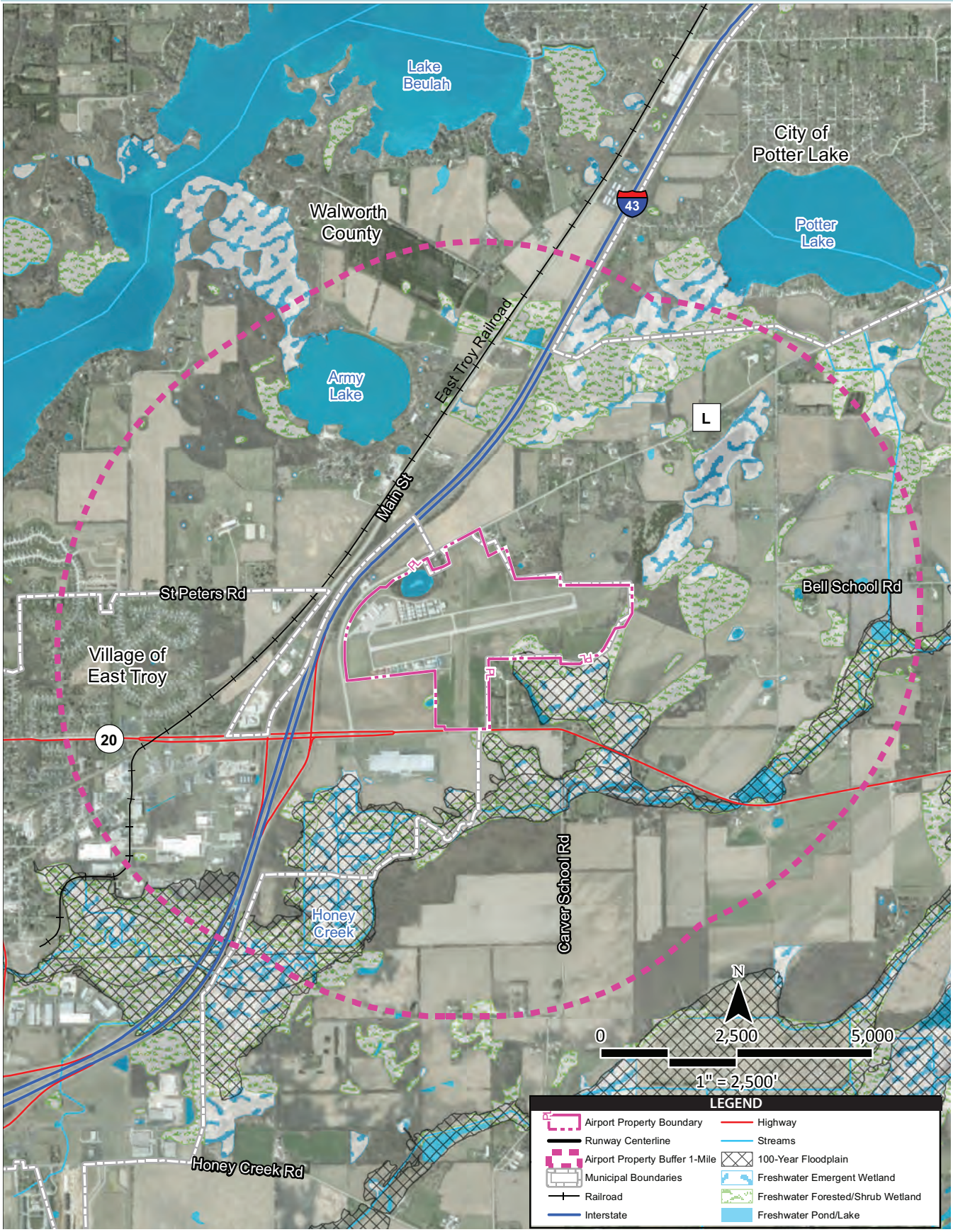
- Climate-Informed Science Approach (CISA) – the elevation and the flood hazard area (i.e., 100-year floodplain) using data that integrate climate science with an emphasis on possible future effects on critical actions
- Freeboard Value Approach – the elevation and flood hazard area, and an additional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

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

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel numbers 55127C0092D and 55127C011D (effective October 2, 2009) indicates that the airport is in Zone X, an area of minimal flood hazard. These areas are not located within a 100-year or 500-year floodplain. A small portion of the FEMA map panel 55127C011D is located in Zone AE, a special flood hazard area, along the southern airport property. This portion of the airport is located in the 100-year floodplain (**Exhibit 1H**).

[16] National Wetlands Inventory (https://www.fws.gov/program/national-wetlands-inventory)

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



Source: ESRI Basemap Imagery (2022), FEMA, USDA, National Wetlands, Coffman Associates Analysis

Surface Waters | The CWA establishes water quality standards, controls discharges, develops waste treatment management plans and practices, prevents or minimizes the loss of wetlands, and regulates other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc. Additionally, U.S. Congress has mandated the NPDES under the CWA.

The airport is in the Spring-Creek Honey-Creek watershed. Honey Creek, an impaired waterbody in the watershed, is located 0.30 miles south of the airport (**Exhibit 1H**).[18]

Groundwater | Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term *aquifer* is used to describe the geologic layers that store or transmit groundwater, such as wells, springs, and other water sources. Examples of direct impacts to groundwater could include withdrawal of groundwater for operational purposes, or reduction of infiltration or recharge area due to new impervious surfaces.[19]

According to Wisconsin's DNR Well Construction Reports, over 10 wells are located on the airport that range from a depth of 30 to 300 feet.[20]

The U.S. EPA's Sole Source Aquifer (SSA) program was established under Section 1424(e) of the *Safe Drinking Water Act* (SDWA). Since 1977, the SSA program has been used by communities to help prevent contamination of groundwater from federally funded projects. It has increased public awareness of the vulnerability of groundwater resources. The SSA program is authorized by Section 1424(e) of the SDWA (Public Law 93-523, 42 U.S.C. 300 et. Seq), which states:

> *"If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of that determination in the Federal Register."*[21]

According to the U.S. EPA's Sole Source Aquifer for Drinking Water website, no sole source aquifers are located within airport boundaries. The nearest sole source aquifer is the St. Joseph Sole Source Aquifer, located over 127 miles southeast of the airport.

Wild and Scenic Rivers | The *National Wild and Scenic Rivers Act* was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The Nationwide River Inventory (NRI) is a list of over 3,400 rivers or river segments that appear to meet the minimum *Wild and Scenic Rivers Act* eligibility requirements, based on their free-flowing status and resource values. The development of the NRI resulted from Section 5(d)(1) in the *Wild and Scenic*

[18] U.S. EPA, How's My Waterway (https://mywaterway.epa.gov/community/2085%20Hwy%20L,%20East%20Troy,%20WI%2053120/overview)
[19] United States Geological Survey – What is Groundwater? (https://www.usgs.gov/faqs/what-groundwater)
[20] Wisconsin DNR, Well Construction Reports (https://wi-dnr.maps.arcgis.com/apps/LocalPerspective/index.html?appid=0cc1b8d9c40749ba9b9e5c2c90848e23), accessed April 2024
[21] U.S. EPA – Overview of the Drinking Water Sole Source Aquifer Program (https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program#Authority)

Rivers Act, which directs agencies to consider potential wild and scenic rivers in the comprehensive planning process.

The closest designated National Wild and Scenic River identified is the Pere Marquette River, which is located 126 miles from the airport in the state of Michigan. The nearest National River Inventory feature is the Fox River, located six miles from the airport.

Chapter Two

Forecasts

The Village of East Troy

Chapter 2
Forecasts

The definition of demand that may reasonably be expected to occur during the useful life of an airport's key components (e.g., runways, taxiways, terminal buildings, etc.) is an important factor in facility planning. In airport master planning, this involves projecting potential aviation activity for at least a 20-year timeframe. Aviation demand forecasting for East Troy Municipal Airport (57C) will primarily consider based aircraft, aircraft operations, peak activity periods, and the airport critical aircraft.

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

When reviewing a sponsor's forecast (from the master plan), the FAA must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. According to the FAA, forecasts should be:

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

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

1) **Identify Aviation Activity Measures**: Determine the levels and types of aviation activities that are likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.

2) **Review Previous Airport Forecasts**: This review may include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.

3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.

4) **Select Forecast Methods**: Several appropriate methodologies and techniques are available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.

5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate them for reasonableness.

6) **Summarize and Document Results**: Provide supporting text and tables, as necessary.

7) **Compare Forecast Results with FAA's TAF**: Based aircraft and total operations are considered consistent with the TAF if they meet the following criteria:

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

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

The following forecast analysis for the airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historical activity. The historical aviation activity is then examined, along with other factors and trends that can affect demand. The intent is to

provide an updated set of aviation demand projections for the airport that will permit airport management to make planning adjustments, as necessary, to maintain a viable, efficient, and cost-effective facility. The forecasts for this master plan will utilize a base year of 2024 with a long-range forecast out to 2044.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition upon preparation of this chapter was the *FAA Aerospace Forecast – Fiscal Years 2024-2044*, which was published in April 2024. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the *FAA Aerospace Forecast*.

The U.S. commercial air carrier industry experienced a decade of relative stability that extended from the end of the great recession in 2009 through 2020, when COVID-19 emerged. During that period, U.S. airlines revamped their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The results of these efforts were impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry.

The COVID-19 pandemic in 2020 effectively ended those boom years, with airline activity and profitability plummeting almost overnight. In response, airlines cut capacity and costs, and most were able to weather the storm. Some small regional carriers ceased operations as a result of the pandemic, but no mainline carriers did. Some segments of aviation were less impacted: cargo activity surged, boosted by consumer purchases, and general aviation generally maintained pre-pandemic levels of activity. In 2022, demand for leisure travel destinations surged domestically and in the Latin region. By 2023, a wider array of accessible destinations opened up and travelers responded by seeking flights across the Atlantic and to some Pacific markets, while domestic and Latin activity remained consistent. As carriers worked to assess shifting passenger preferences and supply response, the overall level of demand was supportive of the industry's aggregate results. Consumer demand for experiences over goods continued to drive the demand for leisure trips and a willingness to pay higher fares that exceeded 2019 levels; the strong overall demand led to positive financial results. The top eight U.S. passenger carriers posted operating and net profits, proving strong success for the new business models air carriers have been utilizing while transitioning out of the pandemic years.

The business changes that airlines implemented due to the pandemic will shape the industry long after recovery is complete. Airlines retired older, less fuel-efficient aircraft and encouraged voluntary employee separations. This has led to airlines seeking newer aircraft investments while meeting the current demand for the rebuilding of business and international travel, which has lagged behind leisure traffic during the recovery. Furthermore, trade tensions that emerged during the pandemic have slowed

some international traffic. There is confidence that U.S. airlines can generate solid returns on capital and sustained profits; however, over the long term, aviation demand will be driven by economic activity as the growing U.S. and world economies provide the basis for aviation growth.

ECONOMIC ENVIRONMENT

According to the FAA forecast, the annual gross domestic product (GDP) of the U.S. is expected to increase by 1.7 percent over the next 20 years. U.S. carriers posted profits in 2023, and the FAA expects carriers to remain profitable over the next few years as demand rises, despite higher fares, which offset the raised labor and fuel costs. As yields stabilize and carriers return to levels of capacity consistent with their fixed costs and shed excess debt, consistent profitability should continue. Over the long term, a competitive and profitable aviation industry is anticipated, characterized by increasing demand for air travel and airfares growing more slowly than overall inflation, reflecting growing U.S. and global economies.

Prior to the COVID-19 pandemic, the U.S. economy was recovering from the most serious economic downturn and slow recovery since the Great Depression. Demand for aviation is fundamentally driven by economic activity; as economic growth picks up, so will growth in aviation activity. Overall, the FAA forecast calls for annual passenger growth over the next 20 years to average 2.5 percent. Oil prices surged to $93 per barrel in 2022 – largely due to the Russian invasion of Ukraine – after averaging $55 per barrel over the five-year period from 2016 to 2021. Prices are forecast to remain consistent over the next few years before climbing slowly to reach $107 per barrel by 2044.

FAA GENERAL AVIATION FORECASTS

The long-term outlook for general aviation (GA) is promising, as growth at the high end of the segment offsets continuing retirements at the traditional low end. The active general aviation fleet is forecast to remain relatively stable between 2024 and 2044, increasing by just 0.4 percent. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period.

The FAA forecasts the fleet mix and hours flown for single-engine piston (SEP) aircraft; multi-engine piston (MEP) aircraft; turboprops; business jets; piston and turbine helicopters; and light sport, experimental, and other aircraft (e.g., gliders and balloons). The FAA forecasts active aircraft, not total aircraft; an active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category. **Table 2A** shows the primary general aviation demand indicators, as forecast by the FAA.

TABLE 2A | FAA General Aviation Forecast

Demand Indicator	2024	2044	CAGR
General Aviation Fleet			
Total Fixed-Wing Piston	136,485	130,790	-0.2%
Total Fixed-Wing Turbine	27,905	41,580	2.0%
Total Helicopters	10,090	14,025	1.7%
Total Other (Experimental, Light Sport, etc.)	31,100	37,810	1.0%
Total GA Fleet	**210,105**	**228,975**	**0.4%**
General Aviation Operations			
Local	15,900,000	17,571,000	0.5%
Itinerant	15,125,000	16,569,000	0.5%
Total General Aviation Operations	**31,026,000**	**34,140,000**	**0.5%**

CAGR = compound annual growth rate (2024-2044)

Source: FAA Aerospace Forecast – FY 2024-2044

General Aviation Fleet Mix

For 2024, the FAA estimates there are 136,485 piston-powered fixed-wing aircraft in the national fleet. That number is forecast to decline by 0.2 percent by 2044, resulting in 130,790 aircraft. This includes a decline of 0.2 percent in SEP aircraft and a decline of 0.3 percent in MEP aircraft.

Total turbine aircraft are forecast to grow at an annual rate of 2.0 percent through 2044. The FAA estimates there are 27,905 fixed-wing turbine-powered aircraft in the national fleet in 2024 and there will be 41,580 by 2044. Turboprops are forecast to grow by 1.0 percent annually, while business jets are projected to grow by 2.6 percent annually through 2044.

Total helicopters are projected to grow by 1.7 percent annually in the forecast period. There are an estimated 10,090 total helicopters in the national fleet in 2024, and that number is expected to grow to a total of 14,025 by 2044. This includes annual growth rates of 0.8 percent for piston helicopters and 2.0 percent for turbine helicopters.

The FAA also forecasts experimental aircraft, light sport aircraft (LSA), and others. Combined, there are an estimated 31,100 other aircraft in 2024 that are forecast to grow to 37,810 by 2044 at an annual growth rate of 1.0 percent.

General Aviation Operations

The FAA also forecasts total operations, based on activity at control towers across the United States. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 31.0 million in 2024 to 34.1 million in 2044, with an average increase of 0.5 percent per year as growth in turbine, rotorcraft, and experimental hours offsets a decline in fixed-wing piston hours. This includes annual growth rates of 0.5 percent for local general aviation operations and 0.5 percent for itinerant general aviation operations. **Exhibit 2A** presents the historical and forecast U.S. active general aviation aircraft and operations.

General Aviation Aircraft Shipments and Revenue

On an annual basis, the General Aviation Manufacturers Association (GAMA) publishes an aviation industry outlook that documents past and current trends and provides an assessment of the future condition of the general aviation industry. **Table 2B** presents historical data related to general aviation aircraft shipments.

TABLE 2B | Annual General Aviation Airplane Shipments

Manufactured Worldwide and Factory Net Billings						
Year	Total	SEP	MEP	TP	J	Net Billings ($ million)
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,129
2016	2,268	890	129	582	667	21,092
2017	2,324	936	149	563	676	20,197
2018	2,441	952	185	601	703	20,515
2019	2,658	1,111	213	525	809	23,515
2020	2,408	1,164	157	443	644	20,048
2021	2,646	1,261	148	527	710	21,603
2022	2,813	1,361	158	582	712	22,866
2023	3,050	1,508	174	638	730	23,378

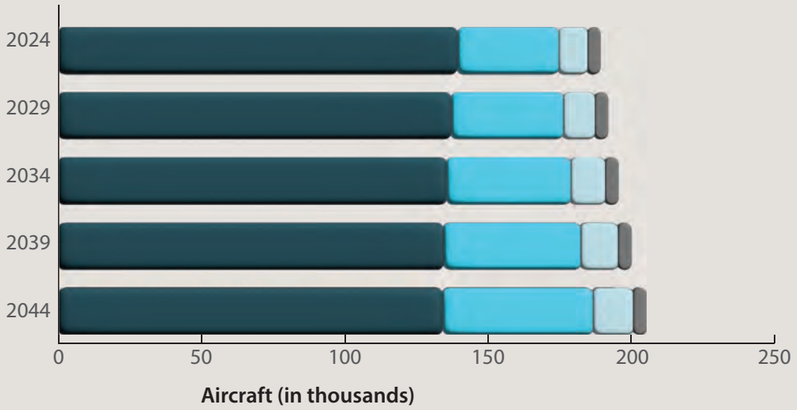
SEP = single-engine piston
MEP = multi-engine piston
TP = turboprop
J = jet

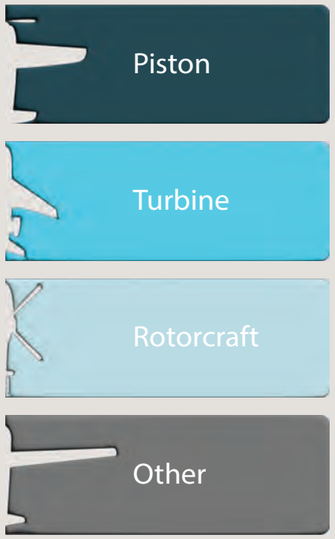
Source: General Aviation Manufacturers Association (GAMA) 2023 Quarterly Shipments and Billings

Worldwide shipments of general aviation airplanes increased in the year 2023, with a total of 3,050 units delivered around the globe, compared to 2,813 units in 2022 – the third year in a row to experience an increase after the drop during 2020, when only 2,408 units were delivered. Worldwide general aviation billings were the highest in 2014. In 2022, an increase in new aircraft shipments generated more than $23 billion, compared to $22.7 billion in the previous year. North America continues to be the largest market for general aviation aircraft and leads in the manufacturing of piston, turboprop, and jet aircraft. Europe is the second largest market for all aircraft categories, while Latin America follows Europe closely in the turboprop market.

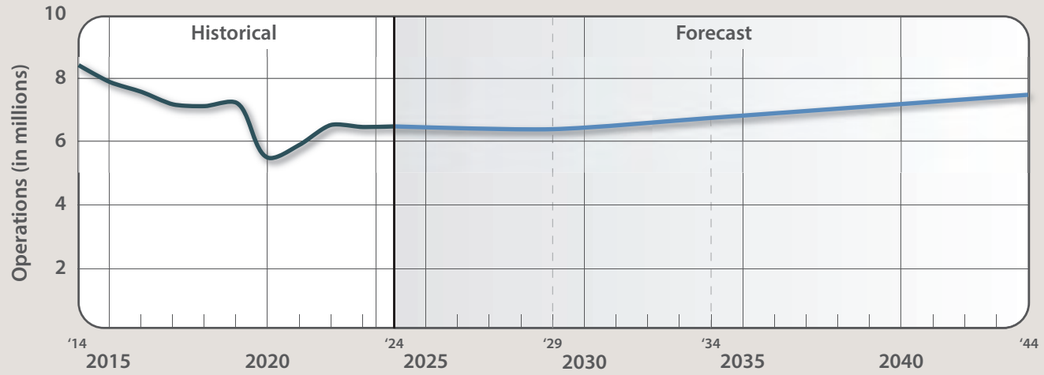
Business Jets | Business jet deliveries increased from 712 units in 2022 to 730 units in 2023. The North American market accounted for 74.9 percent of business jet deliveries, which is a 7.3 percent increase in market share compared to 2022.

U.S. Active General Aviation Aircraft

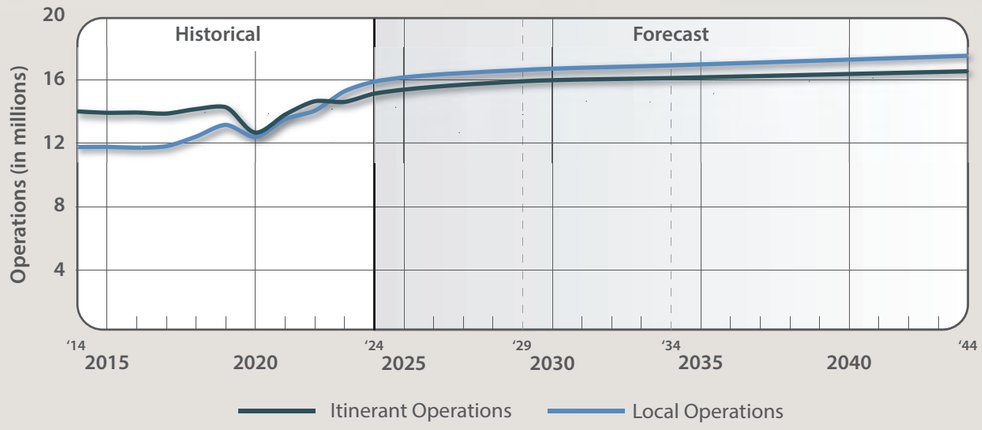




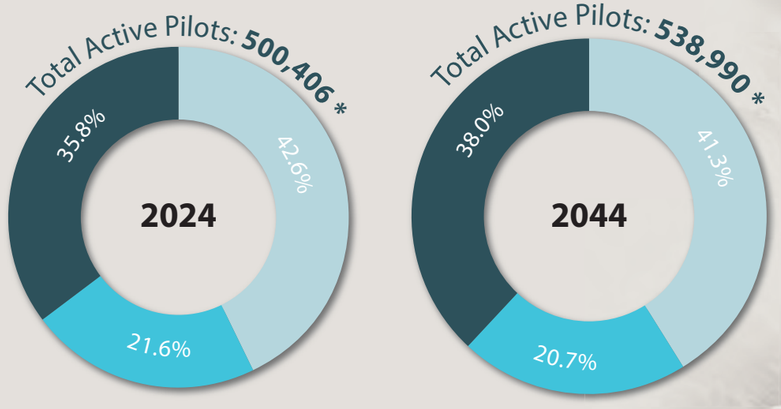
U.S. Air Taxi Operations



U.S. General Aviation Operations



Active Pilots By Certificate



*Excludes Student Pilot Certificates

Source: FAA Aerospace Forecasts FY2023-2043

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Turboprops | Turboprop shipments increased from 582 in 2022 to 638 in 2023. North America's market share of turboprop aircraft decreased by 2.1 percent in the last year. The European, Middle East, and Africa market shares increased while the Asia-Pacific and Latin American market shares decreased.

Pistons | In 2023, piston airplane shipments increased to 1,682 units from 1,519 units in the prior year. North America's market share of piston aircraft deliveries rose 7.2 percent from the year 2022. The European, Latin American, Middle East, and Africa regions experienced a positive rate in market shares during the past year, while the Asia-Pacific market saw a decline.

U.S. PILOT POPULATION

There were 490,470 active pilots certificated by the FAA at the end of 2023, with 500,406 active pilots projected in 2024. All pilot categories – except private and recreational-only certificates – are expected to continue to increase for the forecast length. Excluding student pilots, the number of active pilots is projected to increase by about 38,584 (up 0.4 percent annually) between 2024 and 2044. The airline transport pilot (ATP) category is forecast to increase by 25,800 (up 0.7 percent annually). Sport pilots are predicted to increase by 2.4 percent, commercial pilots should remain steady over the forecast period, and private pilot certificates are projected to decrease at an average annual rate of 0.1 percent through 2044. The FAA has currently suspended the student pilot forecast.

RISKS TO THE FORECAST

While the FAA is confident that its forecasts for aviation demand and activity can be reached, they are dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), changing geopolitical landscape, and oil prices. Higher oil prices could lead to further shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic introduced a new risk, and although the industry has rebounded, the threat of future global health emergencies and potential economic fallout remains.

AIRPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define the airport's generalized service area for various segments of aviation. The service area is determined primarily by evaluating the locations of competing airports, as well as their capabilities, services, relative attraction, and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of the airport, as well as the specific areas of aviation demand the airport is intended to serve. East Troy Municipal Airport is classified as a Local General Aviation (GA) airport within the NPIAS, meaning that its primary role is to provide the community with access to local and regional markets. Within the *Wisconsin State Aviation System Plan 2030*, the airport is classified as a large GA Community airport, meaning its role is to accommodate all GA aircraft, including business jets, support domestic transportation centers, and potentially support international travel. General aviation, which includes all segments of the aviation industry except commercial air carriers and the military, is the largest component of the national aviation system. It includes activities such as pilot training, recreational flying, and the use of sophisticated turboprop and jet aircraft for business and corporate use.

The service area for an airport is a geographic region from which an airport can be expected to attract the largest share of its activity. The definition of the service area can be used to identify other factors, such as socioeconomic and demographic trends, that influence aviation demand at an airport. Aviation demand will be impacted by the proximity of competing airports, the surface transportation network, and the strength of general aviation services provided by an airport and competing airports.

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

As a Local GA airport, East Troy Municipal Airport's service area is driven by aircraft owners/operators and where they choose to base their aircraft. The primary consideration of aircraft owners/operators when choosing where to base their aircraft is convenience (i.e., easy access and proximity to the airport). As a general rule, an airport's service area can extend up to and beyond 30 miles. The proximity and level of general aviation services are largely a defining factor when describing the general aviation service area. A description of nearby airports was previously completed in Chapter One and is presented in **Table 2C**. There are a total of 20 public-use airports within 30 nautical miles (nm) of East Troy Municipal Airport; however, only 12 of those public-use airports are included in the NPIAS. Although any airport located in proximity to East Troy Municipal Airport can impact its service area, the NPIAS airports are generally more competitive, as they have access to more funding options. As such, only airports included in the NPIAS are considered for this portion of the analysis.

TABLE 2C | Regional NPIAS Airports Within 30 Nautical Miles – East Troy Municipal Airport

Airport	nm/Direction from 57C[1]	FAA Service Level[2]	Towered[1]	Based Aircraft[3]	2023 Annual Operations[4]	Longest Runway[1]	Visibility Minimum[1]
East Troy Municipal Airport	**–**	**GA**	**No**	**78[5]**	**41,000**	**3,900'**	**1-mile**
Burlington Municipal Airport	7.1 nm SSE	GA	No	107	54,900	4,300'	1-mile
Palmyra Municipal Airport	11.3 nm WNW	GA	No	54	14,000	2,800'	None
Waukesha County Airport	15.8 nm NNE	GA	Yes	210	61,471	5,849'	½-mile
Capital Drive Airport	19.5 nm NNE	GA	No	116	13,010	3,387'	None
Fort Atkinson Municipal Airport	22.0 nm WNW	GA	No	23	10,900	3,800'	1-mile
General Mitchell International Airport	22.8 nm ENE	Commercial	Yes	83	88,902	9,990'	CAT I
Kenosha Regional Airport	23.0 nm ESE	GA	Yes	222	59,998	6,600'	½-mile
Galt Field Airport	23.7 nm S	GA	No	32	40,000	2,802'	1-mile
Lawrence J Timmerman Airport	24.0 nm NE	GA	Yes	90	27,266	4,107'	1-mile
Batten International Airport	24.7 nm E	GA	No	76	47,000	6,574'	¾-mile
Dacy Airport	26.3 nm SSW	GA	No	34	20,000	3,589'	None
Watertown Municipal Airport	27.1 nm NW	GA	No	60	58,000	4,429'	1-mile

GA = general aviation
nm = nautical miles

Sources: [1]Airnav.com; [2]FAA NPIAS; [3]BasedAircraft.com; [4]ADIP; [5]57C Based Aircraft Airport Records

When discussing the general aviation service area, two primary demand segments need to be addressed. The first component is the airport's ability to attract based aircraft. For East Troy Municipal Airport, the most effective method of defining the airport's service area is by examining the number of registered aircraft owners in proximity to the airport. As previously mentioned, aircraft owners typically choose to

base at airports near their homes or businesses. Based on the current registered aircraft data, presented on **Exhibit 2B**, there are 1,638 registered aircraft within 30 nm of East Troy Municipal Airport. Of these aircraft, 66 (approximately four percent) are based at the airport. It should be noted that 12 based aircraft had addresses beyond the 30-nm radius or addresses that were unlisted in based aircraft records.

The second demand segment to consider is itinerant aircraft operations. In most instances, pilots will opt to utilize airports nearer their intended destinations; however, this is also dependent on the airport's capabilities in accommodating aircraft operators. As a result, airports offering better services and facilities are more likely to attract itinerant operators in the region.

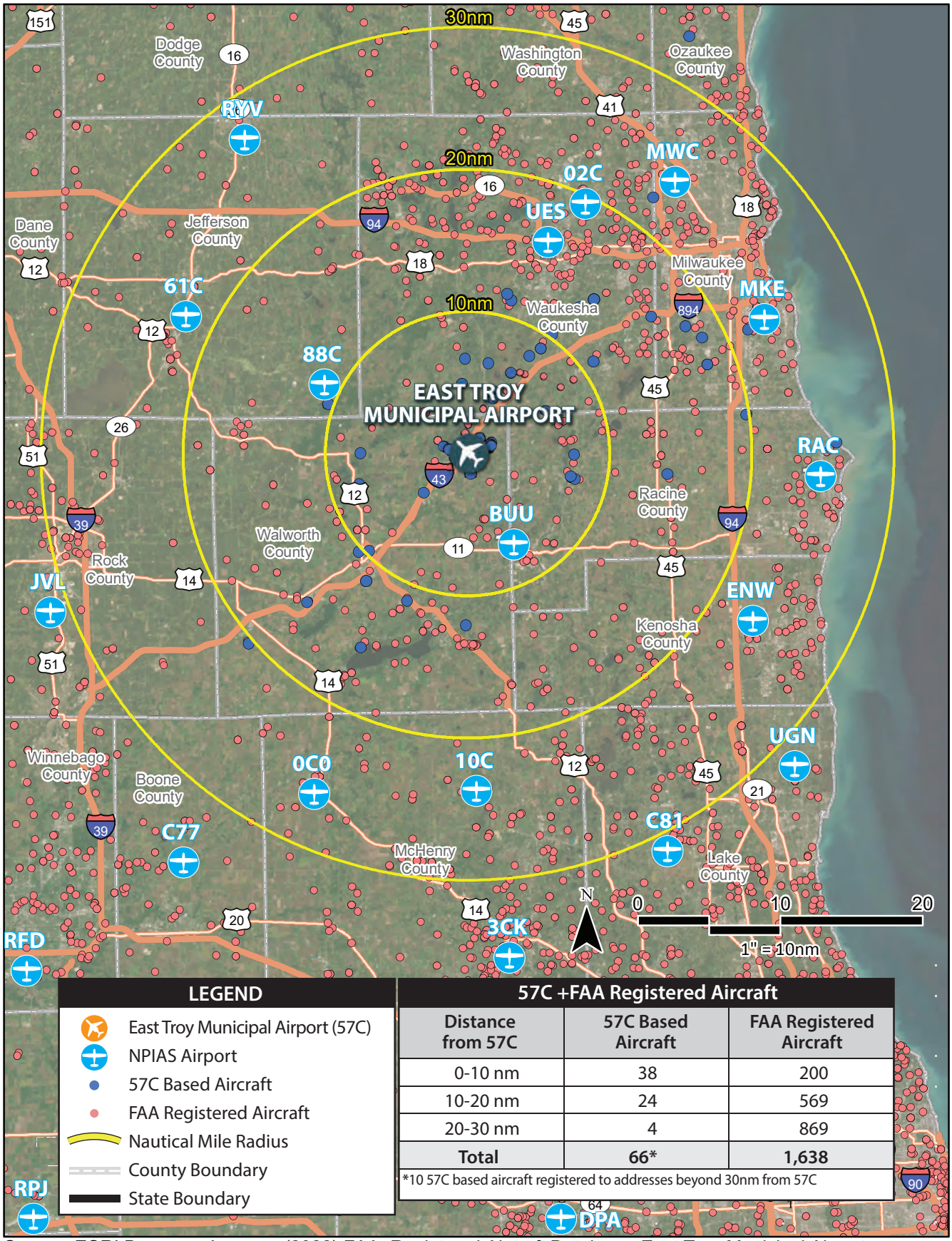
With several competing airports in the region, East Troy Municipal Airport's primary service area is defined by its convenience to its users and its ability to compete for based aircraft. The nearest NPIAS airport is Burlington Municipal Airport (BUU), which is approximately seven miles away and is partially in Walworth and Racine Counties. BUU offers a single 4,300-foot runway and a turf crosswind runway, fixed base operator (FBO) services, and one-mile instrument approaches. The second nearest airport is Palmyra Municipal Airport (88C), which is 11 nm away but only offers a single turf runway, limited services, and no instrument approaches. Neighboring counties are home to more substantial facilities, including Waukesha County Airport (UES) in Waukesha County and Kenosha Regional Airport (ENW) in Kenosha County. Each of these airports offers at least two paved runways, a full array of aviation services, and instrument approach minimums down to ½-mile. Although UES is a competitive airport complex with superior service and amenities, 57C draws many of its based aircraft from Waukesha County, as shown on **Exhibit 2B**. For this reason, the primary service area for East Troy Municipal Airport is established as the Counties of Walworth and Waukesha, which 57C is well-equipped to serve and from which the airport currently draws the majority of its based aircraft owners.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth; however, the judgment of the forecast analyst – based on professional experience, knowledge of the aviation industry, and assessment of the local situation – is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Frequently considered methodologies include trend line/time-series projections, correlation/regression analysis, and market share analysis. The forecast analyst may elect not to use certain techniques, depending on the reasonableness of the forecasts produced using other techniques.

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

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



LEGEND
East Troy Municipal Airport (57C)
NPIAS Airport
57C Based Aircraft
FAA Registered Aircraft
Nautical Mile Radius
County Boundary
State Boundary

57C +FAA Registered Aircraft

Distance from 57C	57C Based Aircraft	FAA Registered Aircraft
0-10 nm	38	200
10-20 nm	24	569
20-30 nm	4	869
Total	**66***	**1,638**

*10 57C based aircraft registered to addresses beyond 30nm from 57C

Source: ESRI Basemap Imagery (2022),FAA Registered Aircraft Database, East Troy Municipal Airport

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

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

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

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

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

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

EXISTING FORECASTS

Consideration is given to any forecasts of aviation demand for the airport that have been completed in the recent past. For East Troy Municipal Airport, the previous forecasts reviewed are those in the FAA *Terminal Area Forecast* (TAF) and the *Wisconsin State Airport System Plan 2030* (SASP), which used a base year of 2010.

FAA TERMINAL AREA FORECAST

The FAA publishes the TAF for each airport included in the NPIAS on an annual basis. The TAF is a generalized forecast of airport activity that is used by the FAA for internal planning purposes primarily. It is available to airports and consultants to use as a baseline projection and is an important point of comparison when developing local forecasts. The current TAF was published in January 2024 and is based on the federal fiscal year (October-September).

As presented in **Table 2D**, the TAF projects general aviation activity at the airport to remain static over the next 20 years, which is the FAA's common practice for airports that are not served by airport traffic control towers (ATCTs). Because there is currently no commercial service activity at East Troy Municipal Airport, the TAF does not reflect any existing and/or forecast air carrier operations; however, the TAF reflects 800 air taxi operations over the forecast period. Operations are projected to be dominated by local and itinerant GA operations, which are estimated to account for over 97 percent of the total operations over the planning period. Military operations are projected to account for less than one percent of total operations, with 200 operations projected for each of the plan years. Based aircraft are also projected to remain flat at 62 aircraft over the next 20 years; as previously mentioned, this is a common FAA practice for non-towered general aviation airports. As noted previously, even though the TAF is generic and presents no real forecast growth, the FAA will compare the new forecasts developed for this master plan to the TAF.

TABLE 2D | 2024 FAA Terminal Area Forecast – East Troy Municipal Airport

	2024	2029	2034	2044	CAGR 2024-2044
ANNUAL OPERATIONS					
Itinerant					
Air Carrier	0	0	0	0	0.00%
Air Taxi	800	800	800	800	0.00%
General Aviation	20,000	20,000	20,000	20,000	0.00%
Military	200	200	200	200	0.00%
Total Itinerant	***21,000***	***21,000***	***21,000***	***21,000***	***0.00%***
Local					
General Aviation	20,000	20,000	20,000	20,000	0.00%
Military	0	0	0	0	0.00%
Total Local	***20,000***	***20,000***	***20,000***	***20,000***	***0.00%***
Total Operations	***41,000***	***41,000***	***41,000***	***41,000***	***0.00%***
BASED AIRCRAFT					
Based Aircraft	***62***	***62***	***62***	***62***	***0.00%***

Source: FAA Terminal Area Forecast (TAF), January 2024

PREVIOUS FORECASTS

Forecasts of aviation activity at East Troy Municipal Airport were previously prepared within the older, less currently relevant 2030 SASP. **Table 2E** summarizes the forecasts of operations and based aircraft at East Troy Municipal Airport that were prepared for this study.

TABLE 2E | Previous Forecasts – East Troy Municipal Airport

Year	Total Operations	Based Aircraft
***Wisconsin State Airport System Plan 2030* Update (2010 Base Year)**		
2010	51,250	70
2015	51,460	70
2020	51,760	71
2030	53,460	73
Note: The SASP forecast includes only total operations; separate forecasts were not developed for itinerant and local operations.		

Source: Wisconsin State Airport System Plan 2030 Update

The SASP, which used a base year of 2010, forecasted total operations to grow from 51,250 in 2010 to 53,460 by 2030, and forecasted based aircraft to increase slightly from 70 to 73 by 2030. The airport has exceeded this based aircraft projection, with 78 based aircraft at the time of this writing (May 2024). Based on recent activity trends at East Troy Municipal Airport and in the region, along with the time that has passed since the preparation of these previous forecasts, it is necessary to develop new forecasts utilizing the most recent information available.

GENERAL AVIATION FORECASTS

The following forecast analysis examines each aviation demand category expected at East Troy Municipal Airport over the next 20 years. Each segment will be examined individually, and then collectively, to provide an understanding of the overall aviation activity at the airport through 2044. Forecasts for airport activities include the following:

- Service Area Registered Aircraft
- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations – Local and Itinerant
- Air Taxi and Military Operations
- Peaking Conditions
- Critical Aircraft

The remainder of this chapter will examine historical trends with regard to these areas of general aviation and will project future demand for these segments of general aviation activity at the airport. Once these forecasts are approved by the FAA, they will become the basis for planning future airside and landside facilities.

REGISTERED AIRCRAFT FORECASTS

The most basic indicator of general aviation demand at an airport is the total number of aircraft based at the facility; however, before a projection of based aircraft can be developed, it is important to ascertain the number, or pool, of aircraft in the market area from which 57C based aircraft will be generated. The methodology for identifying the market pool is to offer an examination and forecast of registered aircraft in the airport's service area.

Table 2F presents the historical registered aircraft for the airport service area (Walworth and Waukesha Counties) for 2005 through 2024. These figures are derived from the FAA aircraft registration database, which categorizes aircraft registrations by county based on the zip code of the aircraft owner. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in the county but be based at an airport outside the county, or vice versa.

TABLE 2F | Historical Registered Aircraft – Walworth and Waukesha Counties

Year	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other[1]	UAV	Total
2005	595	38	38	21	21	30	0	743
2006	565	43	10	12	20	35	0	685
2007	570	33	12	11	25	42	0	693
2008	623	37	19	21	25	41	0	766
2009	617	35	19	21	28	42	0	762
2010	602	36	19	24	23	45	0	749
2011	604	36	22	22	24	44	0	752
2012	593	33	23	22	28	41	0	740
2013	544	32	18	23	24	42	0	683
2014	543	31	13	26	26	38	0	677
2015	525	28	11	30	26	39	2	661
2016	521	27	11	27	26	40	7	659
2017	524	24	11	26	30	42	7	664
2018	516	20	11	27	26	43	7	650
2019	507	18	16	27	27	46	5	646
2020	493	16	14	29	24	43	4	623
2021	484	16	13	31	29	38	4	615
2022	484	18	15	29	29	40	4	619
2023	487	20	16	33	28	36	4	624
2024[2]	499	20	14	35	27	36	4	635

[1] The Other aircraft category includes aircraft such as gliders, electric aircraft, balloons, and dirigibles.
[2] As of 5/15/2024

Source: FAA Aircraft Registration Database

The registered aircraft in the service area show a somewhat declining trend over the last several years, with the historical high recorded in 2008 with 766 registered aircraft. As previously stated, the FAA required aircraft owners to re-register their aircraft after this timeframe, which likely somewhat accounts for the notable decrease from 766 registered aircraft in 2008 to 683 in 2013. Since then, registered aircraft in the service area generally dropped until 2021. The most recent count for 2024 reports 635 registrations in the service area.

Although there are no recently prepared forecasts for the service area regarding registered aircraft, one was prepared for this study using market share, ratio, and historical growth rate projection methods. Several regression forecasts were also considered, including single- and multi-variable regressions examining the correlation of registered aircraft correlation with the service area population, employment, income, and gross regional product, as well as with U.S. active general aviation aircraft. Regression analysis measures the statistical relationship between dependent and independent variables, yielding a correlation coefficient. The correlation coefficient (Pearson's "r") measure associations between the changes in a dependent variable and an independent variable. If the r^2 value is greater than 0.95,

it indicates good predictive reliability. **Table 2G** details the results of this analysis, which considered the correlation between registered aircraft (dependent variable) and several independent variables, as described above.

TABLE 2G | Regression Analysis

Independent Variable	r^2
Year	0.70
Population	0.66
Employment	0.74
Income	0.70
Gross Regional Product	0.85
U.S. Active Aircraft	0.43

Source: Coffman Associates analysis

The regression that produced the best correlation was the gross regional product regression, which produced an r^2 value of 0.85. Because none of the based aircraft regressions produced a correlation value over 0.95, the regression forecasts have been excluded from consideration.

Table 2H presents several other projections of registered aircraft for the service area, with the goal of presenting a planning envelope that shows a range of projections based on historical trends. The first set of forecasts is based on market share and considers the relationship between registered aircraft located in the service area and active aircraft within the United States. The next set of projections is based on a ratio of the number of aircraft per 1,000 service area residents. Lastly, a projection based on the five-year historical growth rate was also prepared.

TABLE 2H | Registered Aircraft Projections – Walworth and Waukesha Counties

Year	Service Area Registrations	U.S. Active Aircraft	Market Share of U.S. Aircraft	Service Area Population	Aircraft per 1,000 Residents
2005	743	224,257	0.331%	478,733	1.55
2006	685	221,942	0.309%	481,825	1.42
2007	693	231,606	0.299%	485,688	1.43
2008	766	228,664	0.335%	488,607	1.57
2009	762	223,876	0.340%	491,034	1.55
2010	749	223,370	0.335%	492,246	1.52
2011	752	220,453	0.341%	493,802	1.52
2012	740	209,034	0.354%	496,304	1.49
2013	683	199,927	0.342%	497,858	1.37
2014	677	204,408	0.331%	499,768	1.35
2015	661	210,031	0.315%	500,211	1.32
2016	659	211,794	0.311%	502,922	1.31
2017	664	211,757	0.314%	505,845	1.31
2018	650	211,749	0.307%	508,372	1.28
2019	646	210,981	0.306%	510,829	1.26
2020	623	204,140	0.305%	512,775	1.21
2021	615	209,194	0.294%	514,280	1.20
2022	619	209,540	0.295%	515,814	1.20
2023	624	209,730	0.298%	518,066	1.20
2024	635	210,105	0.303%	520,293	1.22
Constant Market Share of U.S. Active Aircraft (CAGR 0.44%) – SELECTED FORECAST					
2029	647	213,370	0.303%	530,664	1.22
2034	660	217,685	0.303%	539,552	1.22
2044	694	228,975	0.303%	552,454	1.26
Increasing Market Share of U.S. Active Aircraft – Mid Range (CAGR 0.86%)					
2029	652	213,370	0.305%	530,664	1.23
2034	682	217,685	0.313%	539,552	1.26
2044	753	228,975	0.329%	552,454	1.36
Increasing Market Share of U.S. Active Aircraft – High Range (CAGR 1.23%)					
2029	665	213,370	0.312%	530,664	1.25
2034	709	217,685	0.326%	539,552	1.31
2044	811	228,975	0.354%	552,454	1.47
Constant Ratio Projection per 1,000 County Residents (CAGR 0.30%)					
2029	647	213,370	0.303%	530,664	1.22
2034	658	217,685	0.302%	539,552	1.22
2044	674	228,975	0.294%	552,454	1.22
Increasing Ratio Projection per 1,000 County Residents – Mid Range (CAGR 0.97%)					
2029	670	213,370	0.314%	530,664	1.26
2034	703	217,685	0.323%	539,552	1.30
2044	757	228,975	0.331%	552,454	1.37
Increasing Ratio Projection per 1,000 County Residents – High Range (CAGR 1.66%)					
2029	694	213,370	0.325%	530,664	1.31
2034	753	217,685	0.346%	539,552	1.40
2044	867	228,975	0.379%	552,454	1.57
5-Year Historical Registered Aircraft Growth Rate (CAGR 0.38%)					
2029	647	213,370	0.303%	530,664	1.22
2034	660	217,685	0.303%	539,552	1.22
2044	685	228,975	0.299%	552,454	1.24

Sources: Airport Based Aircraft Records; FAA Aircraft Registration Database; FAA Aerospace Forecast, Fiscal Years 2024-2044; Woods & Poole 2023; Coffman Associates analysis

Market Share Projections

- *Constant Market Share* | This forecast maintains the 2024 market share of service area registered aircraft (0.303 percent) throughout the planning period. The result is modest growth in registrations through the long-term planning horizon. This results in 694 registered aircraft projected for 2044 and a CAGR of 0.44 percent.

- *Increasing Market Share* | Two increasing market share forecasts were also considered. The first evaluated a high-range market share forecast based on a return to the service area's record high market share (0.354 percent), which occurred in 2012. This produced a CAGR of 1.23 percent, or 811 registered aircraft in the service area by 2044. A mid-range scenario – based on the median market share between the constant and high-range scenarios – was also considered, which increased the market share to 0.329 percent. The mid-range scenario resulted in 753 registered aircraft in the service area by the end of the planning period, at a CAGR of 0.86 percent.

Ratio Projections

- *Constant Ratio* | In 2024, there were 1.22 registered aircraft per 1,000 service area residents. Carrying this ratio forward through the plan years results in 674 registrations in the service area by 2044 and a CAGR of 0.30 percent.

- *Increasing Ratio* | Mid- and high-range increases were also projected. The mid-range projection was based on the 20-year historical average ratio and resulted in 757 registered aircraft by 2044, which equates to a CAGR of 0.97 percent. The high-range projection, which is based on a return to the historical high ratio of 1.57, results in 867 aircraft by 2044, for a CAGR of 1.66 percent.

Growth Rate Projection

The historical growth rate was also examined. Over the last five years, service area aircraft registrations have generally increased at a rate of 0.38 percent. If this trend is applied to the forecast years, aircraft registrations should increase to 685 by the end of the planning period.

Selected Forecast

Each of these forecasts offers a projection of what aircraft registrations in the service area could look like over the next 20 years. As presented in **Table 2H**, the projection based on the constant ratio of registered aircraft per 1,000 service area residents and the growth rate forecast provide the low-range projections, and the high-range increasing ratio forecast represents the top end of the planning envelope. Even though service area registrations have generally declined, the service area population is expected to increase and it is not unreasonable to expect some level of growth in aircraft registrations over the next 20 years. This is predicated on the anticipated growth in the national fleet of active aircraft, as well as the slow uptick in registrations over the past five years; therefore, the constant market share of U.S. active aircraft is considered the most reasonable registered aircraft forecast.

At a CAGR of 0.44 percent, this forecast shows slow but steady growth in aircraft registrations in the service area, with the addition of 12 aircraft by 2029, 25 by 2034, and 59 by 2044, for a total of 694 registered aircraft in the service area in 2044. This level of registered aircraft has been experienced within the service area as recently as 2012.

The registered aircraft projection is one data point to be used in the development of a based aircraft forecast. The following section will present several potential based aircraft forecasts, as well as the selected based aircraft forecast, to be utilized in this study.

BASED AIRCRAFT FORECAST

Determining the number of based aircraft at an airport can be a challenging task. Aircraft storage can be somewhat transient in nature: aircraft owners can and do move their aircraft. Some aircraft owners may store their aircraft at an airport for only part of the year. For many years, the FAA did not require airports to report their based aircraft counts and did not validate based aircraft at airports; however, this has changed in recent years, and the FAA now mandates that airports report their based aircraft levels. These counts are recorded in the National Based Aircraft Inventory database and are maintained and validated by the FAA to ensure accuracy.

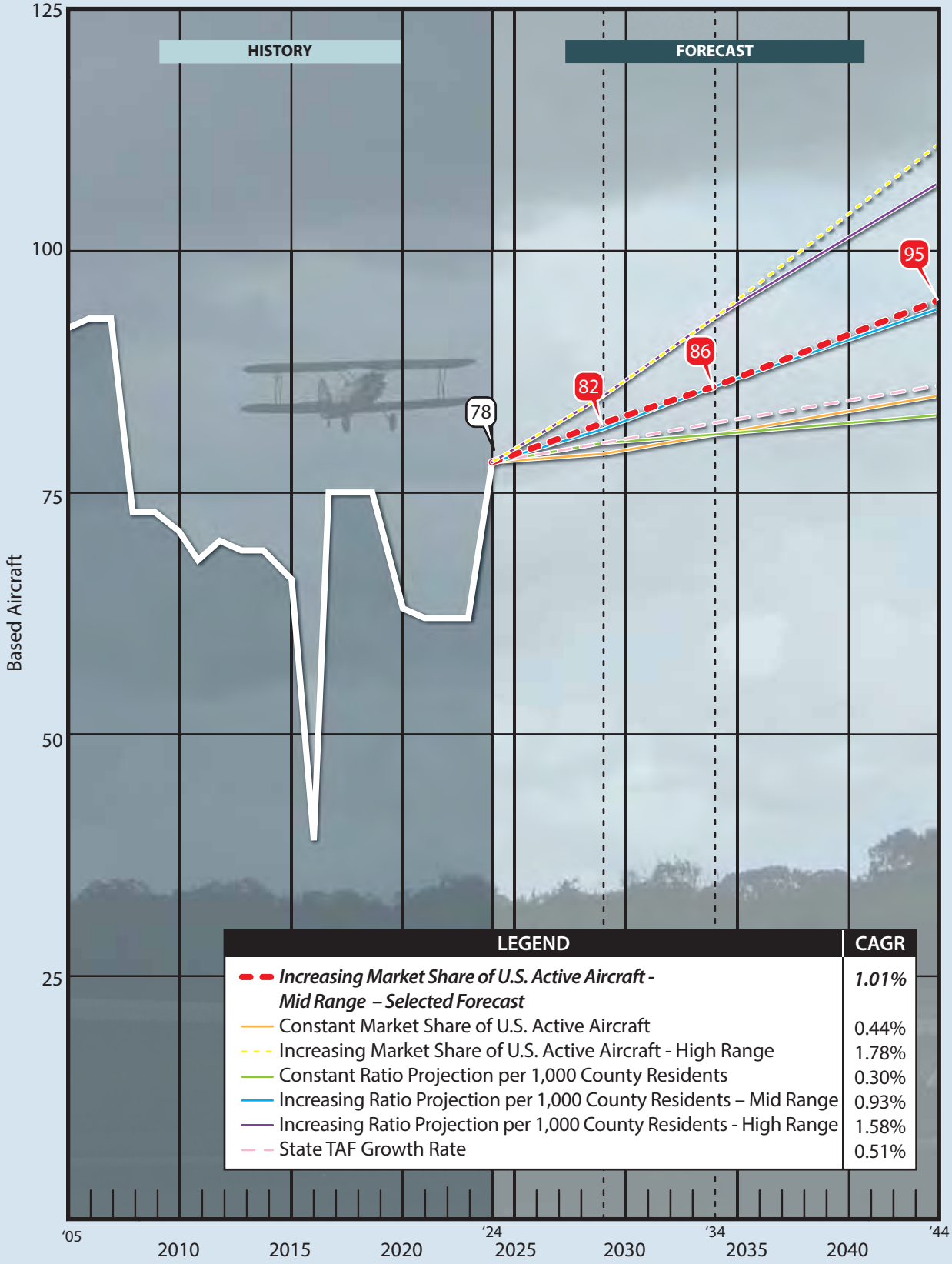
According to the FAA's database, East Troy Municipal Airport has 72 based aircraft, a count which was most recently confirmed in December 2023. Current airport records indicate that an additional six aircraft are currently in the process of being validated as based at 57C; as such, 78 aircraft will serve as the base year count for forecasting purposes.

Like the registered aircraft forecasts, several projections have been made for based aircraft at East Troy Municipal Airport, including market share, ratio, and growth rate forecasts. The market share is based on the airport's percentage of based aircraft compared to registered aircraft in the service area, while the ratio projection is based on the number of based aircraft per 1,000 service area residents. The growth rate projection considers the FAA's TAF projection for the State of Wisconsin. The results of these analyses are detailed in **Table 2J** and depicted graphically on **Exhibit 2C**. It should be noted that no historical based aircraft data were available, other than the FAA TAF; as such, an assumptive analysis was made based on the experience of the forecast preparer and knowledge of regional and national based aircraft trends. The overarching assumption is that 57C will experience some level of growth in based aircraft over the planning period because (1) this reflects national and state estimates for increased aircraft ownership, as noted in the FAA TAF; (2) there is existing demand for aircraft storage space at 57C; and (3) it is not unreasonable to assume that construction of new aircraft hangars will occur.

TABLE 2J | Based Aircraft Forecasts for East Troy Municipal Airport

Year	57C Based Aircraft	Service Area Registrations	Market Share	Service Area Population	Aircraft per 1,000 Residents
2005	92	743	12.38%	478,733	0.192
2006	93	685	13.58%	481,825	0.193
2007	93	693	13.42%	485,688	0.191
2008	73	766	9.53%	488,607	0.149
2009	73	762	9.58%	491,034	0.149
2010	71	749	9.48%	492,246	0.144
2011	68	752	9.04%	493,802	0.138
2012	70	740	9.46%	496,304	0.141
2013	69	683	10.10%	497,858	0.139
2014	69	677	10.19%	499,768	0.138
2015	66	661	9.98%	500,211	0.132
2016	39	659	5.92%	502,922	0.078
2017	75	664	11.30%	505,845	0.148
2018	75	650	11.54%	508,372	0.148
2019	75	646	11.61%	510,829	0.147
2020	63	623	10.11%	512,775	0.123
2021	62	615	10.08%	514,280	0.121
2022	62	619	10.02%	515,814	0.120
2023	62	624	9.94%	518,066	0.120
2024	78	635	12.28%	520,293	0.150
Constant Market Share of U.S. Active Aircraft (CAGR 0.44%)					
2029	79	647	12.28%	530,664	0.150
2034	81	660	12.28%	539,552	0.150
2044	85	694	12.28%	552,454	0.154
Increasing Market Share of U.S. Active Aircraft – Mid Range (CAGR 1.01%) – SELECTED FORECAST					
2029	82	647	12.65%	530,664	0.154
2034	86	660	13.02%	539,552	0.159
2044	95	694	13.75%	552,454	0.173
Increasing Market Share of U.S. Active Aircraft – High Range (CAGR 1.78%)					
2029	85	647	13.21%	530,664	0.161
2034	93	660	14.14%	539,552	0.173
2044	111	694	16.00%	552,454	0.201
Constant Ratio Projection per 1,000 County Residents (CAGR 0.30%)					
2029	80	647	12.31%	530,664	0.150
2034	81	660	12.27%	539,552	0.150
2044	83	694	11.94%	552,454	0.150
Increasing Ratio Projection per 1,000 County Residents – Mid Range (CAGR 0.93%)					
2029	82	647	12.72%	530,664	0.155
2034	86	660	13.08%	539,552	0.160
2044	94	694	13.54%	552,454	0.170
Increasing Ratio Projection per 1,000 County Residents – High Range (CAGR 1.58%)					
2029	85	647	13.19%	530,664	0.161
2034	93	660	14.03%	539,552	0.171
2044	107	694	15.37%	552,454	0.193
State TAF Growth Rate (CAGR 0.51%)					
2029	80	647	12.38%	530,664	0.15
2034	82	660	12.44%	539,552	0.15
2044	86	694	12.45%	552,454	0.16

Sources: Airport Based Aircraft Records; FAA Aircraft Registration Database; FAA Aerospace Forecast, Fiscal Years 2024-2044; Woods & Poole 2023; Coffman Associates analysis



CAGR: Compound Annual Growth Rate

Market Share Projections

- *Constant Market Share* | In May 2024, the airport had 78 based aircraft, which equates to 12.28 percent of the market share of registered aircraft in the service area. Carrying this percentage throughout the plan years results in a small increase in based aircraft, reflective of a 0.44 percent CAGR. This projection yielded 85 based aircraft by 2044.

- *Increasing Market Share* | Two increasing market share forecasts were also evaluated. The mid-range scenario considered a 13.75 percent market share by 2044 and resulted in an increase in based aircraft to 95, or a 1.01 percent CAGR, by the end of the planning period. The high-range market share forecast evaluated a stronger growth scenario that considered East Troy Municipal Airport holding 16.00 percent of the market share by the end of the planning period. This resulted in 111 based aircraft by 2044, for a CAGR of 1.78 percent.

Ratio Projections

- *Constant Ratio* | In 2024, the ratio of based aircraft per 1,000 county residents stood at 1.50. Maintaining this ratio at a constant through 2044 resulted in low growth in based aircraft due to the nature of the service area population projections. Under this scenario, the airport would have 83 based aircraft by the end of the planning period and would grow at a CAGR of 0.30 percent.

- *Increasing Ratio* | Mid- and high-range growth scenarios were also evaluated. The mid-range scenario is based on growing the ratio of based aircraft per 1,000 residents to 1.70 by 2044. Applying this figure to the end of the planning period results in 94 based aircraft at the airport by 2044, at a CAGR of 0.93 percent. The high-range scenario considers more aggressive growth, with 0.193 based aircraft per 1,000 residents (the historical high) by the end of the planning period. Applying this ratio produces 107 based aircraft by 2044 at a CAGR of 1.58 percent.

The FAA TAF projections for based aircraft at East Troy Municipal Airport are also included as a point of comparison. The TAF shows no growth in based aircraft; the count is flatlined at 62 throughout the planning period, which results in a negative CAGR when considering the actual count of based aircraft in 2024. The TAF for the State of Wisconsin was also examined, and the statewide growth rate for based aircraft of 0.51 percent was applied. This resulted in 86 based aircraft at East Troy Municipal Airport by the end of the planning period.

Selected Forecast

The forecasts produce a planning envelope ranging from 83 to 111 based aircraft on the airport by 2044. As of May 2024, there is one T-hangar vacancy, and the airport maintains a waitlist for hangar space. This is indicative of strong demand for aircraft storage space at the airport. Combined with favorable trends in both local and national aircraft ownership, along with the clear demand for hangar space, it is reasonable to assume a more robust growth rate for based aircraft at 57C; therefore, the mid-range increasing market share forecast has been selected as the preferred projection. With a CAGR of 1.01 percent, this forecast shows an increase of 17 based aircraft by the end of the planning period, for a total of 95 aircraft based at 57C by 2044.

Based Aircraft Fleet Mix Forecast

It is important to establish an understanding of the current and projected based aircraft fleet mix at an airport in order to ensure the planning of proper facilities in the future. The forecast mix of based aircraft was determined by comparing existing and forecast U.S. general aviation fleet trends to the fleet mix at the airport. The national trend in general aviation is toward a greater percentage of larger, more sophisticated aircraft as part of the national fleet. East Troy Municipal Airport is capable of accommodating all types of general aviation aircraft, from small piston-powered aircraft up to small business jet aircraft.

As indicated in **Table 2K**, single-engine piston aircraft presently make up the majority of the fleet mix at the airport, comprising 83 percent of the aircraft based at the airport. The remainder of the fleet mix currently includes three multi-engine pistons, two turboprops, and eight helicopters.

TABLE 2K | Total Based Aircraft Fleet Mix

	EXISTING		FORECAST					
Aircraft Type	2024	%	2029	%	2034	%	2044	%
Single-Engine Piston	65	83.3%	66	80.0%	67	78.0%	71	75.0%
Multi-Engine Piston	3	3.8%	3	4.0%	3	3.0%	1	1.0%
Turboprop	2	2.6%	4	5.0%	5	6.0%	8	8.0%
Jet	0	0.0%	1	1.0%	2	2.0%	4	4.0%
Helicopter	8	10.3%	8	10.0%	9	11.0%	11	12.0%
Totals	**78**	**100.0%**	**82**	**100.0%**	**86**	**100.0%**	**95**	**100.0%**

Source: Airport records; Coffman Associates analysis

The FAA predicts piston-powered aircraft will decline in numbers nationwide, with aircraft ownership trends shifting to the more sophisticated turboprops and jets; however, it is anticipated that piston aircraft will continue to comprise the majority of the fleet mix at East Troy Municipal Airport, with some growth in turbine aircraft and helicopters. **Table 2K** details the based aircraft fleet mix projections for the airport over the next 20 years. Single-engine pistons are projected to increase from the 65 that are currently based at the airport to 71 by 2044. The multi-engine pistons are expected to decrease to one by the end of the planning period – in line with national trends – while eight turboprops, four jets, and 11 helicopters are anticipated to be added to the fleet mix by 2044.

OPERATIONS FORECASTS

Operations at East Troy Municipal Airport are classified as either general aviation, air taxi, or military. General aviation operations include a wide range of activities, from recreational use and flight training to business and corporate uses. Air taxi operations are conducted by aircraft operating under Title 14 Code of Federal Regulations (CFR) Part 135, otherwise known as for-hire or on-demand activity. Military operations include operations conducted by various branches of the U.S. military.

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

Because East Troy Municipal Airport is not equipped with an airport traffic control tower (ATCT), precise operational (takeoff and landing) counts are not available. Sources for estimated operational activity at the airport include the FAA Form 5010 Airport Master Record, the FAA TAF, and the *Wisconsin State Airport System Plan 2030*. The 2024 FAA TAF indicates a total of 41,000 operations in 2024, as does the Form 5010 for the 12-month period ending May 5, 2021. In both estimates, there is an even split of local and itinerant operations; each comprises 48.8 percent of the total operations count. Air taxi and military operations are estimated at 1.9 percent and 0.5 percent of the total, respectively. On a more local level, the SASP provided an estimate of 51,250 total operations, with a base year of 2010. The SASP did not categorize operations by local or itinerant.

Additional calculations to estimate annual operations were also conducted for comparison purposes. The first, Equation 15 in the FAA's *Model for Estimating General Aviation Operations at Non-towered Airports Using Towered and Non-towered Airport Data* factors in regional population and based aircraft data to develop a baseline operational count. When these data were input, the result was 40,598 annual operations, as shown in **Table 2L**.

TABLE 2L | FAA Model for GA Operations Estimates

Inputs		
Population within 25 nm	1,437,662	
Population within 100 nm	14,593,617	
Based Aircraft	78	
Based Aircraft at Airports within 100 nm	4,886	
Equation 15		
755		775
241 (BA)	+	18,798
0.14 (BA^2)	-	852
31,478 (% in 100 miles)	+	503
5,557 (VITFSnum)	+	5,557
0.001 (Pop. 100)	+	14,594
3,736 (WACAORAK)	-	0
12,121 (Pop. 25/100)	+	1,224
Estimate of Total Operations	**40,598**	

775 = constant
BA = based aircraft
VITFSnum = number of FAR 141 pilot schools on airport
WACAORAK = 1 if CA, OR, WA, AK; 0 otherwise

Source: Equation 15, Model for Estimating General Aviation Operations at Non-towered Airports Using Towered and Non-towered Airport Data, GRA, Inc. (2001)

Lastly, the FAA's Traffic Flow Management System Counts (TFMSC) database was examined to assist in determining total annual operations at 57C. The TFMSC database captures an operation when a pilot files a flight plan and/or when a flight is detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to certain factors – such as incomplete flight plans, limited radar coverage, and visual flight rules (VFR) operations – TFMSC data do not account for all aircraft activity at an airport by a given aircraft type. The TFMSC reports 98 operations occurring at 57C during 2023, which is considered to be a limited dataset.

In summary, the following are estimates of annual operations, as derived from various sources:

- FAA Form 5010 – 41,000 annual operations
- 2024 FAA TAF – 41,000 annual operations
- *Wisconsin State Airport System Plan 2030* – 51,250 (2010 base year estimate)
- FAA Equation 15 – 40,598 annual general aviation operations
- TFMSC – 98 operations (2023)

Based on activity levels in the region and at similar airports, Equation 15 in the FAA's *Model for Estimating General Aviation Operations at Non-towered Airports Using Towered and Non-towered Airport Data* estimates 40,598 annual general aviation operations, which is considered to be the most in line with actual operations. A 50/50 split between local and itinerant operations is assumed, based on what is reported in the FAA TAF and the Form 5010; as such, the following figures will be carried forward for use as the base year count for general aviation operations:

- 40,598 annual general aviation operations
    - 20,299 annual itinerant GA operations (50 percent of total)
    - 20,299 annual local GA operations (50 percent of total)

General Aviation Operations Forecast

Market Share Projections

Table 2M presents three market share forecasts for local and itinerant GA operations, based on the airport's current market share of total U.S. itinerant GA operations. In 2024, the airport holds a 0.134 percent market share of national itinerant operations and 0.128 percent of the market share for local operations.

TABLE 2M | Operations Forecasts – Market Share

Year	57C GA Itinerant	U.S. GA Itinerant	Market %	57C GA Local	U.S. GA Local	Market %
2024	20,299	15,125,333	0.134%	20,299	15,900,404	0.128%
Constant Market Share – Low Range						
2029	21,400	15,924,000	0.134%	21,300	16,655,000	0.128%
2034	21,700	16,133,000	0.134%	21,600	16,950,000	0.128%
2044	22,200	16,569,000	0.134%	22,400	17,571,000	0.128%
CAGR	**0.45%**	–	–	**0.49%**	–	–
Increasing Market Share – Mid Range – SELECTED FORECAST						
2029	22,000	15,924,000	0.138%	22,200	16,655,000	0.133%
2034	22,900	16,133,000	0.142%	23,500	16,950,000	0.139%
2044	24,900	16,569,000	0.150%	26,400	17,571,000	0.150%
CAGR	**1.03%**	–	–	**1.32%**	–	–
Increasing Market Share – High Range						
2029	24,000	15,924,000	0.151%	24,300	16,655,000	0.146%
2034	27,000	16,133,000	0.167%	27,800	16,950,000	0.164%
2044	33,100	16,569,000	0.200%	35,100	17,571,000	0.200%
CAGR	**2.47%**	–	–	**2.78%**	–	–

Sources: FAA Aerospace Forecast, Fiscal Years 2023-2043; Coffman Associates analysis

The first forecast carries this figure forward as a constant through the planning period, resulting in 22,200 itinerant operations and 22,400 local operations by 2044, for CAGRs of 0.45 percent and 0.49 percent, respectively. Because growth in both itinerant and local operations is expected to occur nationally, two increasing market share forecasts were also developed. The second forecast considers a slower growth scenario, with an increase to 24,900 itinerant operations and 26,400 local operations by 2044. This produced CAGRs of 1.03 percent and 1.32 percent, respectively. A faster growth scenario evaluated market shares at 0.200 percent for both itinerant and local operations, which resulted in 33,100 itinerant operations by 2044 at a CAGR of 2.47 percent, and 35,100 local operations at a CAGR of 2.78 percent.

Other Projections

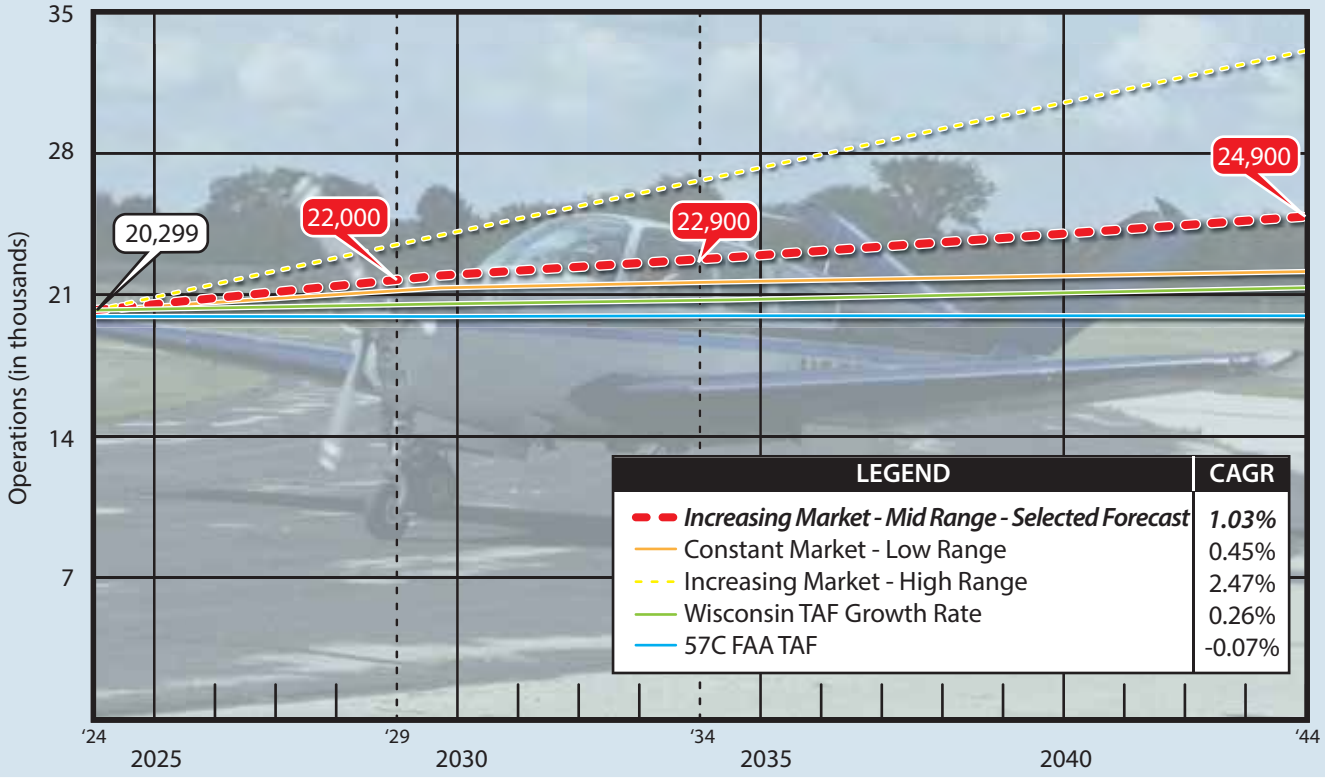
Lastly, projections presented in the FAA TAF and the Wisconsin TAF growth rate were considered, with the TAF projections included primarily for comparison purposes. The TAF estimates both itinerant and local operations at East Troy Municipal Airport to remain flatlined at 20,000 over the course of the planning period. The statewide TAF growth rate for itinerant operations is estimated at 0.26 percent, which results in 21,400 itinerant operations at East Troy Municipal Airport by 2044 when applied to the base year count. The Wisconsin TAF growth rate for local operations is estimated at 0.19 percent, which results in 21,100 local operations 2044 when applied to the base year count.

Exhibit 2D presents graphs of the itinerant and local GA operation projections, while **Table 2N** summarizes each forecast. In terms of itinerant operations, the forecasts present a planning envelope that ranges from 21,400 (Wisconsin TAF growth rate forecast) to 33,100 itinerant operations (high-range market share forecast). Local operations show a very similar scenario, ranging from 21,100 (Wisconsin TAF growth rate) to 35,100 (high-range market share forecast) local operations. With growth in itinerant and local operations anticipated both nationally and regionally, it is reasonable to assume a moderate increase in this type of traffic over the next 20 years; as such, the mid-range increasing market share forecast is the selected projection for each operational category. For itinerant operations, this is reflective of a 1.03 percent CAGR, or 24,900 operations by the end of the planning period, and for local operations, the result is 26,400 operations at a CAGR of 1.32 percent. Overall, this projection represents a somewhat conservative, yet realistic, growth scenario. Combined, these forecasts illustrate growth from an estimated 40,598 total GA operations in 2024 to 51,300 total GA operations by 2044 – an increase of 10,702 operations.

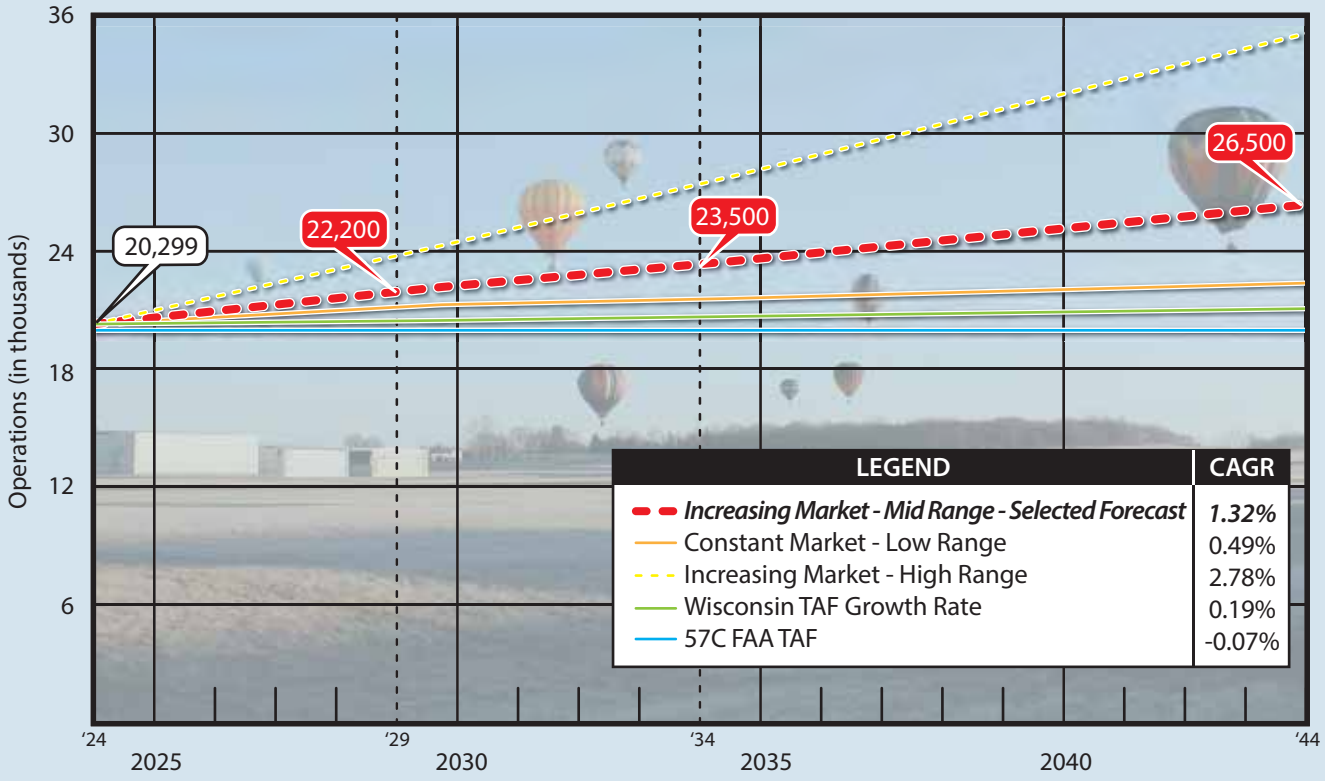
TABLE 2N | 57C GA Operations Forecast Summary

Projections	2029	2034	2044	CAGR
Itinerant GA				
Constant Market – Low Range	21,400	21,700	22,200	0.45%
Increasing Market – Mid Range	**22,000**	**22,900**	**24,900**	**1.03%**
Increasing Market – High Range	24,000	27,000	33,100	2.47%
Wisconsin TAF Growth Rate	20,600	20,800	21,400	0.26%
57C FAA TAF	20,000	20,000	20,000	-0.07%
Local GA				
Constant Market – Low Range	21,300	21,600	22,400	0.49%
Increasing Market – Mid Range	**22,200**	**23,500**	**26,400**	**1.32%**
Increasing Market – High Range	24,300	27,800	35,100	2.78%
Wisconsin TAF Growth Rate	20,500	20,700	21,100	0.19%
57C FAA TAF	20,000	20,000	20,000	-0.07%

Itinerant GA



Local GA



CAGR: Compound Annual Growth Rate

Air Taxi Operations Forecast

The air taxi category, which is a subset of the itinerant operations category, is comprised of operations that are conducted by aircraft operating under 14 CFR Part 135. Part 135 operations are for-hire or on-demand and include charter and commuter flights, air ambulance operations, or fractional ownership aircraft operations. The FAA projects a 0.7 percent CAGR increase in air taxi operations between 2024 and 2044. The primary reasons for this increase are the technological advancements of the electric vertical takeoff and landing aircraft (eVTOL) and the continued national growth in the business jet segment of the air taxi category.

Historical air taxi records at East Troy Municipal Airport were not available. The FAA TAF and Form 5010 both report 800 air taxi operations. AirportIQ, a company that records Part 135 operations, was consulted to determine a more accurate air taxi count. Over the last 10 years, air taxi operations at 57C (as reported by AirportIQ) have fluctuated from over 100 to nearly 300, as can be seen in **Table 2P**. For this reason, and due to the generally low number of this type of operation, the constant market share of U.S. air taxi operations is carried forward for each of the plan years. This forecast yields a total of 320 air taxi operations by 2044 and a CAGR of 0.72 percent.

TABLE 2P | Historical and Projected Air Taxi Operations

Year	57C Air Taxi Operations	U.S. Air Taxi Operations	Market %
2015	229	7,895,478	0.0029%
2016	270	7,580,119	0.0036%
2017	214	7,179,651	0.0030%
2018	247	7,125,556	0.0035%
2019	259	7,234,239	0.0036%
2020	195	5,471,641	0.0036%
2021	192	5,884,738	0.0033%
2022	114	6,522,238	0.0017%
2023	227	6,456,202	0.0035%
2024*	277	6,475,738	0.0043%
Constant Market Share Air Taxi Operations (CAGR 0.72%)			
2029	270	6,386,000	0.0043%
2034	290	6,748,000	0.0043%
2044	320	7,490,000	0.0043%

*2023 counts are from 5/1/23-4/30/24.

Source: AirportIQ

Military Operations Forecast

Military aircraft can and do utilize civilian airports across the country, including East Troy Municipal Airport; however, it is inherently difficult to project future military operations due to their national security nature and the fact that missions can change without notice, so it is typical for the FAA to use a flat-line number for military operations. For this planning study, military operations at East Troy Municipal Airport are projected to stay constant through the plan years at 200 itinerant operations and will likely constitute helicopter activity.

Peak Period Forecasts

Peaking characteristics play an important role in determining airport capacity and facility requirements. Because East Troy Municipal Airport does not have a control tower, the generalized peaking characteristics of other non-towered general aviation airports have been used for the purposes of this study. The peaking periods used to develop the capacity analysis and facility requirements are described below.

- Peak month – the calendar month in which traffic activity is the highest
- Design day – the average day in the peak month, derived by dividing the peak month by the number of days in the month
- Design hour – the average hour within the design day
- Busy day – the busiest day of a typical week in the peak month

For the purposes of this study, the peak month for total operations was estimated at 10 percent of the annual operations. By 2044, the estimated peak month is projected to reach 5,182 operations. The design day is estimated by dividing the peak month by the number of days in the month (31), and the busy day is calculated at 1.25 times the design day. The design hour is then calculated at 15 percent of the design day. These projections are included in **Table 2Q**.

TABLE 2Q | Peak Period Forecasts – East Troy Municipal Airport

	2024	2029	2034	2044
Annual	41,075	44,670	46,890	51,820
Peak Month	4,108	4,467	4,689	5,182
Design Day	133	144	151	167
Design Hour	20	22	23	25
Busy Day	166	179	186	202

Source: Coffman Associates analysis

FORECAST SUMMARY

This chapter has outlined the various activity levels that might be reasonably anticipated over the planning period. **Exhibit 2E** presents a summary of the aviation forecasts prepared in this chapter. The base year for these forecasts is 2024, with a 20-year planning horizon to 2044. The primary aviation demand indicators are based aircraft and operations. Based aircraft are forecast to increase from 78 in 2024 to 95 by 2044 (1.01 percent CAGR). Total operations at East Troy Municipal Airport are forecast to increase from 41,075 in 2024 to 51,820 by 2044 (1.17 percent CAGR).

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

	BASE YEAR	FORECAST		
	2024	2029	2034	2044
OPERATIONS				
Itinerant				
Air Carrier	-	-	-	-
Air Taxi	277	270	290	320
General Aviation	20,299	22,000	22,900	24,900
Military	200	200	200	200
Subtotal	***20,776***	***22,470***	***23,390***	***25,420***
Local				
General Aviation	20,299	22,200	23,500	26,400
Military	-	-	-	-
Subtotal	***20,299***	***22,200***	***23,500***	***26,400***
Total Operations	***41,075***	***44,670***	***46,890***	***51,820***
PEAKING				
Peak Month	4,108	4,467	4,689	5,182
Busy Day	166	179	186	202
Design Day	133	144	151	167
Design Hour	20	22	23	25
BASED AIRCRAFT				
Single-Engine Piston	65	66	67	71
Multi-Engine Piston	3	3	3	1
Turboprop	2	4	5	8
Jet	0	1	2	4
Helicopter	8	8	9	11
Total Based Aircraft	***78***	***82***	***86***	***95***

FORECAST COMPARISON TO THE FAA TAF

Historically, forecasts have been submitted to the FAA for evaluation and for comparison to the TAF. The FAA prefers that forecasts differ by less than 10 percent in the five-year period and less than 15 percent in the 10-year period. Where the forecasts differ, supporting documentation is necessary to justify the difference.

Table 2R presents a summary of the selected forecasts and a comparison to the FAA TAF. The direct comparison between the master plan forecasts and the TAF is presented at the bottom of the table. The operations forecast is within the TAF tolerance for both the five-year and 10-year periods.

TABLE 2R | Comparison of Master Plan Forecasts to FAA TAF

	2024	2029	2034	2044	CAGR
Total Operations					
Master Plan Forecast	41,075	44,670	46,890	51,820	1.17%
TAF	41,000	41,000	41,000	41,000	0.00%
% Difference	**0.18%**	**8.57%**	**13.40%**	**23.31%**	**–**
Based Aircraft					
Master Plan Forecast	78	82	86	95	1.01%
TAF	62	62	62	62	0.00%
% Difference	**22.86%**	**27.52%**	**32.27%**	**42.44%**	**–**

In terms of based aircraft, the master plan forecast is outside the TAF tolerance for both the five-year and 10-year periods. This is partially due to the TAF count being well below the FAA-validated count for the base year for based aircraft, as well as the flatlined growth projection for based aircraft over the next 20 years.

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

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

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily on the characteristics of the aircraft that are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft type or a composite aircraft that represents a collection of aircraft with similar characteristics. The critical aircraft is classified by three parameters: aircraft approach category (AAC), airplane design group (ADG), and taxiway design group (TDG). FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2F**.

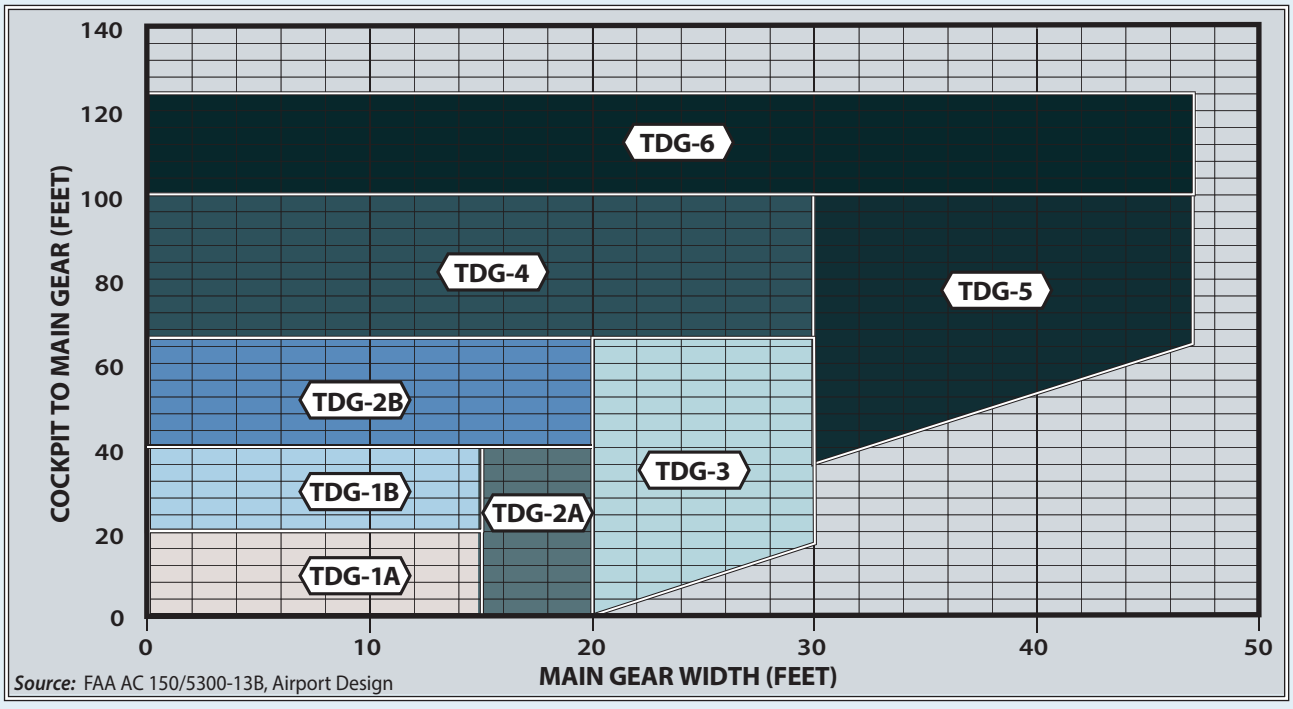
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

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

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

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



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

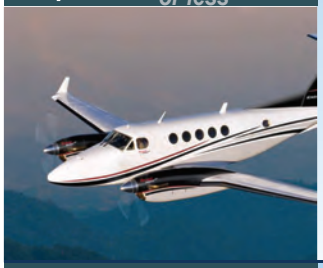
A-I

Aircraft	TDG
• **Beech Bonanza**	**1A**
• Cessna 150, 172	1A
• Piper Comanche, Seneca	1A

B-I

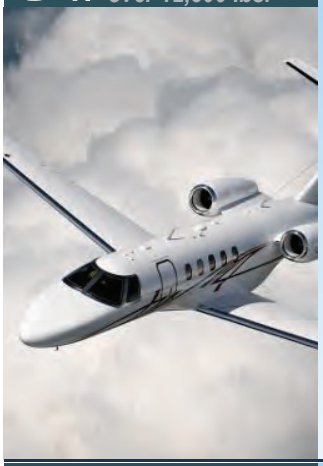
Aircraft	TDG
• Eclipse 500	1A
• **Beech Baron 55/58**	**1A**
• Beech King Air 100	1A
• Cessna 421	2A
• Cessna Citation M2 (525)	1A
• Cessna Citation 1(500)	1A
• Embraer Phenom 100	1A

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



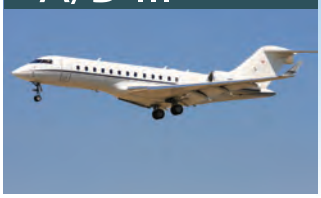
Aircraft	TDG
• **Beech Super King Air 200**	**2A**
• Beech King Air 90	1A
• Cessna 441 Conquest	1A
• Cessna Citation CJ2	2A
• Pilatus PC-12	2

B-II *over 12,500 lbs.*



Aircraft	TDG
• Beech Super King Air 350	2A
• **Cessna Citation CJ3(525B)**	**2A**
• Cessna Citation CJ4 (525C)	1B
• Cessna Citation Latitude	1B
• Embraer Phenom 300	1B
• Falcon 20	1B
• Pilatus PC-24	2A

A/B-III

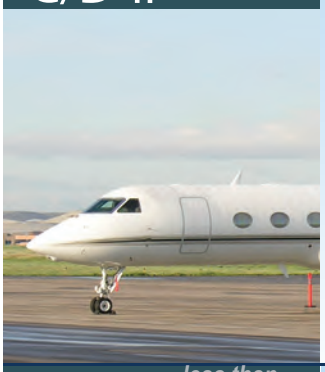


Aircraft	TDG
• Bombardier Dash 8	3
• **Bombardier Global 7500**	**2B**
• Falcon 7X, 8X	2A

C/D-I

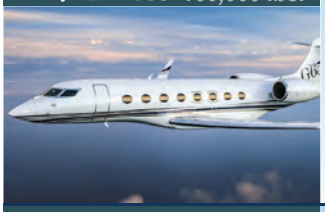
Aircraft	TDG
• **Lear** 35, 40, 45, 55, **60XR**	**1B**
• F-16	1A

C/D-II



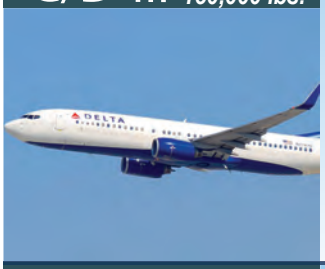
Aircraft	TDG
• Challenger 600/604	1B
• Cessna Citation III, VI,VII, X	1B
• Embraer Legacy 135/140	2B
• **Gulfstream IV** (D-II)	**2A**
• Gulfstream G280	1B
• Lear 70, 75	1B
• Falcon 50, 900, 2000	2A
• Hawker 800XP, 4000	1B

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



Aircraft	TDG
• Gulfstream V	2B
• **Gulfstream** 550, 600, **650**	**2B**
• Global 5000, 6000	2B

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



Aircraft	TDG
• Airbus A319, A320, A321	3
• **Boeing 737-800,** 900	**3**
• MD-83, 88	4

C/D-IV

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

C/D-V

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

Note: Aircraft pictured is identified in bold type.

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

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

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

Taxiway Design Group (TDG) | A classification of airplanes based on outer-to-outer main gear width (MGW) and cockpit to main gear (CMG) distance. The TDG relates to the undercarriage dimensions of the critical aircraft. The TDG is classified by an alphanumeric system: 1A, 1B, 2A, 2B, 3, 4, 5, 6, and 7. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and (in some cases) the separation distance between parallel taxiways/taxilanes. Other taxiway elements – such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances – are determined solely based on the wingspan (ADG) of the critical aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards, based on expected use.

The back side of **Exhibit 2F** summarizes the classifications of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft fall in AAC A and B, and ADG I and II. Business jets typically fall in AAC B and C, while the larger commercial aircraft fall in AAC C and D.

AIRPORT AND RUNWAY CLASSIFICATIONS

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

Runway Design Code (RDC) | The RDC is a code that signifies the design standards to which the runway is to be built. The RDC is based on planned development and has no operational component.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a runway. The RDC provides the information needed to determine certain applicable design standards. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan

or tail height (physical characteristics), whichever is most restrictive. The third component relates to the available instrument approach visibility minimums, expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component is labeled "VIS" for runways that are designed for visual approach use only.

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

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

Airport Reference Code (ARC) | The ARC is an airport designation that signifies the airport's highest RDC minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. The current airport layout plan (ALP) for East Troy Municipal Airport identifies the existing ARC as B-II.

CRITICAL AIRCRAFT

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

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

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

According to FAA AC 150/5300-13B, *Airport Design*, "airport designs based only aircraft currently using the airport can severely limit the airport's ability to accommodate future operations of more demanding aircraft. Conversely, it is not practical or economical to base airport design on aircraft that will not realistically use the airport." Selection of the current and future critical aircraft must be realistic in nature and supported by current data and realistic projections.

AIRPORT CRITICAL AIRCRAFT

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

As discussed, the FAA's TFMSC database captures certain operations (i.e., those for which a flight plan is filed and those detected by radar). While the TFMSC does not account for all aircraft activity at an airport by a given aircraft type, it does provide an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate.

Exhibit 2G presents the TFMSC operational mix at the airport for turbine aircraft operations for the last 10 years. There has been limited reporting of activity by turboprops and business jets, and no single aircraft or family of aircraft has conducted 500 or more operations at the airport over the last 10 years.

In 2023, the greatest number of operations in any single design family was 52 in category A-I, which accounted for approximately 53 percent of all logged turbine aircraft activity. The majority of this activity (48 operations) was conducted by the Socata TBM 7/850/900. The second highest number of operations by a single design family in 2023 was 40 operations in category B-II. Operations within the B-II category were primarily conducted by the King Air 90 and the Embraer Phenom 300. The remaining operations recorded in the TFMSC were conducted by aircraft in A-II (two operations) and B-I (four operations).

When planning for future facilities at East Troy Municipal Airport, it is necessary to consider the types of aircraft that operate the most frequently at the airport in order to identify the existing and ultimate critical aircraft. When extrapolating data from the TFMSC, it is reasonable to assume that aircraft weighing less than 12,500 pounds in category A/B-I small (S) and A/B-II(S) conduct more than 500 annual operations at 57C. Operations by aircraft in category A/B-I(S) typically make up the majority of operations conducted at GA airports; however, operations at East Troy Municipal Airport by B-II aircraft also make up a significant percentage of the total in recent years. Over the past five years, category B-II aircraft have conducted nearly 50 percent of the operations captured within the TFMSC. The existing critical aircraft for East Troy Municipal Airport has been determined to fall within ARC B-II(S). The Beechcraft King Air 90 serves as the representative aircraft because it has been the single most active aircraft at 57C within the TFMSC over the last five years. The ultimate critical aircraft has been determined as category B-II, with the King Air 200/300/350 or small to mid-sized corporate jets (such as the Cessna Citation family) as representative aircraft. It should be noted that single-engine pistons will likely continue to lead in operations at the airport over the planning period, with some turboprop and jet operations; however, turbine aircraft operations will be the primary determinant of the critical aircraft.

Airport Critical Aircraft Summary

While the previous ALP determined the existing and ultimate critical aircraft to be B-II, more specific information has become available regarding the types of aircraft most frequently operating at East Troy Municipal Airport (i.e., the TFMSC). Based on recent data, the current aircraft approach category is identified as "B," and the current airplane design group is "II (S)", based on the Beechcraft King Air 90, which weighs less than 12,500 pounds. B-II aircraft (such as the Embraer Phenom 300 and King Air 200/300/350) also currently operate at the airport, and are likely to operate more frequently in the coming years as the national fleet mix evolves to include more sophisticated turboprop and jet aircraft; therefore, the current critical aircraft for East Troy Municipal Airport is classified as B-II(S)-1A, represented by the Beechcraft King Air 90, and the ultimate critical aircraft is classified as B-II-2A, represented by the King Air 200/300/350.

RUNWAY DESIGN CODE

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

Runway 8-26

As the primary runway, Runway 8-26 should be designed to accommodate the overall airport design aircraft. The primary runway is 3,900 feet long by 75 feet wide and has non-precision instrument approaches with visibility minimums as low as one mile on each runway end. It has been established that the current critical aircraft falls within ARC B-II(S); therefore, when factoring in the RVR, the existing RDC for Runway 8-26 is B-II(S)-5000, while the ultimate RDC is classified as B-II-5000.

Runway 18-36

Runway 18-36 is the airport's turf crosswind runway. It measures 2,446 feet long by 75 wide and does not currently offer instrument approach capability. The RDC for Runway 18-36 is presently classified as A-I(S)-VIS (visual approach capability only) and should be maintained in the future.

APPROACH AND DEPARTURE REFERENCE CODES

The approach and departure reference codes (APRC and DPRC) describe the current operational capabilities of each runway and the adjacent parallel taxiways under conditions in which no special operating procedures are necessary. Essentially, the APRC and DPRC describe the current conditions at an airport in runway classification terms when considering the parallel taxiway.

The quasi-parallel Taxiway A serves Runway 8-26, is located 330 feet from the runway (centerline to centerline) near the Runway 8 end, and tapers to 240 feet from the runway near the Runway 26 end. Partial parallel Taxiway B is located 350 from the runway centerline. Each runway end has non-precision

ARC	Aircraft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-I	A36 Bonanza Turbine	0	0	2	0	0	0	0	0	0	0
	Cirrus Vision Jet	0	0	0	0	0	0	0	2	0	0
	Piper Malibu/Meridian	0	2	0	0	2	6	4	2	0	4
	Socata TBM 7/850/900	2	6	10	0	4	8	12	16	14	48
	Total	2	8	12	0	6	14	16	20	14	52
A-II	Cessna Caravan	0	0	2	2	0	2	0	2	0	0
	Pilatus PC-12	100	122	8	4	0	14	22	4	4	2
	Total	100	122	10	6	0	16	22	6	4	2
B-I	Beech 99 Airliner	0	0	0	0	0	0	0	2	0	0
	Citation CJ1	0	0	2	0	2	0	6	2	0	0
	Citation I/SP	2	0	0	0	0	0	0	0	0	0
	Citation M2	0	0	2	0	0	0	0	0	0	4
	Eclipse 400/500	2	0	0	0	2	0	0	0	0	0
	King Air 100	0	0	0	8	12	48	54	0	0	0
	Piper Cheyenne	2	0	12	24	4	4	0	0	0	0
	Total	6	0	16	32	20	52	60	4	0	4
B-II	Cessna Conquest	2	0	0	0	2	0	2	0	0	0
	Citation CJ2/CJ3/CJ4	0	0	4	0	0	0	0	0	2	0
	Citation II/SP/Latitude	0	0	2	0	0	0	0	0	0	0
	Citation XLS	0	0	0	0	2	0	0	0	0	0
	King Air 200/300/350	8	0	0	4	6	16	0	6	14	8
	King Air 90	4	4	4	0	0	0	0	68	42	18
	King Air F90	0	0	0	0	0	0	0	0	2	0
	Phenom 300	0	0	40	28	22	22	22	20	28	12
	Citation II/SP/Latitude	0	0	0	0	0	0	0	0	0	2
	Total	614	4	50	32	32	38	24	94	88	40
C-II	Challenger 600/604	0	2	0	0	0	0	0	0	0	0
	Hawker 800 (Formerly Bae-125-800)	0	0	0	2	0	0	0	0	0	0
	Total	0	2	0	2	0	0	0	0	0	0

Source: TFMSC 2014 thru 2023, Data normalized annually

AIRPORT REFERENCE CODE (ARC) SUMMARY

ARC CODE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-I	2	8	12	0	6	14	16	20	14	52
A-II	100	122	10	6	0	16	22	6	4	2
B-I	6	0	16	32	20	52	60	4	0	4
B-II	14	4	50	32	32	38	24	94	88	40
C-II	0	2	0	2	0	0	0	0	0	0
Total	122	136	88	72	58	120	122	124	106	98

Approach Category

AC	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A	102	130	22	6	6	30	38	26	18	54
B	20	4	66	64	52	90	84	98	88	44
C	0	2	0	2	0	0	0	0	0	0
Total	122	136	88	72	58	120	122	124	106	98

Design Group

DG	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
I	8	8	28	32	26	66	76	24	14	56
II	114	128	60	40	32	54	46	100	92	42
Total	122	136	88	72	58	120	122	124	106	98

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instrument approaches with one-mile visibility minimums. The APRC for Runway 8-26 is B/II/4000 and its DPRC is B/II. Runway 18-36 is not served by a parallel taxiway; therefore, it does not have an approach or departure reference code.

AIRPORT AND RUNWAY CLASSIFICATION SUMMARY

Table 2S summarizes the airport and runway classifications currently and in the future. The existing critical aircraft is now defined by those aircraft in ARC B-II(S), with a transition to ARC B-II by the end of the planning period.

TABLE 2S | Airport and Runway Classifications

	Runway 8-26		Runway 18-36
	Existing	Ultimate	Existing & Ultimate
Airport Reference Code (ARC)	B-II(S)	B-II	A-I(S)
Airport Critical Aircraft	B-II(S)-1A	B-II-2A	A-I(S)-1A
Critical Aircraft (Typ.)	King Air 90	King Air 200/300/350	Cessna 172
Runway Design Code (RDC)	B-II(S)-5000	B-II-5000	A-I(S)-VIS
Approach Reference Code (APRC)	B/II/4000	Same	–
Departure Reference Code (DPRC)	B/II	Same	–
Taxiway Design Group (TDG)	1A	2A	–

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

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical aircraft for the airport. Total based aircraft are forecast to grow from 78 in 2024 to 95 by 2044. Operations are forecast to grow from an estimated 41,075 in 2024 to 51,820 by 2044. The projected growth is driven by the FAA's positive outlook for general activity nationwide, as well as generally positive outlooks for the region.

The critical aircraft for the airport was determined by examining the FAA TFMSC database, as well as existing based aircraft. The current critical aircraft is described as B-II(S) and is best represented by a Beechcraft King Air 90, a small turboprop that is typically utilized for business operations or air charters. The ultimate critical aircraft is the King Air 200/300/350, which is classified as a B-II-2A aircraft.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The range of forecasts developed here will be carried forward in the next chapter as planning horizon activity levels that will serve as milestones or activity benchmarks in evaluating facility requirements.

Chapter Three

Airport Facility Requirements

The Village of East Troy

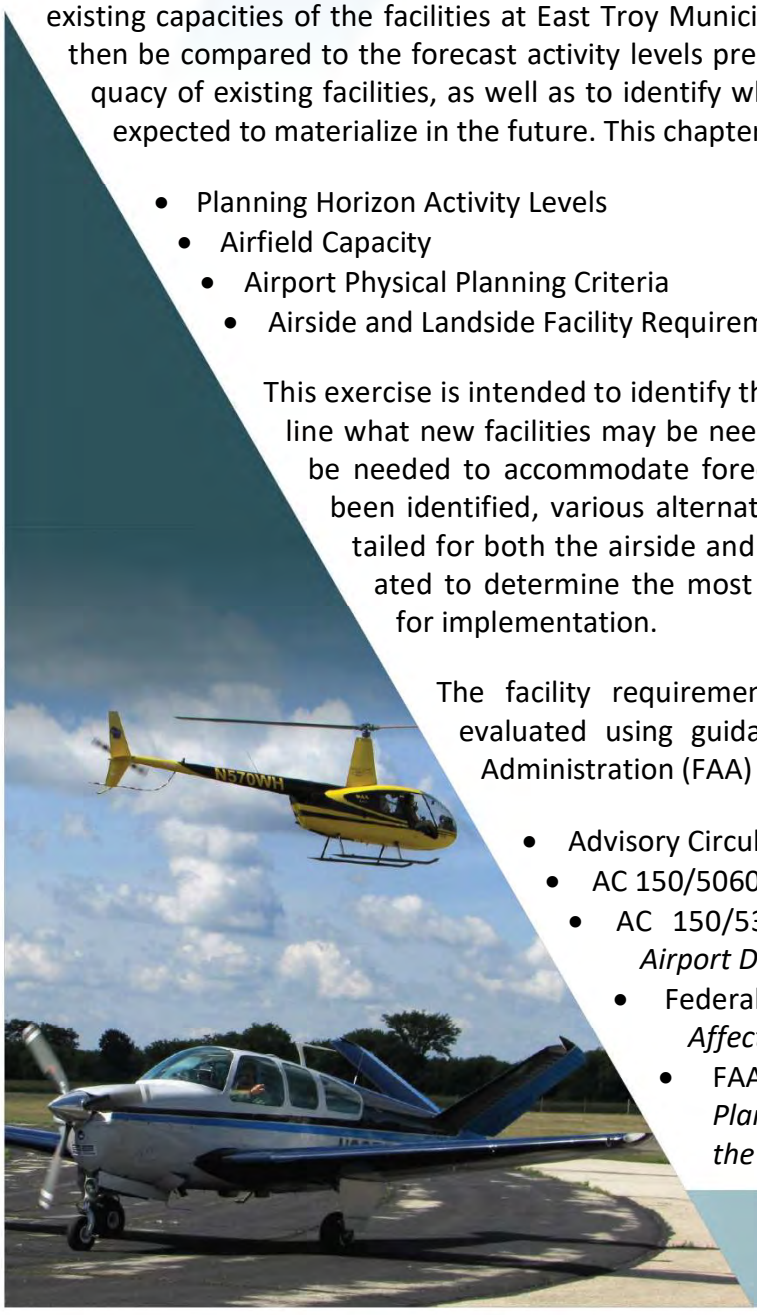
Chapter 3

Facility Requirements

Proper airport planning requires the translation of forecast aviation demand into the specific types and quantities of facilities that can adequately serve the identified demand. This chapter will analyze the existing capacities of the facilities at East Troy Municipal Airport (57C). The existing capacities will then be compared to the forecast activity levels prepared in Chapter Two to determine the adequacy of existing facilities, as well as to identify whether deficiencies currently exist or may be expected to materialize in the future. This chapter will present the following elements:

- Planning Horizon Activity Levels
- Airfield Capacity
- Airport Physical Planning Criteria
- Airside and Landside Facility Requirements

This exercise is intended to identify the adequacy of existing airport facilities, outline what new facilities may be needed, and determine when new facilities may be needed to accommodate forecast demands. Once the facility needs have been identified, various alternatives for providing these facilities will be detailed for both the airside and the landside. Each alternative will be evaluated to determine the most feasible, cost-effective, and efficient means for implementation.



The facility requirements for East Troy Municipal Airport were evaluated using guidance contained in several Federal Aviation Administration (FAA) publications, including the following:

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

DEMAND-BASED PLANNING HORIZONS

An updated set of aviation demand forecasts for East Troy Municipal Airport has been established and was detailed in Chapter Two. These activity forecasts include annual aircraft operations, based aircraft, aircraft fleet mix, and peaking characteristics. With this information, specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should be based more on actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is demand-based, rather than time-based, a series of planning horizon milestones has been established that takes into consideration the reasonable range of aviation demand projections. The planning horizons are the short term (years 1-5), the intermediate term (years 6-10), and the long term (years 11-20).

It is important to consider that the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand by allowing airport management the flexibility to make decisions and develop facilities based on need generated by actual demand levels, rather than dates in time. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program. **Table 3A** presents the short-, intermediate-, and long-term planning horizon milestones for each aircraft activity level forecasted in Chapter Two.

TABLE 3A | Aviation Demand Planning Horizons

	Base Year (2024)	Short Term (1-5 Years)	Intermediate Term (6-10 Years)	Long Term (11-20 Years)
BASED AIRCRAFT				
Single-Engine	65	66	67	71
Multi-Engine	3	3	3	1
Turboprop	2	4	5	8
Jet	0	1	2	4
Helicopter	8	8	9	11
TOTAL BASED AIRCRAFT	**78**	**82**	**86**	**95**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Air Taxi	277	270	290	320
General Aviation	20,299	22,000	22,900	24,900
Total Itinerant	***20,776***	***22,470***	***23,390***	***25,420***
Local				
General Aviation	20,299	22,200	23,500	26,400
Total Local	***20,299***	***22,200***	***23,500***	***26,400***
TOTAL OPERATIONS	***41,075***	***44,670***	***46,890***	***51,820***

Source: Coffman Associates analysis

AIRFIELD CAPACITY

An airfield's capacity is expressed in terms of its annual service volume (ASV). ASV is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without incurring significant delay factors. As aircraft operations near or surpass the ASV, delay factors increase.

57C's ASV was examined using FAA AC 150/5060-5, *Airport Capacity and Delay*. Several factors were evaluated to calculate the airport's ASV, including the following:

- Runway configuration
- Runway use
- Exit taxiways
- Weather conditions
- Aircraft mix
- Percent arrivals
- Touch-and-go activity
- Peak period operations

Each factor listed above and presented on **Exhibit 3A** represents an airfield or operational element that can contribute to delay. When these factors are examined together, the ASV at East Troy Municipal Airport is approximately 230,000 annual operations. This does not indicate a point of absolute gridlock, but represents a point at which delay for each operation increases exponentially and capacity becomes constrained.

Current operational estimates for 57C represent approximately 18 percent of the airfield's ASV. By the end of the long-term planning period, total annual operations are expected to represent nearly 23 percent of the airfield's ASV. FAA guidance recommends that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the ASV. At the 80 percent level, planned improvements should be made. As existing and forecast operations remain well below these levels, no significant capacity improvements are planned; however, other options to improve airfield efficiency, such as taxiway geometry improvements, will still be considered.

AIRSIDE FACILITY REQUIREMENTS

Airside facilities include those facilities related to the arrival, departure, and ground movement of aircraft. Airside facility requirements are based primarily on the runway design code (RDC) for each runway. Analysis in Chapter Two identified the existing RDC for Runway 8-26 as B-II(S)-5000 and the ultimate RDC as B-II-5000. For Runway 18-36, the existing and ultimate RDC is A-I(S)-VIS.

RUNWAYS

Runway conditions – such as orientation, length, width, and pavement strength – were analyzed at East Troy Municipal Airport. Requirements for runway improvements were determined for the airport from this information.

AIRFIELD LAYOUT

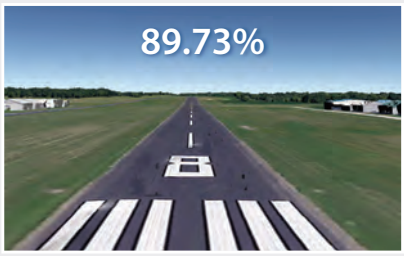
Runway Configuration

Runway Use

Number of Exits

WEATHER CONDITIONS

VMC (VFR)
Visual Meteorological Conditions



IMC (IFR)
Instrument Meteorological Conditions

PVC
Poor Visibility Conditions

AIRCRAFT MIX

Category A & B Aircraft

Category C Aircraft

Category D Aircraft

OPERATIONS

Arrivals

Departures

Total Annual Operations

Touch-and-Go Operations

Runway Orientation

Key considerations in the runway configuration of an airport involve the orientation for wind coverage and the operational capacity of the runway system. FAA AC 150/5300-13B, *Airport Design*, recommends that a crosswind runway should be made available when the primary runway orientation provides less than 95 percent crosswind component coverage for an aircraft design group. **Table 3B** details the allowable crosswind component for each RDC.

TABLE 3B | Allowable Crosswind Component by RDC

RDC	Allowable Crosswind Component
A-I and B-I (includes small aircraft)	10.5 knots
A-II and B-II	13 knots
A-III and B-III	16 knots
C-I through D-III	
A-IV and B-IV	20 knots
C-IV through C-VI	
D-IV through D-VI	
E-I through E-VI	

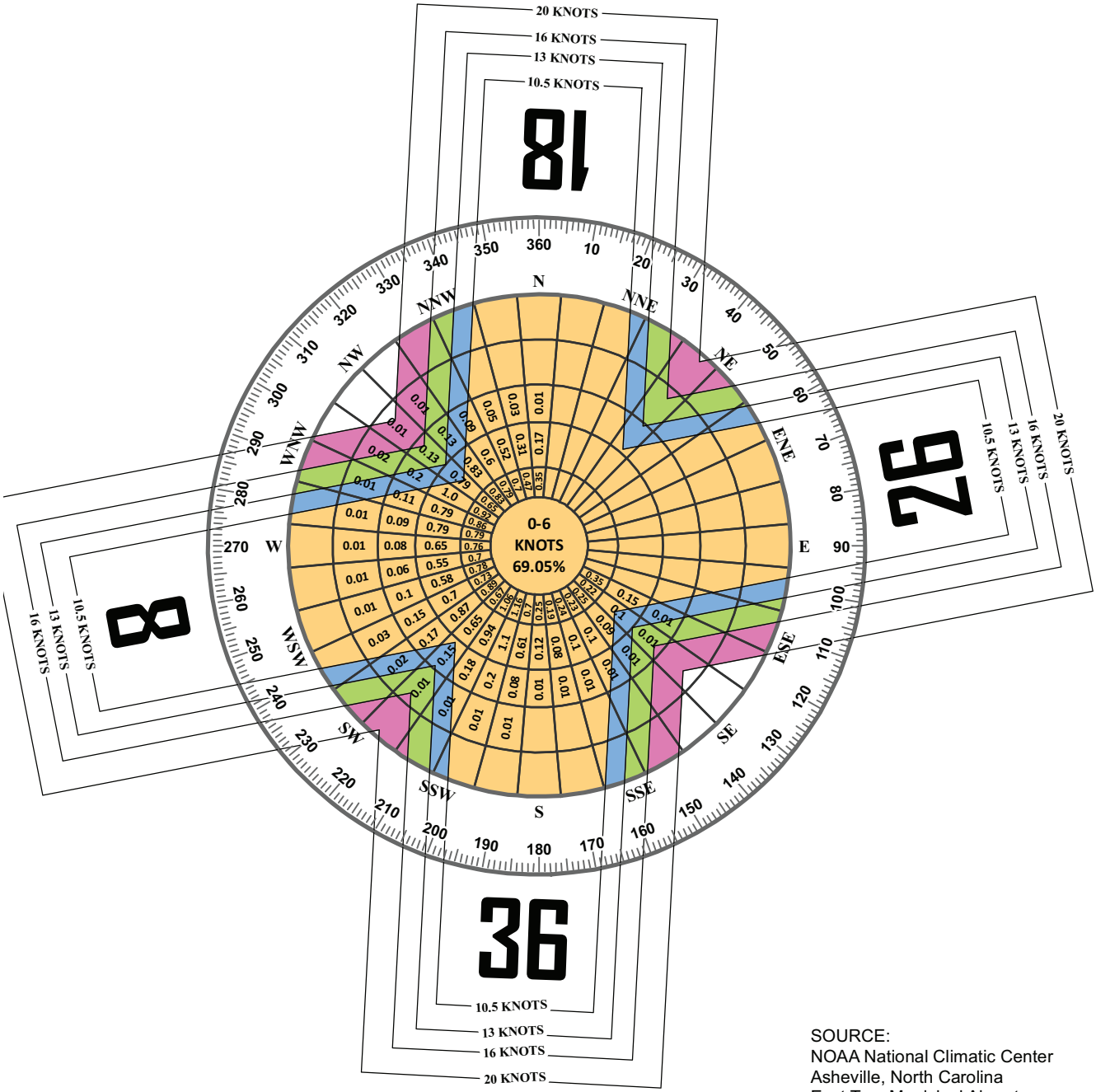
Source: FAA AC 150/5300-13B, Airport Design

Exhibit 3B presents the generalized, FAA-accepted all-weather and instrument flight rules (IFR) wind roses for the airport. The previous 10 years of wind data[1] were obtained from the on-airport automated weather observation station (AWOS) and have been analyzed to identify the wind coverage provided by the existing runway orientations. Although 57C has an AWOS located on the airfield, it has not been in service long enough to meet the 10-year wind data requirement; as such, the most recent 10 years of wind data have been utilized from the Burlington Municipal Airport AWOS, located approximately seven nautical miles south-southeast. At 57C, the orientation of the primary runway (Runway 8-26) provides 94.1 percent coverage for the 10.5-knot crosswind component, and greater than 97 percent coverage for the 13-knot component and greater. The current orientation of Runway 8-26 meets the wind coverage for the crosswind component for ARC B-II, which is the existing and ultimate runway design code.

Turf Runway 18-36, which has been identified as having a design code of A-I(S), provides 92.5 percent coverage for a 10.5-knot crosswind component and above 96 percent coverage for all crosswind components 13 knots and higher. The combined crosswind configuration provides greater than 95 percent wind coverage for all crosswind component conditions; thus, the runway configuration is adequate for the wind conditions at 57C and no modification to either runway orientations is needed. The visual and instrument flight rules (VFR and IFR) wind roses are shown on **Exhibit 3B**.

[1] 255,137 observations were collected from Burlington Municipal Airport for the period from January 1, 2014, through December 31, 2023.

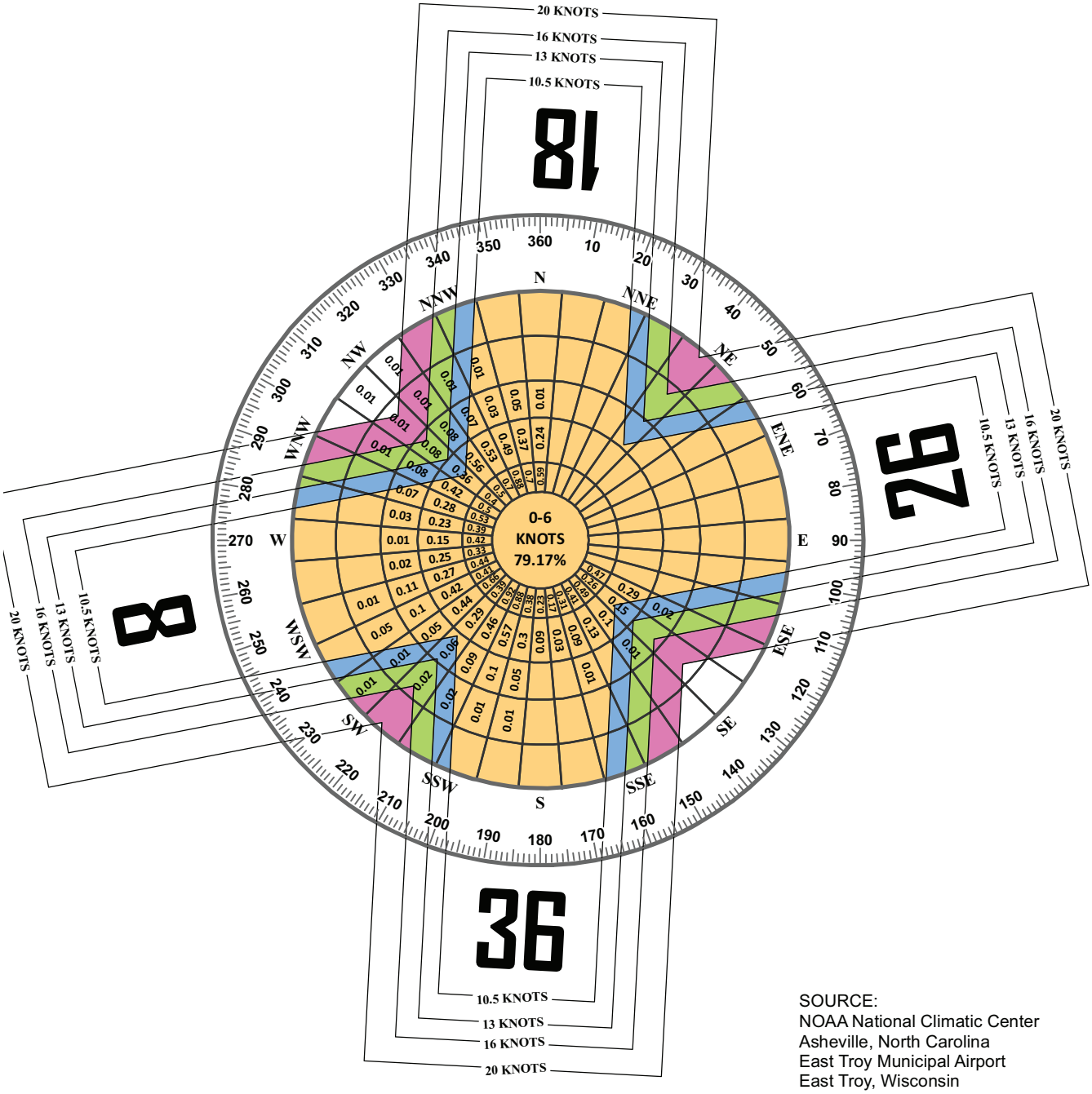
ALL WEATHER WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8-26	94.11%	97.22%	99.41%	99.93%
Runway 18-36	92.54%	96.09%	99.06%	99.83%
All Runways	98.68%	99.73%	99.96%	100.00%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
East Troy Municipal Airport
East Troy, Wisconsin
Burlington Municipal Wind Data Used

OBSERVATIONS:
255,137 All Weather Observations
Jan. 1, 2014 - Dec, 31 2023

IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 8-26	96.06%	98.10%	99.61%	99.93%
Runway 18-36	93.75%	96.66%	99.13%	99.84%
All Runways	99.29%	99.84%	99.97%	100.00%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
East Troy Municipal Airport
East Troy, Wisconsin
Burlington Municipal Wind Data Used

OBSERVATIONS:
24,569 IFR Observations
Jan. 1, 2014 - Dec, 31 2023

Runway Length | AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. The determination of runway length requirements for the airport is based on five primary factors:

- Mean maximum temperature of the hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month for East Troy Municipal Airport is 81 degrees Fahrenheit (°F), which occurs in July. The airport elevation is 860.2 feet mean sea level (MSL). Runway 8-26 has a longitudinal gradient of 0.45 percent, while Runway 18-36 has a gradient of 0.42 percent. Both runways conform to FAA design standards for gradient.

Airplanes operate on a wide variety of available runway lengths. Many factors govern the sustainability of runway lengths for aircraft, such as elevation, temperature, wind, aircraft weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that maximize the sustainability of the runway length. Policies such as area zoning and height and hazard restricting can protect an airport's runway length. Airport ownership (fee simple easement) of land leading to the runway ends reduces the possibility of natural growth or human-made obstructions. Planning for runways should include an evaluation of the aircraft types expected to use the airport now and in the future. Future planning should be realistic, supported by the FAA-approved forecasts, and based on the critical aircraft (or family of aircraft).

General Aviation Aircraft

Most operations occurring at East Troy Municipal Airport are conducted using smaller general aviation (GA) aircraft that weigh less than 12,500 pounds. Following guidance from AC 150/5325-4B, to accommodate 95 percent of these small aircraft with fewer than 10 passenger seats, a runway length of 3,300 feet is recommended. For 100 percent of these small aircraft, a runway length of 3,900 feet is recommended. For small aircraft with 10 or more passenger seats, 4,200 feet of runway length is recommended.

The airport is also utilized by aircraft that weigh more than 12,500 pounds, including small- to medium-sized business jet aircraft. Runway length requirements for business jets that weigh less than 60,000 pounds have also been calculated. These calculations take into consideration the runway gradient and landing length requirements for contaminated (wet) runways. Business jets tend to need greater runway length when landing on wet surfaces because of their increased approach speeds. AC 150/5325-4B stipulates that runway length determination for business jets should consider a grouping of airplanes with similar operating characteristics. The AC provides two separate family groupings of airplanes, each of which is based on its representative percentage of aircraft in the national fleet. The first grouping is those business jets that make up 75 percent of the national fleet, and the second group is those that make up 100 percent of the national fleet.

Table 3C presents a partial list of common aircraft in each aircraft grouping. A third group considers business jets that weigh more than 60,000 pounds. Runway length determination for these aircraft must be based on the performance characteristics of the individual aircraft.

TABLE 3C | Business Jet Categories for Runway Length Determination

75 Percent of the National Fleet	MTOW (lbs.)	75-100 Percent of the National Fleet	MTOW (lbs.)	Greater than 60,000 Pounds	MTOW (lbs.)
Lear 35	20,350	Lear 55	21,500	Gulfstream II	65,500
Lear 45	20,500	Lear 60	23,500	Gulfstream IV	73,200
Cessna 550	14,100	Hawker 800XP	28,000	Gulfstream V	90,500
Cessna 560XL	20,000	Hawker 1000	31,000	Global Express	98,000
Cessna 650 (VII)	22,000	Cessna 650 (III/IV)	22,000	Gulfstream 650	99,600
IAI Westwind	23,500	Cessna 750 (X)	36,100		
Beechjet 400	15,800	Challenger 604	47,600		
Falcon 50	18,500	IAI Astra	23,500		

MTOW = maximum takeoff weight

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

Table 3D presents the results of the runway length analysis for business jets that was developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,400 feet is recommended. This length is derived from a raw length of 4,690 feet, which is adjusted (as recommended) for runway gradient and consideration of landing length needs on a contaminated (wet and slippery) runway. To accommodate 100 percent of the business jet fleet at 60 percent useful load, 5,500 feet is the recommended runway length.

TABLE 3D | Runway Length Requirements

Airport Elevation	860.2 feet MSL
Average High Monthly Temperature	81°F July
Primary Runway End Elevation Difference	17.5'

Fleet Mix Category	TAKEOFF LENGTHS		LANDING LENGTHS	Final Runway Length
	Raw Runway Length from FAA AC	Runway Length with Gradient Adjustment (+175')	Wet Surface Landing Length for Jets (+15%)*	
75% of fleet at 60% useful load	4,690'	4,865'	5,393'	5,400'
100% of fleet at 60% useful load	5,323'	5,498'	5,500'	5,500'
75% of fleet at 90% useful load	6,206'	6,381'	7,000'	7,000'
100% of fleet at 90% useful load	7,875'	8,050'	7,000'	8,100'

*Max 5,500' for 60% useful load and max 7,000' for 90% useful load in wet condition

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

Utilization of the 90 percent category for runway length determination is generally not considered by the FAA unless there is a demonstrated need at an airport, such as documented activity by a business jet operator that flies out frequently with heavy loads. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 7,000 feet is recommended. To accommodate 100 percent of business jets at 90 percent useful load, a runway length of 8,100 feet is recommended.

Another method to determine runway length requirements for aircraft at East Troy Municipal Airport is to examine aircraft flight planning manuals under conditions that are specific to the airport. Several aircraft were analyzed for takeoff length requirements at a design temperature of 81°F and a field

elevation of 860.2 feet MSL with a 0.45 percent runway grade. **Table 3E** provides a detailed runway length analysis for some of the most common small and mid-size turbine aircraft in the national fleet. These data were obtained from Ultranav software, which computes operational parameters for specific aircraft based on flight manual data. The analysis includes the maximum takeoff weight (MTOW) allowable and the percent useful load from 60 percent to 100 percent.

TABLE 3E | Business Aircraft Takeoff Length Requirements – Runway 8-26

		TAKEOFF LENGTH REQUIREMENTS (feet)				
		Useful Load				
Aircraft Name	MTOW	60%	70%	80%	90%	100%
Pilatus PC-12	9,921	2,036	2,199	2,370	2,549	2,736
King Air 200 GT	12,500	3,446	3,505	3,572	3,645	3,725
Citation CJ3	13,870	2,916	3,051	3,243	3,485	3,743
Citation V (Model 560)	15,900	2,805	3,035	3,285	3,553	3,839
King Air 350	15,000	3,277	3,410	3,544	3,767	4,103
Citation Sovereign	30,300	3,618	3,642	3,694	3,901	4,180
Citation II (550)	13,300	2,933	3,219	3,523	3,846	4,188
Citation Encore	16,630	3,160	3,306	3,572	3,879	4,195
Citation (525A) CJ2	12,375	3,128	3,357	3,640	3,929	4,221
Citation Encore Plus	16,830	3,215	3,363	3,597	3,909	4,263
Citation 560 XL	20,000	3,328	3,570	3,839	4,120	4,447
Citation 560 XLS	20,200	3,714	3,987	4,310	4,635	5,011
Citation (525) CJ1	10,600	3,152	3,559	4,086	4,667	5,196
Hawker 800XP	28,000	4,135	4,610	5,036	5,511	6,019
Citation VII	23,000	4,732	5,067	5,432	5,821	6,246
Falcon 900EX	49,200	4,040	4,540	5,110	5,760	6,360
Citation III	21,500	4,543	4,966	5,426	5,923	6,459
Citation X	35,700	4,511	5,011	5,505	5,996	6,490

Note: Green cell values are less than or equal to the length of the primary runway at East Troy Municipal Airport; red cell values are greater than the length of the primary runway at East Troy Municipal Airport.
MTOW = maximum takeoff weight

Source: Ultranav software

The analysis shows that the current length of 3,900 feet available on Runway 8-26 is adequate for many business jet and turboprop aircraft for takeoffs up to 80 percent useful load. Few of the aircraft analyzed are able to operate at 90 or 100 percent useful load. Aircraft included in the analysis primarily fall within aircraft reference code (ARC) A and B-II; the analysis also included limited ARC C-II aircraft, such as the Hawker 800XP and Falcon 900EX.

Table 3F presents the runway length required for landing under three operational categories: Title 14 Code of Federal Regulations (CFR) Part 25, CFR Part 135, and CFR Part 91k. CFR Part 25 operations are those conducted by individuals or companies that own their aircraft. CFR Part 135 applies to all for-hire charter operations, including most fractional ownership operations. CFR Part 91k includes operations in fractional ownership that utilize their own aircraft under the direction of pilots specifically assigned to said aircraft. Part 91k and Part 135 rules regarding landing operations require operators to land at the destination airport within 60 percent of the effective runway length. An additional rule allows for operators to land within 80 percent of the effective runway length if the operator has an approved destination airport analysis in the aircraft's program operating manual. The landing length analysis accounts for both scenarios.

TABLE 3F | Business Aircraft Landing Length Requirements – Runway 8-26

		LANDING LENGTH REQUIREMENTS (feet)					
		Dry Runway Condition			Wet Runway Condition		
Aircraft Name	MLW	Part 25	80% Rule	60% Rule	Part 25	80% Rule	60% Rule
King Air 200 GT	12,500	1,879	2,349	3,132	N/A	N/A	N/A
Pilatus PC-12	9,921	2,261	2,826	3,768	N/A	N/A	N/A
King Air 350	15,000	2,703	3,379	4,505	3,108	3,885	5,180
Citation Sovereign	27,100	2,781	3,476	4,635	3,473	4,341	5,788
Citation (525) CJ1	9,800	2,903	3,629	4,838	3,928	4,910	6,547
Hawker 800XP	23,350	2,703	3,379	4,505	3,962	4,953	6,603
Citation CJ3	12,750	2,934	3,668	4,890	4,001	5,001	6,668
Citation III	19,000	2,948	3,685	4,913	4,123	5,154	6,872
Citation VII	20,000	3,101	3,876	5,168	4,175	5,219	6,958
Falcon 900EX	44,500	3,733	4,666	6,222	4,293	5,366	7,155
Citation Encore	15,200	2,943	3,679	4,905	4,454	5,568	7,423
Citation Encore Plus	15,200	2,948	3,685	4,913	4,456	5,570	7,427
Citation V (560)	15,200	3,036	3,795	5,060	4,470	5,588	7,450
Citation (525A) CJ2	11,500	3,128	3,910	5,213	4,552	5,690	7,587
Citation X	31,800	3,200	4,000	5,333	4,862	6,078	8,103
Citation 560 XLS	18,700	3,363	4,204	5,605	5,294	6,618	8,823
Citation 560 XL	18,700	3,361	4,201	5,602	5,333	6,666	8,888
Citation II (550)	12,700	2,445	3,056	4,075	5,909	7,386	9,848

Note: Green cell values are less than or equal to the length of the primary runway at East Troy Municipal Airport; red cell values are greater than the length of the primary runway at East Troy Municipal Airport.
MLW = maximum landing weight
N/A = not applicable; some turboprop aircraft landing lengths are not adjusted for wet runway conditions

Source: Ultranav software

The landing length analysis shows that all of the aircraft examined operating under Part 25 can land on the available runway length at 57C during dry runway conditions. The analysis for landing length shows that many of the business jets and turboprops analyzed can be accommodated under the 80 percent rule, and only the King Air 200GT and Pilatus PC-12 can conduct landing operations under the 60 percent rule during dry runway conditions. When factoring in wet conditions, the landing length often increases, and nearly all of the aircraft analyzed exceed the current runway length under Part 25 and the 80 and 60 percent rules. Of the aircraft analyzed, only the King Air 350 and Citation Sovereign can conduct landing operations with wet runway conditions while operating under Part 25, and the King Air 350 is the only aircraft able to conduct an operation under the 80 percent rule in wet runway conditions.

Runway Length Summary

Many factors are considered when determining appropriate runway length for safe and efficient operations of aircraft at East Troy Municipal Airport. The airport should strive to accommodate smaller business jets and turboprop aircraft to the greatest extent possible, as demand dictates. Primary Runway 8-26 is currently 3,900 feet long and (as detailed in the tables above) can accommodate many of the more common business jets operating at East Troy Municipal Airport under moderate loading and dry runway conditions.

Justification for any runway extension to meet the needs of turbine aircraft would require regular use (500 annual itinerant operations) by these aircraft, which is the minimum threshold required to obtain FAA grant funding assistance. While the primary runway at 57C currently exceeds the recommended

length for all small aircraft with fewer than 10 passenger seats, the runway length recommendation (per FAA AC 150/5325-4B) is 4,200 feet to accommodate all small aircraft with 10 or more passenger seats, and 5,400 feet to accommodate at least 75 percent of the business jet fleet at 60 percent useful load.

Most of the aircraft analyzed are classified as ARC B-II aircraft and are increasingly limited by runway length when taking off at more than 60 percent useful load, as well as landing under any condition other than Part 25 operating rules and dry runway conditions; as such, there is merit to examining extension options. Analysis in the next chapter will examine potential impacts of an extension to Runway 8-26 up to a maximum of 5,500 feet, while considering appropriate safety design standards, which will be detailed later in this chapter. As discussed earlier, a runway length of 5,400 feet can accommodate 75 percent of the business jet fleet operating at 60 percent useful load and a runway length of 5,500 feet can accommodate 100 percent of the business jet fleet operating at 60 percent useful load. Additionally, a runway of this length could accommodate the King Air 350 at 100 percent useful load under design day runway conditions.

Runway Width | Runway width design standards are primarily based on the critical aircraft but can also be influenced by the visibility minimums of published instrument approach procedures. For primary Runway 8-26, existing RDC B-II(S)-5000 and ultimate B-II-5000 design criteria stipulate a runway width of 75 feet. Runway 8-26 is currently 75 feet wide, which should be maintained throughout the planning period.

For crosswind Runway 18-36, the RDC is A-I(S)-VIS in the existing and ultimate conditions. The runway width standard for this design category is 60 feet. Crosswind Runway 18-36 is currently 75 feet wide. Because Runway 18-36 is a turf runway, the additional width provides an added safety margin for aircraft that operate on this runway; as such, the existing width should be maintained.

Pavement Strength | An important feature of airfield pavement is its ability to withstand repeated use by aircraft of varying weights. The FAA reports the pavement strength for primary Runway 8-26 as 12,000 pounds for single wheel aircraft (S). Because crosswind Runway 18-36 is of turf construction, there is no published weight-bearing capacity; however, it is designated to serve only small aircraft that weigh less than 12,500 pounds.

The strength rating of a runway does not preclude aircraft that weigh more than the published strength rating from using the runway. All federally obligated airports must remain open to the public, and it is typically up to the pilot of an aircraft to determine if a runway can safely support their aircraft. An airport sponsor cannot restrict an aircraft from using the runway simply because its weight exceeds the published strength rating; however, the airport sponsor has an obligation to properly maintain and protect the useful life of the runway (typically for 20 years).

The strength rating of a runway can change over time. Regular usage by heavier aircraft can decrease the strength rating, while periodic runway resurfacing can increase the strength rating. The current runway strength rating for each runway is adequate to accommodate the aircraft that currently operate at the airport. The ultimate critical aircraft, represented by the King Air 350, can weigh 15,000 pounds on dual wheel main landing gear; therefore, consideration should be given to increasing the pavement strength for Runway 8-26 to at least 15,000 dual wheel loading (D). It should be noted that airports conforming to a full B-II design standard typically have runway strength ratings of 30,000 (S) and 60,000 (D).

Runway Gradient | The surface gradient of a runway affects aircraft performance and pilot perception. The surface gradient is the maximum allowable slope for a runway. For runways designated for approach categories A and B, the maximum longitudinal grade is 2.0 percent. Runway 8-26 has a longitudinal grade of 0.45 percent, while Runway 18-36 has a longitudinal grade of 0.42 percent. Both runways meet the gradient standard.

SAFETY AREA DESIGN STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), runway protection zone (RPZ), runway visibility zone (RVZ), and building restriction line (BRL).

The entire RSA, ROFA, and ROFZ must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. RPZs should also be under airport ownership. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place that ensure the RPZ remains free of incompatible development. The various airport safety areas and their dimensions – as sourced from FAA AC 150/5300-13B, *Airport Design* – are presented in **Table 3G** and graphically depicted on **Exhibit 3C**.

TABLE 3G | Runway Design Standards

	Runway 8-26 (Existing)	8-26 (Ultimate)	18-36 (Existing/Ultimate)
Runway Design Code	B-II(S)-5000	B-II-5000	A-I(S)-VIS
Visibility Minimums	1-mile	1-mile	Visual
RUNWAY DESIGN			
Runway Width	75	75	60
Blast Pad Length x Width	150 x 95	150 x 95	60 x 80
RUNWAY PROTECTION			
Runway Safety Area			
Width	150	150	120
Length Beyond Departure End	300	300	240
Length Prior to Threshold	300	300	240
Runway Object Free Area			
Width	500	500	250
Length Beyond Departure End	300	300	240
Length Prior to Threshold	300	300	240
Runway Obstacle Free Zone			
Width	250	400	250
Length Beyond Runway End	200	200	200
Approach Runway Protection Zone			
Runway End	8/26	8/26	18/36
Inner Width	250	500	250
Outer Width	450	700	450
Length	1,000	1,000	1,000
Acres	8.04	13.77	8.04

(Continues on next page.)

TABLE 3G | Runway Design Standards (continued)

	Runway 8-26 (Existing)	8-26 (Ultimate)	18-36 (Existing/Ultimate)
Departure Runway Protection Zone			
Inner Width	250	500	250
Outer Width	450	700	450
Length	1,000	1,000	1,000
Acres	8.04	13.77	8.04
RUNWAY SEPARATION			
Runway Centerline to:			
Hold Line Position	125	200	125
Parallel Taxiway	240	240	150
Aircraft Parking Apron	250	250	125
Note: All dimensions are in feet unless otherwise noted.			

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

Runway Safety Area | The RSA is defined in FAA AC 150/5300-13B, *Airport Design*, as a "defined area surrounding the runway consisting of a prepared surface suitable for reducing the risk of damage to aircraft in the event of undershoot, overshoot, or excursion from the runway." The RSA is centered on the runway and dimensioned in accordance with the approach speed of the critical aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the critical aircraft and fire and rescue vehicles, and free of obstacles that are not fixed by navigational purpose (such as runway edge lights or approach lights).

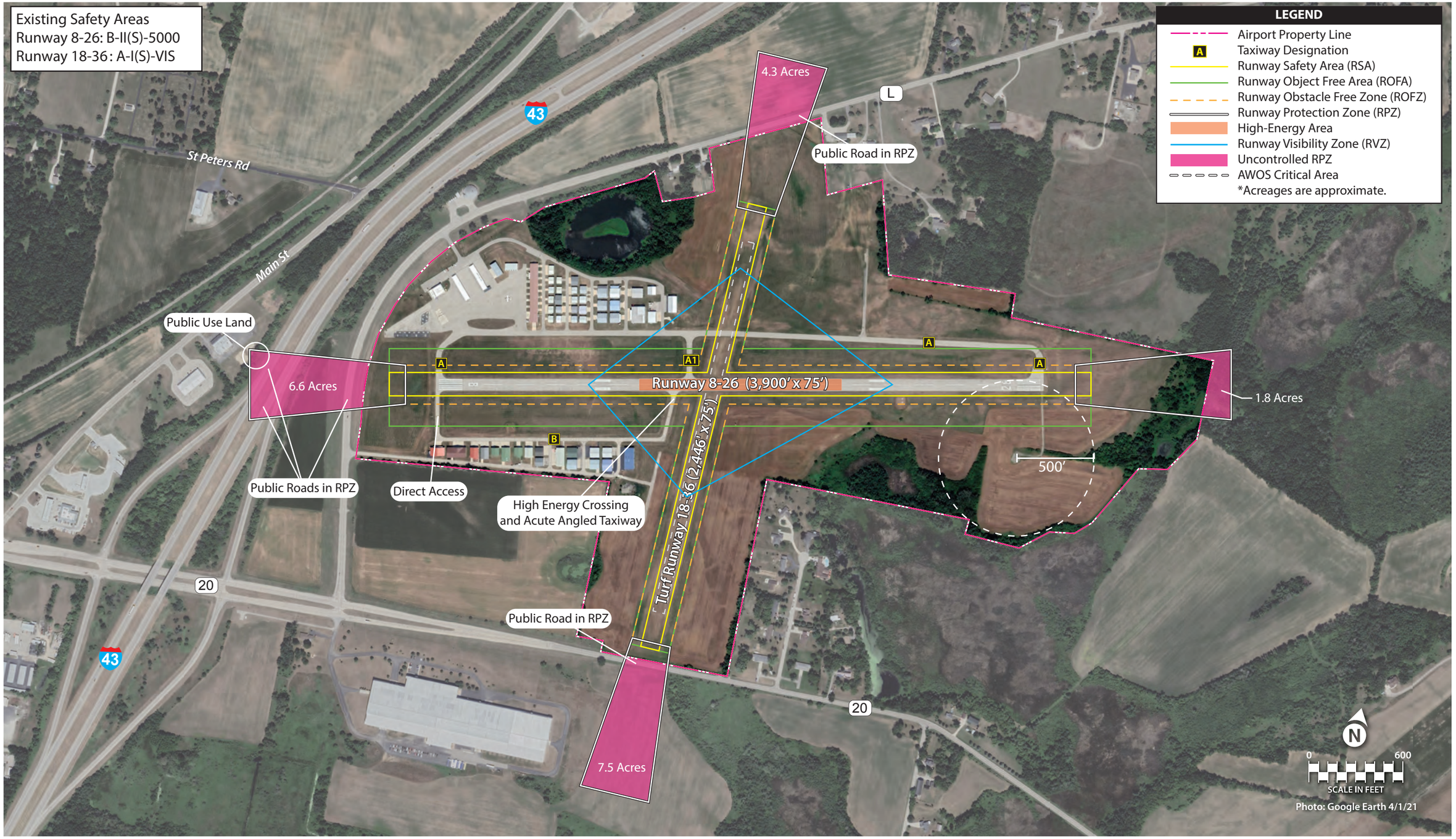
The FAA places high significance on maintaining adequate RSA at all airports. The FAA established the *Runway Safety Area Program* under Order 5200.8, effective October 1, 1999. The Order states: "The objective of the *Runway Safety Area Program* is that all RSAs at federally obligated airports…shall conform to the standards contained in AC 150/5300-13, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for all runways and to perform airport inspections.

As shown on **Exhibit 3C**, for existing RDC B-II(S)-5000 and ultimate B-II-5000 design standards on primary Runway 8-26, the FAA calls for the RSA to be 150 feet wide and extend 300 feet beyond the runway ends. For crosswind Runway 18-36 in both the existing and ultimate runway environment, the RSA dimensions are 120 wide and extend 240 feet beyond the runway ends. For both runways, the RSA is fully contained within airport property and free of obstructions at the dimensions detailed above.

Runway Object Free Area | The ROFA is "a clear area limited to equipment necessary for air and ground navigation and provides wingtip protection in the event of an aircraft excursion from the runway." It is a two-dimensional ground area surrounding runways, taxiways, and taxilanes that is clear of objects, except for objects with locations that are fixed by function (i.e., airfield lighting). The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrates the lateral elevation of the RSA. The ROFA is centered on the runway, extending out in accordance with the critical aircraft utilizing the runway.

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Existing Safety Areas
Runway 8-26: B-II(S)-5000
Runway 18-36: A-I(S)-VIS



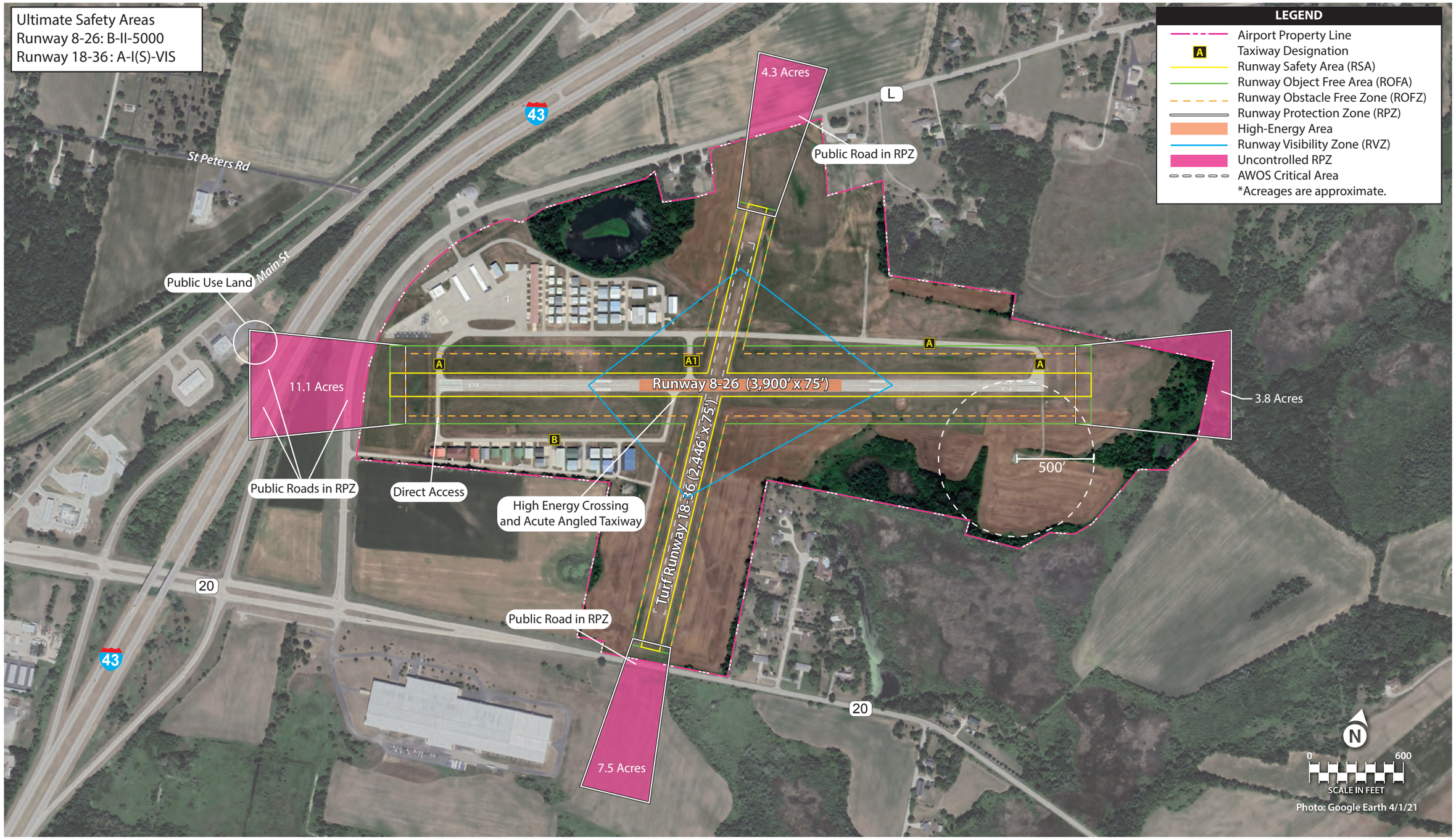
LEGEND

- Airport Property Line
- A — Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- High-Energy Area
- Runway Visibility Zone (RVZ)
- Uncontrolled RPZ
- AWOS Critical Area

*Acreages are approximate.

Exhibit 3C
EXISTING SAFETY AREAS

Ultimate Safety Areas
Runway 8-26: B-II-5000
Runway 18-36 : A-I(S)-VIS



LEGEND

- Airport Property Line
- A — Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- High-Energy Area
- Runway Visibility Zone (RVZ)
- Uncontrolled RPZ
- AWOS Critical Area

*Acreages are approximate.

The ROFA design standards associated with primary Runway 8-26 for existing RDC B-II(S)-5000 and ultimate RDC B-II-5000 are 500 feet wide and extend 300 feet beyond the end of the runway. For cross-wind Runway 18-36, the ROFA dimensions are 250 feet wide and extend 240 feet beyond the end of the runway for both the existing and ultimate conditions. The ROFAs associated with each runway in both the existing and ultimate scenarios are fully contained on airport property and free of obstructions.

Obstacle Free Zone | The ROFZ is an imaginary surface that precludes object penetrations, including taxiing and parked aircraft. The only allowance for ROFZ obstructions is navigational aids mounted on frangible bases that are fixed in their locations by function, such as airfield signs. The ROFZ is established to ensure the safety of aircraft operations. If the ROFZ is obstructed, the airport's approaches could be removed or approach minimums could be increased.

For runways serving small aircraft under 12,500 pounds but with approach speeds greater than or equal to 50 knots, the ROFZ is 250 feet wide, centered on the runway, and extends 200 feet beyond the runway ends. This standard applies to Runway 8-26 under the existing condition and crosswind Runway 18-36 under the existing and ultimate conditions. For all runways serving aircraft over 12,500 pounds, the ROFZ is 400 feet wide, centered on the runway, and extends 200 feet beyond the runway ends. This standard applies to ultimate Runway 8-26 at 57C. Under the current evaluation with available data, there are no ROFZ obstructions at the airport under the existing and ultimate conditions.

Runway Protection Zone | An RPZ is a trapezoidal area centered on the extended runway centerline, beginning 200 feet from the end of the runway. This safety area is established to protect the end of the runway from airspace penetrations and incompatible land uses. The RPZ dimensions are based on the established RDC and the approach visibility minimums serving the runway. While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13B, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements
- Irrigation channels, as long as they do not attract birds
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable
- Unstaffed navigational aids (NAVAIDs) and facilities, such as those required for airport facilities that are fixed by function in regard to the RPZ
- Aboveground fuel tanks associated with backup generators for unstaffed NAVAIDS

In September 2022, the FAA published AC 150/5190-4B, *Airport Land Use Compatibility Planning*, which states that airport owner control over RPZs is preferred. Airport owner control over RPZs may be achieved through:

- Ownership of the RPZ property in fee simple;
- Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.;
- Possessing sufficient land use control authority to regulate land use in the jurisdiction containing the RPZ;
- Possessing and exercising the power of eminent domain over the property; or
- Possessing and exercising permitting authority over proponents of development within the RPZ (e.g., where the sponsor is a state).

AC 150/5190-4B further states that "control is preferably exercised through acquisition of sufficient property interest and includes clearing RPZ areas (and keeping them clear) of objects and activities that would impact the safety of people and property on the ground." The FAA recognizes that land ownership, environmental, geographical, and other considerations can complicate land use compatibility within RPZs; regardless, airport sponsors must comply with FAA grant assurances, including (but not limited to) Grant Assurance 21, *Compatible Land Use*. Sponsors are expected to take appropriate measures to "protect against, remove, or mitigate land uses that introduce incompatible development within RPZs." For proposed projects that would shift an RPZ into an area with existing incompatible land uses – such as a runway extension or construction of a new runway – the sponsor is expected to have or secure sufficient control of the RPZ, ideally through fee simple ownership. Where existing incompatible land uses are present, the FAA expects sponsors to "seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses" through acquisition, land exchanges, right-of-first-refusal to purchase, agreement with property owners on land uses, easements, or other such measures. These efforts should be revisited during master plan or airport layout plan (ALP) updates, and periodically thereafter, and should be documented to demonstrate compliance with FAA grant assurances. If new or proposed incompatible land uses impact an RPZ, the FAA expects the airport to take the above actions to control the property within the RPZ and adopt a strong public stance opposing the incompatible land uses.

For new incompatible land uses that result from a sponsor-proposed action (i.e., an airfield project, such as a runway extension, a change in the critical aircraft that increases the RPZ dimension, or lower minimums that increase the RPZ dimension), the airport sponsor is expected to conduct an alternatives evaluation. The intent of the alternatives evaluation is to "proactively identify a full range of alternatives and prepare a sufficient evaluation to be able to draw a conclusion about what is 'appropriate and reasonable.'" For incompatible off-airport development, the sponsor should coordinate with the FAA Airports District Office (ADO) as soon as the sponsor is aware of the development, and the alternatives evaluation should be conducted within 30 days of the sponsor's first awareness of the development within the RPZ. The following items are typically necessary in an alternatives evaluation:

- Sponsor's statement of the purpose and need of the proposed action (airport project, land use change, or development)

- Identification of any other interested parties and proponents

- Identification of any federal, state, and local transportation agencies involved
- Analysis of sponsor control of the land within the RPZ
- Summary of all alternatives considered, including:
    - Alternatives that preclude introducing the incompatible land use within the RPZ (e.g., zoning action, purchase, and design alternatives, such as implementation of declared distances, displaced thresholds, runway shift or shortening, raising minimums)
    - Alternatives that minimize the impact of the land use in the RPZ (e.g., rerouting a new roadway through less of the RPZ, etc.)
    - Alternatives that mitigate risk to people and property on the ground (e.g., tunnelling, depressing and/or protecting a roadway through the RPZ, implementing operational measures to mitigate any risks, etc.)
- Narrative discussion and exhibits or figures depicting the alternative
- Rough order of magnitude cost estimates associated with each alternative, regardless of potential funding sources
- Practicability assessment based on the feasibility of the alternative in terms of cost, constructability, operational impacts, and other factors

Once the alternatives evaluation has been submitted to the ADO, the FAA will determine whether the sponsor has made an adequate effort to pursue and give full consideration to appropriate and reasonable alternatives. **The FAA will not approve or disapprove the airport sponsor's preferred alternative; the FAA will only evaluate whether an acceptable level of alternatives analysis has been completed before the sponsor makes the decision to allow or disallow the proposed land use within the RPZ.**

The RPZ guidance published in September 2022 shifts the responsibility of protecting the RPZ to the airport sponsor. The airport sponsor is expected to take action to control the RPZ or demonstrate that appropriate actions have been taken. The decision to permit or disallow existing or new incompatible land uses within an RPZ is ultimately up to the airport sponsor, with the understanding that the sponsor still has grant assurance obligations, and the FAA retains the authority to review and approve or disapprove portions of the ALP that would adversely impact the safety of people and property within the RPZ.

RPZs have been further designated as approach and departure RPZs. The approach RPZ is a function of the aircraft approach category (AAC) and approach visibility minimums associated with the approach runway end. The departure RPZ is a function of the AAC and departure procedures associated with the runway. For a particular runway end, the more stringent RPZ requirements (usually associated with the approach RPZ) will govern the property interests and clearing requirements the airport sponsor should pursue.

As shown on **Exhibit 3C**, the existing RPZs associated with each runway end extend beyond airport property and encompass varying amounts of uncontrolled property. Under existing B-II(S)-5000 design conditions, the RPZ serving Runway 8 extends beyond airport property to the west and encompasses

approximately 6.6 acres of uncontrolled property. Similarly, the RPZ serving Runway 26 extends beyond airport property to the east and encompasses approximately 1.8 acres of uncontrolled property. Under ultimate RDC B-II-5000 conditions, the RPZs serving Runway 8-26 expand in size, encompassing approximately 11.1 and 3.8 acres of uncontrolled property, respectively. Under the existing and ultimate conditions, the RPZs serving Runway 18-36 extend beyond airport property to the north and south, encompassing approximately 4.3 and 7.5 acres of uncontrolled property, respectively.

There are public roadways that pass through the RPZs associated with Runways 8, 18, and 36. Additionally, the RPZ serving Runway 8 extends to the west, encompassing a portion of land that is zoned for public use and contains public facilities, such as picnic tables and volleyball courts; this is considered an incompatible land use. Considerations for potential mitigation options will be further explored in the next chapter, Airport Development Alternatives.

As mentioned previously, public roadways are generally considered incompatible uses within an RPZ; however, the FAA considers existing roads to be grandfathered so that no corrective action is necessary. It should be noted that a change to the runway environment that alters the size of the RPZ may negate the grandfathered condition; however, Runway 8-26 has historically been planned to a B-II-5000 design standard. If the runways are equipped with lower instrument visibility minimums in the future, the area contained within the applicable RPZs would increase; thus, the amount of potentially incompatible land uses within the larger RPZ would also increase. To lower the visibility minimums, the airport will have to develop a plan of action to mitigate the newly introduced incompatible land uses and work in consultation with the FAA to determine if the additional incompatible land is acceptable. The alternatives discussion in the next chapter will discuss options to mitigate potential incompatibilities (i.e., roads).

Runway Visibility Zone | The RVZ is an area formed by imaginary lines connecting the line-of-sight points of intersecting runways. The purpose of the RVZ is to facilitate coordination among aircraft, as well as between aircraft and vehicles that are operating on active runways. Having a clear line of sight allows departing aircraft and arriving aircraft to verify the locations and actions of other aircraft and vehicles on the ground that could create a conflict. Within the RVZ, any point five feet above the runway centerline must be mutually visible with any other point five feet above the centerline of the crossing runway. The RVZ at 57C is depicted on **Exhibit 3C**. Currently, there are no obstructions to the RVZ serving the runway system.

Building Restriction Line | The BRL identifies suitable building area locations on the existing and proposed airport property. The BRL encompasses the RPZs, the ROFA, navigational aid critical areas, areas required for terminal instrument procedures, and other areas that are necessary for meeting airport line-of-sight criteria.

Two primary factors contribute to the determination of the BRL: the type of runway (utility or other-than-utility) and the capability of the instrument approaches. Under existing conditions, Runways 8-26 and 18-36 are considered utility runways (serving aircraft under 12,500 pounds). Currently, Runway 8-26 is served by non-precision instrument approaches with visibility minimums not lower than one-mile, while Runway 18-36 is a visual approach only runway. Under the ultimate condition, Runway 8-26 is planned as an other-than-utility (serving large aircraft over 12,500 pounds) non-precision instrument runway with visibility minimums not lower than one-mile.

The BRL is the product of 14 CFR Part 77 transitional surface clearance requirements. These requirements stipulate that no object be located in the primary surface, which is defined as being 500 feet wide for utility and other-than-utility runways with instrument approach minimums greater than ¾-mile. The primary surface for utility runways with only visual approaches is 250 feet wide. From the primary surface, the transitional surface extends outward at a slope of one vertical foot to every seven horizontal feet. For Runway 8-26, the 25-foot BRL is set at 425 feet from the runway centerline under the existing and ultimate conditions. Similarly, the existing and ultimate BRL serving Runway 18-36 is set 300 feet from the runway centerline, as depicted on **Exhibit 3C**.

SEPARATION STANDARDS

There are several other standards related to separation distances for runways and taxiways. Each is designed to enhance the safety of the airfield.

Runway/Taxiway Separation

The design standard for the separation between runways and parallel taxiways is a function of the critical aircraft and the instrument approach visibility minimum. The separation standard for primary Runway 8-26 in the existing RDC B-II(S)-5000 and ultimate B-II-5000 conditions is 240 feet from the runway centerline to the parallel taxiway centerline. Quasi-parallel Taxiway A is currently separated from the runway by 240 to 330 feet and should be maintained in its current location. Similarly, partial parallel Taxiway B is 350 feet from the runway centerline and should be maintained. Crosswind Runway 18-36 is not currently served by a parallel taxiway. Any planned parallel taxiway serving Runway 18-36 should be located a minimum of 150 feet from the runway centerline, according to existing and ultimate RDC A-I(S)-VIS standards.

Hold Line Position Separation

Hold line position markings are placed on taxiways leading to runways. When instructed, pilots are required to stop short of the holding position marking line. The existing and ultimate design standards for Runway 8-26 call for holding positions to be separated from the runway centerline by 125 and 200 feet, respectively. The existing and ultimate design standards for Runway 18-36 call for holding positions to be separated from the runway centerline by 125 feet.

At East Troy Municipal Airport, each hold line position marking on taxiways leading to primary Runway 8-26 is situated at least 200 feet from the runway centerline. It should be noted that the hold line positions serving each end of Runway 8-26 are acutely angled to the runway at other than 90 degrees. Similarly, the midfield Taxiway B connector serving Runway 8-26 is acutely angled to the runway, causing the associated hold line position to be angled at other than 90 degrees to the runway. The holding positions on Taxiway A connecting to crosswind Runway 18-36 are situated approximately 122 feet from the runway centerline, as shown in **Figure 3A**. The alternatives in the next chapter will consider relocating the hold lines that do not meet the 125-foot separation standard, as well as reorienting the hold line positions to be 90 degrees perpendicular to Runway 8-26.

Aircraft Parking Area Separation

According to FAA AC 150/5300-13B, aircraft parking positions should be located to ensure that aircraft components (wings, tail, and fuselage) do not:

1. Conflict with the object free areas for adjacent runways or taxiways:
    a. Runway object free area (ROFA)
    b. Taxiway object free area (TOFA)
    c. Taxilane object free area (TLOFA)
2. Violate any of the following aeronautical surfaces and areas:
    a. Runway approach or departure surface
    b. Runway visibility zone (RVZ)
    c. Runway obstacle free zone (ROFZ)
    d. Navigational aid equipment critical areas

Figure 3A – Runway 18-36 Hold Positions

Existing aircraft parking positions at East Troy Municipal Airport are located on the aircraft parking apron near the terminal/fixed base operator (FBO) building. In their existing locations, each marked aircraft parking position at 57C is clear of the safety areas, as well as the aeronautical surfaces and areas detailed above. When considering each area detailed above, the nearest marked tiedown is located on the FBO apron and is separated from the Taxiway A centerline by approximately 157 feet. As illustrated in **Figure 3B**, this parking position is clear of the TOFA[2] associated with Taxiway A.

Figure 3B – ADG I and II TOFAs

[2] The TOFA illustrated in Figure 3B is representative of an ADG II TOFA, which measures 124 feet wide, centered on the taxiway centerline.

It should be noted that the parking position separation (approximately 49 feet) from the taxilane along the apron area meets TLOFA standards for airplane design group (ADG) I (39.5 feet) but falls short of ADG II standards (55 feet). Additionally, a corner of the 16-unit T-hangar currently obstructs the ADG II TOFA. Alternatives to follow in the next chapter will explore options to mitigate this condition.

TAXIWAYS

The design standards associated with taxiways are determined by the taxiway design group (TDG) or the ADG of the critical aircraft. As determined previously, the existing and ultimate ADG for Runway 8-26 is ADG II, while the crosswind Runway 18-36 ADG was identified as ADG I in the existing and ultimate condition. **Table 3H** presents the various taxiway design standards related to both ADG I and II. The table also shows the taxiway design standards related to TDG. The TDG standards are based on the main gear width (MGW) and cockpit to main gear (CMG) distance of the critical aircraft expected to use those taxiways. Different taxiway and taxilane pavements can and should be planned to the most appropriate TDG design standards, based on usage.

The current critical design aircraft for 57C is the Beechcraft King Air 90, which is a TDG 1A aircraft. The current design for Taxiway A is TDG 2A, which meets the needs for the ultimate critical aircraft (Beechcraft King Air 350) and dictates a taxiway width of 35 feet. Partial parallel Taxiway B and its connectors are 25 feet wide, which meets TDG 1A standards. Certain portions of the landside area that are utilized exclusively by small aircraft, such as the T-hangars and other aircraft parking or hangar areas, should adhere to TDG 1A/1B standards. All taxiway widths on the airfield should be maintained.

TABLE 3H | Taxiway Dimensions and Standards

STANDARDS BASED ON WINGSPAN	ADG I	ADG II
Taxiway and Taxilane Protection		
Taxiway Safety Area (TSA) Width	49'	79'
Taxiway Object Free Area (TOFA) Width	89'	124'
Taxilane Object Free Area (TLOFA) Width	79'	110'
Taxiway and Taxilane Separation		
Taxiway Centerline to Parallel Taxiway Centerline	70'	101.5'
Taxiway Centerline to Fixed or Moveable Object	44.5'	62'
Taxilane Centerline to Parallel Taxilane Centerline	64'	94.5'
Taxilane Centerline to Fixed or Moveable Object	39.5'	55'
Wingtip Clearance		
Taxiway Wingtip Clearance	20'	22.5'
Taxilane Wingtip Clearance	15'	15.5'
STANDARDS BASED ON TDG	**TDG 1A/B**	**TDG 2A/B**
Taxiway Width Standard	25'	35'
Taxiway Edge Safety Margin	5'	7.5'
Taxiway Shoulder Width	10'	15'

ADG = airplane design group
TDG = taxiway design group

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

Taxiway and Taxilane Design Considerations

FAA AC 150/5300-13B, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation included in the current AC, as well as previous FAA safety and design recommendations.

1. **Taxiing Method**: Taxiways are designed for cockpit-over-centerline taxiing with pavement that is wide enough to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, existing intersections should be upgraded to eliminate judgmental oversteering, which is when a pilot must intentionally steer the cockpit outside the marked centerline to ensure the aircraft remains on the taxiway pavement.

2. **Curve Design**: Taxiways should be designed so that the nose gear steering angle is no more than 50 degrees, which is the generally accepted value to prevent excessive tire scrubbing.

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

4. **Channelized Taxiing**: To support visibility of airfield signage, taxiway intersections should be designed to meet standard taxiway width and fillet geometry.

5. **Designated Hot Spots and Runway Incursion Mitigation (RIM) Locations**: A hot spot is a location on the airfield with elevated risk of a collision or runway incursion. Mitigation measures should be prioritized for areas the FAA designates as hot spots or RIM locations.

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

7. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.

    - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple by using the three-path concept.

    - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.

    - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold: through a simple reduction in the number of occurrences and a reduction in air traffic controller workload.

- *Avoid High Energy Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.

- *Increase Visibility*: Right-angle intersections between both taxiways and runways provide the best visibility. Acute-angle runway exits provide greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.

- *Avoid Dual Purpose Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway, and only a runway.

- *Direct Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.

- *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

8. **Runway/Taxiway Intersections**

   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for an acute-angled exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs so the signs are visible to pilots.

   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage. The construction of high-speed exits is typically only justified for runways that experience regular use by jet aircraft in approach categories C and above.

   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

9. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access to a runway should be avoided. Increase pilot situational awareness by designing taxiways in a manner that forces pilots to consciously make turns. Taxiways that originate from aprons and form a straight line across runways at mid-span should be avoided.

   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.

- *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout or a no-taxi island that forces pilots to make a conscious decision to turn.

- *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

FAA AC 150/5300-13B, *Airport Design*, states that "existing taxiway geometry should be improved whenever feasible, with emphasis on designated 'hot spots.'" There are no FAA-designated hot spots at 57C; however, there are non-standard taxiway geometry conditions, as detailed on **Exhibit 3C** and listed below:

- The midfield intersection of Taxiway A and B crosses within the high-energy area of Runway 8-26;
- Taxiway B provides direct access to Runway 8-26 as it connects to the Runway 8 threshold; and
- The midfield Taxiway B entry/exit is acutely angled to Runway 8-26.

Potential solutions for these non-standard conditions will be presented in the alternatives chapter. Analysis in the alternatives chapter will also consider improvements that could be implemented on the airfield to minimize runway incursion potential and conform to FAA standards for taxiway design. Options to correct the abovementioned issues will be included in the alternatives chapter, and any future taxiways that are planned will also consider the taxiway design standards.

Taxilane Design Considerations

Taxilanes are distinguished from taxiways in that they do not provide direct access to or from the runway system. Taxilanes typically provide access to hangar areas and can be planned to varying design standards, depending on the type(s) of aircraft utilizing the taxilane, as described previously.

NAVIGATIONAL AND APPROACH AIDS

Navigational aids are devices that provide pilots with guidance and position information when utilizing the runway system. Electronic and visual guidance to arriving aircraft enhance the safety and capacity of the airfield. Such facilities are vital to the success of an airport and provide additional safety to pilots and passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by pilots conducting flight training and operating larger aircraft when visibility is good.

Instrument Approach Aids

East Troy Municipal Airport has two published instrument approaches: a localizer performance (LP) instrument approach is available to the Runway 8 end and a localizer performance with vertical guidance (LPV) via an area navigation (RNAV) global positioning system (GPS) instrument approach is available to the Runway 26 end. The approaches have visibility minimums down to one-mile for categories A and B aircraft but are not available to categories C and D aircraft. These approaches are considered adequate for primary Runway 8-26 at this time.

Although there is no expressed need for improved instrument approach visibility minimums, a reduction in the visibility minimums to lower than one-mile but not below ¾-mile would result in an increase to the RPZ dimensions for the affected runway. Additionally, if Runway 8-26 is extended in the future, additional property would be uncontrolled, with potentially incompatible land uses. For planning purposes, the alternatives to follow in the next chapter will analyze instrument approaches with not lower than ¾-mile minimums serving Runway 8-26.

Crosswind Runway 18-36 is currently a visual runway with no published instrument approach procedures. Runway 18-36 is planned to remain as such in the future.

Visual Approach Aids

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. Both ends of primary Runway 8-26 are currently equipped with a two-box precision approach path indicator (PAPI-2) system. As more turbine aircraft begin to operate at the airport, consideration should be given to upgrading the PAPI-2 to a PAPI-4 (four-box system) on each runway end.

Runway end identification lights (REILs) are flashing lights located at the runway threshold end that facilitate rapid identification of the runway end at night and during poor visibility conditions. REILs enable pilots to identify the runway thresholds and distinguish the runway end lighting from the other lighting on the airport and in the approach areas. The FAA indicates that REILs should be considered for all lighted runway ends that are not planned for more sophisticated approach lighting systems. Both ends of primary Runway 8-26 are equipped with REILs, which should be maintained.

Crosswind Runway 18-36 is not equipped with any visual approach aids. As a visual-only turf crosswind runway designated for small aircraft, this condition is adequate and should be maintained in the future.

Weather Reporting Aids

East Troy Municipal Airport has a lighted wind cone and wind tee, which are located near the Runway 8 threshold and adjacent Taxiway B. Three additional supplemental wind cones are positioned at various locations on the airfield. These provide information to pilots regarding wind speed and direction and should be maintained through the planning period. A segmented circle is often co-located with an airport's primary wind cone. The segmented circle consists of a system of visual indicators designed to provide traffic pattern information to pilots. 57C does not have a segmented circle, and consideration should be given to installing one.

The airport is also equipped with an automated weather observation station (AWOS), which provides weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur in real time. This information is transmitted via a designated radio frequency at regular intervals. The AWOS has a 500-foot-radius critical area, which must be kept free of obstructions that could interfere with its sensors. The AWOS at East Troy Municipal Airport is located on the south side of Runway 8-26 near the threshold of Runway 26 and should be maintained through the planning period.

AIRFIELD LIGHTING, MARKING, AND SIGNAGE

Several lighting and pavement marking aids serve pilots using the airport. These aids assist pilots in locating the airport and runway at night or in poor visibility conditions. They also serve aircraft navigating the airport environment on the ground when transitioning to/from aircraft parking areas to/from the runway.

Airport Identification Lighting | East Troy Municipal Airport's rotating beacon is located on the north-east side of the airport property near the public parking area. The beacon is in good working condition and should be maintained.

Runway and Taxiway Lighting | Runway 8-26 is equipped with a medium intensity runway lighting (MIRL) system. This system is adequate and should be maintained. Because crosswind Runway 18-36 is a visual-only turf runway, it is currently unlit and marked with yellow edge markers. This condition is adequate and should be maintained. Taxiways A and B and their associated entry/exit taxiways are equipped with medium intensity taxiway lighting (MITL). This system is also adequate and should be maintained. Planning should consider expansion of both MIRL and MITL systems if/when new pavements are constructed.

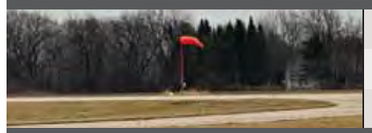
Airfield Signs | Airfield identification signs assist pilots in identifying their locations on the airfield and directing them to their desired locations. Lighted signs are installed on the runway and taxiway systems on the airfield. The signage system includes lighted runway and taxiway designations and routing/directional signage. All of these signs should be maintained throughout the planning period and consideration should be given to installing runway distance remaining signage.

It should be noted that many airports are transitioning to light emitting diode (LED) systems. LEDs have many advantages, including lower energy consumption, longer lifespan, increased durability, reduced size, greater reliability, and faster switching. While a larger initial investment is required up front, the energy savings and reduced maintenance costs outweigh any additional costs over time. When these systems need to be repaired/replaced, consideration should be given to upgrading them to LED systems.

Pavement Markings | Runway markings are typically designed to the type of instrument approach available on the runway. FAA AC 150/5340-1K, *Standards for Airport Markings*, provides the guidance necessary to design airport markings. Runway 8-26 is equipped with non-precision markings, while turf Runway 18-36 has yellow markers indicating each end and the edge boundaries of the runway. These runway markings should be maintained throughout the long-term planning horizon.

A summary of the airside facilities at East Troy Municipal Airport is presented on **Exhibit 3D**.

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

		EXISTING	ULTIMATE	EXISTING/ULTIMATE
RUNWAYS		**8-26**	**8-26**	**18-36**
	Runway Design Code (RDC)	B-II(S)-5000	B-II-5000	A-I(S)-VIS
	Dimensions	3,900' x 75'	Consider runway extension	2,446' x 75'
	Pavement Strength	12,000 lbs S	30,000 lbs S | 60,000 lbs D	Small aircraft only (Turf)
SAFETY AREAS				
	Runway Safety Area (RSA)	Standard RSA	Maintain	Standard RSA/Maintain
	Runway Object Free Area (ROFA)	Standard ROFA	Maintain	Standard ROFA/Maintain
	Runway Obstacle Free Zone (ROFZ)	Standard ROFZ	Maintain	Standard ROFZ/Maintain
	Runway Protection Zone (RPZ)	RPZs extend beyond airport property; public use land and roads in Runway 8 RPZ	Consider mitigation of incompatible use	RPZs extend beyond airport property/Consider mitigation of potential incompatible use
TAXWAYS				
	Design Group	Conforms to 1A and 2A	Maintain	None
	Parallel Taxiway	Taxiway A and B (Partial)	Maintain	None
	Parallel Taxiway Separation from Runway	240'-350'	Maintain	None
	Widths	35' (Taxiway A) / 25' (Taxiway B)	Maintain	None
	Holding Position Separation	200'+	Maintain	122'/125'
	Notable Conditions	Direct access, acute angle	Consider mitigation	Consider 125' hold position separation
NAVIGATIONAL AND WEATHER AIDS				
	Instrument Approaches	1-mile GPS/VOR	Maintain/analyze ¾-mile	None
	Weather Aids	AWOS, wind cones/tee, rotating beacon	Maintain	AWOS, wind cones/tee, rotating beacon
	Approach Aids	PAPI-2, REILS on both runway ends	PAPI-4 / Maintain	None
LIGHTING AND MARKING				
	Runway Lighting	MIRL	Maintain	None
	Runway Marking	Non-Precision Instrument	Maintain	Yellow edge markers
	Taxiway Lighting	MITL	Maintain	None
	Airfield Signage	Runway/taxiway designation, routing, runway exits, mandatory instruction signs	Maintain/consider runway distance remaining signage	Runway/taxiway designation, routing, runway exits, mandatory instruction signs

KEY:

AWOS - Automated Weather Observation System
D - Dual Wheel Loading
GPS - Global Positioning System
MIRL - Medium Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
PAPI - Precision Approach Path Indicator
REIL - Runway End Identification Lights
S - Single Wheel Loading
VIS - Visual
VOR - Very High Frequency Omni-directional Range

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LANDSIDE FACILITY REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each element was examined in relation to projected demand to identify future landside facility needs. At East Troy Municipal Airport, this includes the following components for general aviation needs:

- General Aviation Terminal Facilities and Auto Parking
- Aircraft Storage Hangars
- Aircraft Parking Aprons
- Airport Support Facilities

Projections made for aircraft storage hangars, aircraft parking aprons, and marked parking positions are based on the number of aircraft currently based and forecast to base on the airport property over the 20-year planning horizon. Terminal facilities, auto parking, and other airport support facilities are based on the annual number of operations projected to occur over the planning period.

In addition to landside facility requirements, potential non-aeronautical land uses will be evaluated in subsequent chapters. These are portions of airport property that are suitable for non-aviation purposes and can generate revenue for the airport, such as agriculture or industrial uses. While airport property is generally subject to Airport Improvement Program (AIP) grant assurances, airports can request a release from aeronautical federal obligations for certain areas of property that are not necessary for aviation uses. These requests are facilitated under the *FAA Reauthorization Act of 2018*, Section 163, which governs the FAA's authority over non-aeronautical development.

GENERAL AVIATION TERMINAL SERVICES

The general aviation terminal facilities at an airport often provide corporate officials and visitors with their first impression of the community. General aviation terminal facilities at an airport provide space for passenger waiting, a pilots' lounge, flight planning, concessions, management, storage, and many other various needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by fixed base operators (FBOs) and other specialty operators for these functions and services. At East Troy Municipal Airport, general aviation terminal services are provided in the terminal building, which includes a lobby, a pilots' lounge, a snooze room, and restrooms.

The methodology used in estimating general aviation terminal facility needs was based on the number of airport users expected to utilize general aviation facilities during the design hour. This methodology is a general airport planning practice and is not considered exacting, as each airport terminal serves unique functions. The space requirements for terminal building facilities were based on providing 125 square feet (sf) per design hour itinerant passenger. A multiplier of 2.0 in the short term, increasing to 3.0 in the long term, was also applied to terminal facility needs to better determine the number of passengers associated with each itinerant aircraft operation. This increasing multiplier indicates an expected increase in larger aircraft operations throughout the long term. These operations typically support larger turboprop and jet aircraft, which can accommodate an increasing passenger load factor; this is the case at East Troy Municipal Airport, where an increasing number of turbine operations are anticipated.

Table 3J outlines the space requirements for general aviation terminal services at East Troy Municipal Airport through the long-term planning period. The amount of space currently offered in the terminal building is approximately 1,200 sf. As shown in the table, additional terminal space could be needed over the planning period.

TABLE 3J | General Aviation Terminal Area Facilities

	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need
Terminal Building (sf)	1,200	2,800	3,500	4,600
General Aviation Design Hour Itinerant Passengers	–	11	11	12
Passenger Multiplier	–	2.0	2.5	3.0
Terminal Building Vehicle Parking	–	22	28	37
Visitor/Tenant Vehicle Parking	–	25	26	29
Total Vehicle Parking Spaces	**52**	**47**	**54**	**66**

Source: Coffman Associates analysis

General aviation vehicle parking demands have also been determined for the airport. Space determinations for passengers were based on an evaluation of existing airport use, as well as standards set forth to help calculate projected terminal facility needs. There are currently 52 marked individual vehicle spaces provided at the airport. Most based aircraft owners park near their hangars. As can be seen in the table, additional vehicle parking could be needed over the planning period. Proposed terminal area and hangar facility layouts in the next chapter will include dedicated vehicle parking for tenants.

AIRCRAFT HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preference. The trend in general aviation aircraft is toward more sophisticated (and consequently, more expensive) aircraft; therefore, many aircraft owners prefer enclosed hangar space, as opposed to outside tiedowns.

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

While most aircraft owners prefer enclosed aircraft storage, some will still use outdoor tiedown spaces, usually due to lack of available hangar space, high hangar rental rates, or operational needs; therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft.

Hangar types vary greatly in size and function. T-hangars, box hangars, and shade hangars are popular with aircraft owners who need to store single private aircraft. These hangars often provide individual spaces within a larger structure or in standalone portable buildings. There is approximately 29,500 sf of T-hangar storage space at the airport. To determine future aircraft storage needs, a planning standard of 1,200 sf per aircraft is utilized for this type of hangar.

Executive box hangars are open-space facilities with no interior supporting structure. These hangars can vary in size from 1,500 and 2,500 sf to nearly 10,000 sf. They are typically able to house single-engine, multi-engine, turboprop, and jet aircraft, as well as helicopters. Executive box hangar space at East Troy Municipal Airport is estimated at 158,700 sf. For future planning, a standard of 3,000 sf per turboprop, 5,000 sf per jet, and 1,500 sf per helicopter is utilized for executive box hangars.

Conventional hangars are large open-space facilities with no interior supporting structure. These hangars provide for bulk aircraft storage and are often utilized by airport businesses, such as FBOs or aircraft maintenance operators. Conventional hangars are generally larger than executive box hangars and can range in size from 10,000 sf to more than 20,000 sf. Often, a portion of a conventional hangar is utilized for non-aircraft storage needs, such as maintenance or office space. There are no conventional hangars at East Troy Municipal Airport. For planning purposes, the same aircraft sizing standards utilized for executive hangars are also utilized for conventional hangars. To determine service hangar needs, a planning standard of 250 sf per based aircraft has been calculated.

Future hangar requirements for the airport are summarized in **Table 3K**. The analysis shows that future hangar requirements indicate a potential need for over 81,000 sf of new hangar storage capacity through the long-term planning period. This includes a mixture of hangar types, with the largest need projected in the executive/conventional hangar category. Due to the projected increase in based aircraft, the existing demand for hangar space, annual general aviation operations, and hangar storage needs, facility planning will consider additional hangars at the airport. It is expected that the aircraft storage hangar requirements will continue to be met through a combination of hangar types.

TABLE 3K | Aircraft Hangar Requirements

	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need	Difference
Total Based Aircraft	78	82	86	95	+17
Hangar Area Requirements					
T-Hangar Area (sf)	29,500	34,300	37,300	40,500	+11,000
Executive Box/Conventional Hangar Area (sf)	158,700	180,700	195,000	217,000	+58,300
Service Hangar Area (sf)	0	10,300	10,800	11,900	+11,900
Total Hangar Area (sf)	**188,200**	**225,300**	**243,100**	**269,400**	**+81,200**

Source: Coffman Associates analysis

It should be noted that hangar requirements are general in nature and are based on the aviation demand forecasts. The actual need for hangar space will further depend on the usage within the hangars. For example, some hangars may be utilized entirely for non-aircraft storage (such as maintenance), yet have an aircraft storage capacity from a planning standpoint; therefore, the needs of an individual user may differ from the calculated space necessary.

AIRCRAFT PARKING APRONS

The aircraft parking apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near the airside entry point, such as the terminal building or FBO facility. Ideally, the main apron is large enough to accommodate transient airport users, as well as a portion of locally based aircraft. Smaller aprons are often available adjacent to FBO or specialty aviation service operator (SASO) hangars and at other locations around the airport. The apron layout at East Troy Municipal Airport generally follows this typical pattern, with the aircraft parking apron located adjacent to the terminal/FBO facility and the self-service fuel farm.

FAA AC 150/5300-13B, *Airport Design*, suggests a methodology by which transient apron requirements can be determined from knowledge of busy day operations. The busy day is calculated at 1.25 times the design day, which is the peak month divided by the number of days (31). The peak month at 57C is currently estimated at 10 percent of annual operations. The number of itinerant parking spaces required was determined to be approximately 25 percent of the busy day itinerant operations for general aviation operations. A planning standard of 800 square yards (sy) per aircraft was applied to determine future transient apron requirements for single- and multi-engine piston aircraft. For business jets, which are often much larger, a planning standard of 1,600 sy per aircraft position was used. In addition, 57C has based aircraft that occasionally use outside aircraft tiedowns for storage. It is assumed that these aircraft require less space than transient aircraft; therefore, a planning standard of 650 sy per aircraft was applied. For local tiedown needs, five percent of the total based aircraft was added for maintenance activities and temporary storage needs.

The total apron parking requirements are presented in **Table 3L**. The existing apron pavement area at East Troy Municipal Airport currently encompasses approximately 16,400 sy of space. Using the planning standards described above and factoring in assumptions regarding operational and based aircraft growth, additional apron space is projected to be needed, with an additional 13,600 sy of aircraft parking apron pavement estimated to be needed over the next 20 years.

There are currently 20 marked parking positions available for based and itinerant aircraft at the airport. There is no helicopter parking. As shown in the table, additional aircraft parking is projected to be needed beginning in the short term, including dedicated parking for helicopters and small corporate jets.

TABLE 3L | Aircraft Parking Apron Requirements

	Available	Short Term	Intermediate Term	Long Term
Aircraft Parking Positions				
Based/Local GA Aircraft	–	4	4	5
Transient GA Aircraft	–	23	24	26
Corporate Jet Aircraft	–	1	2	3
Helicopter	–	1	1	2
Total Parking Positions	**20**	**29**	**31**	**36**
Total Apron Area	**16,400 sy**	**23,300 sy**	**25,800 sy**	**30,000 sy**

Source: Coffman Associates analysis

SUPPORT FACILITIES

Various other landside facilities that play a supporting role in overall airport operations have also been identified. These support facilities include:

- Aviation Fuel Storage
- Perimeter Fencing and Gates

Aviation Fuel Storage

The Village of East Troy currently owns and operates the airport's fuel facilities, which are located on the main apron in front of the terminal/FBO building. Existing storage capacity for 100LL and Jet A fuels totals 12,000 gallons each. Additionally, auto fuel (which is approved for use in certain aircraft) is also dispensed from a 5,000-gallon tank. Fuel is dispensed via a self-serve system that is co-located with the tanks.

Fuel storage requirements are typically based on maintaining a two-week supply of fuel during an average month; however, more frequent deliveries can reduce the fuel storage capacity requirements. Generally, fuel tanks should be of adequate capacity to accept a full refueling tanker – approximately 8,000 gallons – while maintaining a reasonable level of fuel in the storage tank. Future aircraft demand experienced by the airport will determine the need for additional fuel storage capacity. It is important that airport personnel work with the fuel service provider and other specialty aviation operators to plan for adequate levels of fuel storage capacity through the long-term planning period. Given that the current fuel storage capacity can accommodate a full refueling tanker, it is recommended that the airport maintain the fuel storage capacity for 100LL and Jet A fuels at 12,000 gallons each. This allows the fuel service provider to maintain a reasonable level of fuel for customers while accepting a full refueling tanker load of fuel, ultimately preventing the need to completely drain a fuel tank prior to taking on another load of fuel.

TABLE 3M | Fuel Storage Requirements Analysis

	Capacity	PLANNING HORIZON		
		Short-Term	Intermediate-Term	Long-Term
Fuel Available				
Avgas (100LL)	12,000 gal.	Maintain		
Jet A	12,000 gal.	Maintain		
Auto Fuel	5,000 gal.	Maintain		

Source: Coffman Associates analysis

Maintenance and Snow Removal Equipment (SRE) Facility

Maintenance equipment is currently stored in a hangar adjoined to the terminal/FBO building on the airport's northeast side (identified as Building #2 on Exhibit 1E). This equipment includes a snow blower, a sweeper, a New Holland tractor with a plow attachment, and a front-end loader with a snow pusher box. Other equipment includes a Toro mower with a 10-foot deck, as well as various maintenance tools and small equipment. While this facility is adequately sized for accommodating this equipment, it may be better served as an aircraft storage or SASO facility due to its location (i.e., accessibility to taxiways, apron area, and terminal/FBO building). Alternatives presented in the next chapter will assess other locations on the airfield that may be better suited as a maintenance and SRE facility.

Perimeter Fencing and Gates

Perimeter fencing is used at airports primarily to secure the aircraft operational area. The physical barrier of perimeter fencing:

- Gives notice of legal boundary of the outermost limits of the facility or security-sensitive areas;
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary;
- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion detection equipment and closed-circuit television (CCTV);
- Deters casual intruders from penetrating the aircraft operations areas on the airport;
- Creates a psychological deterrent;
- Demonstrates a corporate concern for facilities; and
- Limits inadvertent access to the aircraft operations area by wildlife.

As detailed in Chapter One, East Troy Municipal Airport operations areas are enclosed by four-foot chain-link fencing, and controlled access gates are available for use at the airport. All fencing and gates should be maintained throughout the planning period and should be regularly inspected to ensure they are functioning properly and are undamaged.

A summary of the overall general aviation landside facilities is presented in **Exhibit 3E**.

SUMMARY

This chapter has outlined the safety design standards and facilities required to meet potential aviation demand projected at East Troy Municipal Airport for the next 20 years. In an effort to provide a more flexible master plan, the yearly forecasts from Chapter Two have been converted to planning horizon levels. The short term roughly corresponds to a five-year timeframe, the intermediate term is approximately 10 years, and the long term is 20 years. By utilizing planning horizons, airport management can focus on demand indicators for initiating projects and grant requests, rather than on specific dates in the future.

In Chapter Four, potential improvements to the airside and landside systems will be examined through a series of airport development alternatives. Most of the alternatives discussion will focus on those capital improvements that would be eligible for federal and state grant funds. Other projects of local concern will also be presented. Ultimately, an overall airport development plan that presents a vision beyond the 20-year scope of this master plan will be developed for East Troy Municipal Airport.

	Available	Short Term	Intermediate Term	Long Term
Aircraft Storage Hangars				
				
Aircraft to be Hangared	78	82	86	95
T-Hangar Area (sf)	29,500	34,300	37,300	40,500
Executive/Conventional Hangar Area (sf)	158,700	180,700	195,000	217,000
Service/Maintenance Area (sf)	-	10,300	10,800	11,900
Total Hangar Storage Area (sf)	**188,200**	**225,300**	**243,100**	**269,400**
Aircraft Parking Apron				
				
Aircraft Parking Positions	20	29	31	36
Total Public Apron Area (sy)	16,400	23,300	25,800	30,000
General Aviation Terminal Facilities and Parking				
				
Building Space (sf)	1,200	2,800	3,500	4,600
Total GA Parking Spaces	52	47	54	66
Fuel Storage Requirements				
				
Jet A 14-Day Supply (gal.)	12,000	Maintain		
100LL 14-Day Supply (gal.)	12,000	Maintain		
Auto Fuel 14-Day Supply (gal.)	5,000	Maintain		

Chapter Four

Airport Development Alternatives

The Village of East Troy

Chapter 4

Airport Development Alternatives

In the previous chapter, the aviation facilities required to satisfy airside and landside demand through the 20-year planning period of the master plan were identified. Several Federal Aviation Administration (FAA) and Wisconsin Department of Transportation (WisDOT) – Bureau of Aeronautics (BOA) development standards that apply to airfield design were also discussed. The next step in the planning process is to evaluate appropriate staging for these facilities while meeting applicable federal and local design standards. The purpose of this chapter is to formulate and examine a range of realistic development alternatives that address the short-, intermediate-, and long-term planning horizon levels. Because there are multiple possibilities and combinations, it is necessary to focus on the opportunities that have the greatest potential for success. Each alternative provides a different approach to meeting existing and future facility needs. The alternatives considered in this chapter are presented in graphic form for ease of understanding, evaluation, and discussion.

Some airports become constrained due to limited availability of vacant and/or underutilized land, while others may be constrained due to adjacent existing and/or approved land use development or other manmade or geographical features. These conditions must be carefully considered and understood to organize a functionally successful layout of the new and improved facilities at East Troy Municipal Airport (57C). Taking a long-term approach to facility planning now will provide an effective insurance policy for the Village of East Troy, ensuring the airport's long-term viability for safe and functional aviation operations, while supporting compatible and sustainable economic growth.

The primary goal of this planning process is to develop a feasible plan to meet the projected needs driven by market demand over the next 20 years.

The Village of East Troy

The resulting master plan and capital financial plan should be developed in a manner that is consistent with the future goals and objectives of the Village of East Troy and airport stakeholders, including users of the airport and the local community and region, all of which have a vested interest in the successful development and operation of 57C.

The goal of this chapter is to develop an underlying rationale that supports the final recommended concept. Through this planning process, an evaluation of the highest and best uses of airport property will be made, while also considering local development goals, efficiency, physical and environmental factors, capacity, and appropriate safety design standards.

The alternatives presented in this chapter have been formulated as potential solutions to meet the overall program objectives for the airport in a balanced manner. Through coordination with the Village of East Troy, the Planning Advisory Committee (PAC), and the public, an alternative (or combination of alternatives) will be refined and modified as necessary into a recommended development concept (Chapter Five); therefore, the planning considerations and alternatives presented in this chapter serve as the starting points in a recommended development concept to attain the airport's desired future.

PLANNING OBJECTIVES

A set of basic planning objectives has been established to guide the alternative development process. The goal of this master planning update effort is to produce a development plan for the airport that addresses forecast aviation demand and meets FAA and/or BOA design standards to the greatest degree possible. As owner and operator, the Village of East Troy provides the overall guidance for the operation and development of the airport. It is of primary importance that 57C is marketed, developed, and operated for the benefit of the community and its users. The following basic planning principles and objectives will be utilized as general guidelines during this planning effort:

- Develop a safe, attractive, and efficient aviation facility in accordance with applicable federal, state, and local regulations
- Preserve and protect public and private investments in existing airport facilities
- Provide a means for the airport to grow, as dictated by demand
- Establish a plan to ensure the long-term viability of the airport and promote compatible land uses surrounding the airport
- Develop a facility that is responsive to the changing needs of all aviation users
- Reflect and support the long-term planning efforts that are currently applicable to the region
- Develop a facility with a focus on self-sufficiency in both operational and developmental cost recovery
- Ensure that future development is environmentally compatible

NO-ACTION/NON-DEVELOPMENT ALTERNATIVES

The Village of East Troy is charged with managing the airport for the economic betterment of the community and region. In some cases, alternatives may include a no-action option; however, for 57C, this would effectively reduce the quality of services being provided to the public, affect the aviation facility's ability to meet FAA design standards, and impact the region's ability to support aviation needs. The ramifications of a no-action alternative extend into impacts on the economic well-being of the region. If facilities are not maintained and improved so the airport can provide a pleasant experience for the visitor or business traveler, or if delays become unacceptable, then activity and business may shift elsewhere. The no-action alternative is also inconsistent with the primary long-term goal of the FAA and the BOA, which is to enhance local and interstate commerce. Additionally, the acceptance and use of state and federal grants carries an obligation called grant assurances, which requires the Village of East Troy to maintain and allow for the improvement of 57C as needed to serve local and regional demand. Other significant considerations are previous investments and outstanding contractual agreements with all airport tenants and users. Not continuing active management and development of the airport would require the city to breach these obligations and could result in associated legal actions; therefore, a no-action alternative is not considered further in this master plan.

This study will not consider the relocation of services to another airport or the development of a new airport site. The development of a new facility like 57C is a very complex and expensive option. A new site would require greater land area, duplication of investment in facilities, installation of supporting infrastructure that is already available at the existing site, and greater potential for negative impacts to natural, biological, and cultural resources.

The purpose of this study is to examine aviation needs at 57C over the course of the next 20 years. As such, this master plan will examine the needs of the existing airport and will present a program of necessary capital improvement projects to cover the scope of the plan. The airport is a lucrative business, transportation utility, and economic asset for the region. It can accommodate existing and future demand and should be developed accordingly to support the interests of the residents and local businesses that rely upon it. Ultimately, the final decision regarding pursuing development rests with the Village of East Troy, the FAA, and the BOA on an individual project basis. The following analysis considers airside and landside development alternatives that consider an array of facility demands, including safety, capacity, access, and efficiency.

REVIEW OF PREVIOUS AIRPORT PLANS

Although the airport has not gone through an official master planning process historically, the airport does have an airport layout plan (ALP) drawing set, which was completed in 1998. More recently, the ALP was updated with a pen and ink revision in 2001. The 2001 ALP is shown on **Exhibit 4A**. The ALP provides information regarding existing and ultimate conditions at 57C, including:

- Airport data related to airport category, airport reference code (ARC), elevation, wind conditions, temperature, and navigational aids located at the airport; and

- Runway data related to the critical design aircraft, safety areas, markings, lighting, and visual and navigational aids associated with the runway and taxiway system.

Additionally, the drawing graphically depicts both airside and landside recommendations based on previous airport planning efforts, including:

- Extending Taxiway A and Runway 8-26 to an ultimate length of 4,500 feet;
- Paving Runway 18-36;
- Constructing a parallel taxiway serving Runway 18-36;
- Acquiring property for approach protection; and
- Constructing landside facilities (aprons/taxilanes/hangars) on the north and south sides of Runway 8-26.

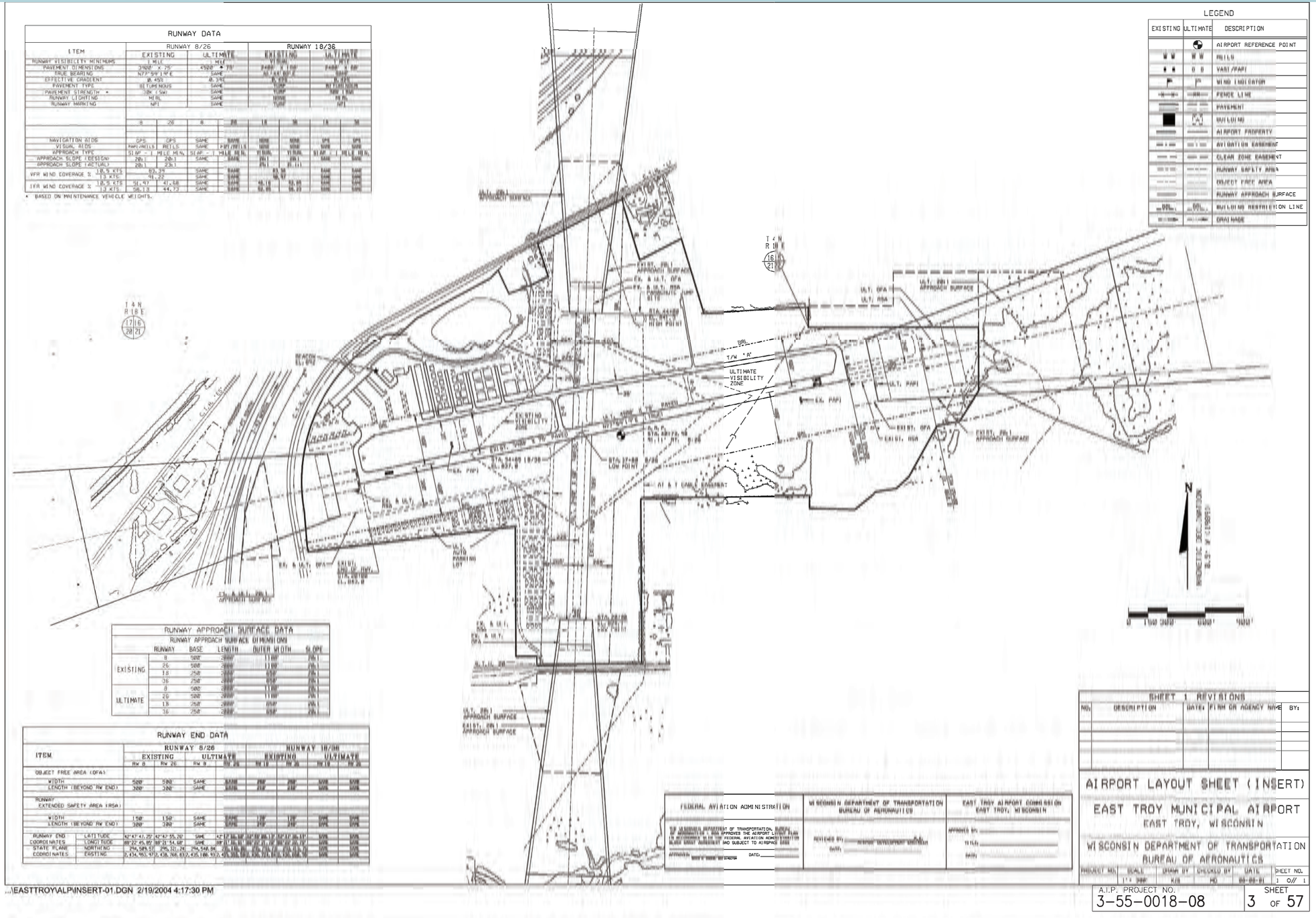
The analysis presented in this chapter will revisit the recommendations presented on the ALP. Since the completion of the last ALP, the FAA has made modifications to design standards, as outlined in the previous chapter. As such, some of the previous plan's elements may be carried over to this master plan, while others may be changed or removed from further consideration.

AIRSIDE ALTERNATIVES

As previously detailed, the development alternatives are categorized into two functional areas: airside and landside. Airside considerations relate to runways, taxiways, navigational aids, lighting and marking aids, etc., and require the commitment of an extensive land area to meet the physical layout of the airport and the required airfield safety standards. The design of the airfield also defines minimum setback distances from the runway and object clearance standards. These criteria are established first to ensure that the fundamental operational needs of the airport are met. Landside considerations include hangars, aircraft parking aprons, and terminal services, as well as the potential utilization of property to provide revenue support for the airport and to benefit the economic development and well-being of the surrounding area.

Exhibit 4B presents the airside and landside alternative considerations that will be specifically addressed in this analysis. These initial concepts stem from the findings of the aviation demand forecasts and facility requirements evaluations, as well as input from the PAC, the Village of East Troy, and the public.

The remainder of this chapter will describe various development alternatives for airside and landside facilities. Although each airfield component is treated separately in this chapter, the final master plan will integrate all these individual requirements so that they complement one another.


RUNWAY DATA
RUNWAY APPROACH SURFACE DATA
RUNWAY END DATA
LEGEND
AIRPORT LAYOUT SHEET (INSERT)
EAST TROY MUNICIPAL AIRPORT
EAST TROY, WISCONSIN
WISCONSIN DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS
FEDERAL AVIATION ADMINISTRATION
WISCONSIN DEPARTMENT OF TRANSPORTATION BUREAU OF AERONAUTICS
EAST TROY AIRPORT COMMISSION EAST TROY, WISCONSIN
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AIRSIDE CONSIDERATIONS

- Evaluate improvements necessary to meet the appropriate existing and ultimate Federal Aviation Administration (FAA) design standards.
- Examine a potential runway extension on Runway 8-26.
- Analyze options to mitigate incompatible land uses within the runway protection zones (RPZs).
- Consider increased runway pavement strength on Runway 8-26 and paving Runway 18-36.
- Evaluate the potential for improved instrument approach minimums.
- Evaluate the taxiway system in meeting airfield safety, design, and geometry standards.
- Upgrade airport signage to include runway distance remaining signs and upgrade visual approach aids.

LANDSIDE CONSIDERATIONS

- Determine efficient land uses that allow the airport to meet the needs of aviation users and promote non-aviation uses where possible.
- Identify locations for hangar development and additional aircraft apron area to meet projected demand.
- Consider options for expanded or additional general aviation terminal facilities.
- Evaluate options to construct support facilities such as perimeter fencing, access gates and potential for additional fuel storage needed for aviation activities.
- Examine options for vehicle parking access while best segregating aircraft and vehicle traffic on airport movement areas.

AIRSIDE CONSIDERATIONS

This section identifies and evaluates various airside development factors at 57C to meet the requirements set forth in Chapter Three. Airside facilities are, by nature, the focal point of an airport facility. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs often serve as the most critical factor in the determination of viable development options.

AIRPORT DESIGN CRITERIA

Applicable standards for airport design are outlined in FAA Advisory Circular (AC) 150/5300-13B Change 1, *Airport Design*. The design of airfield facilities is primarily based on the physical and operational characteristics of the aircraft using the airport. As discussed in Chapter Two, an RDC is applied to each runway at an airport to identify the appropriate design standards for the runway and its associated taxiway system. The RDC is comprised of the aircraft approach category (AAC), the airplane design group (ADG), and the approach visibility minimums expressed in runway visual range (RVR) values, which relates to the maximum size and top speed of aircraft that regularly operate at the airport. The FAA has historically defined regular use as at least 500 annual operations at the airport. While this standard can sometimes be represented by one specific make and model of aircraft, most of the runway's RDC values are represented by several different aircraft that, collectively, operate frequently at the airport.

As a local general aviation airport in the FAA's *National Plan of Integrated Airport Systems* (NPIAS), 57C should be capable of safely accommodating the needs of recreational, instructional, and public safety uses, as well as charter and military aviation uses on a more limited basis. Analysis in Chapter Two indicated that the RDC for Runway 8-26 is currently B-II(S)-5000, while the RDC for Runway 18-36 is A-I(S)-VIS. The airfield should continue to be planned with the most demanding piston- and turbine-powered aircraft utilizing the airport in mind and should account for a potential increase in business jet activity to the greatest extent possible, as demand dictates. As such, alternative analyses associated with runway length and the possibility of improved instrument approach visibility minimums will be considered. Design considerations for Runway 8-26 will be presented under ultimate RDC B-II-5000 standards, while considerations for Runway 18-36 will be presented under RDC A-I(S)-VIS standards.

OBJECTS AFFECTING NAVIGABLE AIRSPACE – TITLE 14 CFR PART 77

Title 14 Code of Federal Regulations (CFR) Part 77 establishes standards for determining obstructions in navigable airspace. It sets forth requirements for the construction and alteration of structures (i.e., buildings, towers, etc.). This federal regulation also provides for studies of obstructions to determine their effect on the safe and efficient use of airspace, public hearings regarding these obstructions, and the creation of antenna or wind farm areas. It also establishes methods of identifying surfaces that must be free from penetration by obstructions (including buildings, cranes, cell towers, etc.) in the vicinity of an airport. This regulation is predominately focused on airspace-related issues. Implementation and enforcement of the elements contained in this regulation are a cooperative effort between the FAA and individual state aviation agencies or individual airports. The imaginary surfaces defined in 14 CFR Part 77

include the primary surface, transitional surface, approach surface, horizontal surface, and the conical surface. As part of the 57C airport master plan update, a detailed obstruction analysis is being conducted for inclusion in the ALP drawing set. The ALP is the culmination of the airport master plan update and depicts the ultimate layout for the airport over the next 20 years or more.

BUILDING RESTRICTION LINE (BRL)

The BRL identifies suitable building area locations on the existing and proposed airport property. The BRL encompasses the runway protection zones (RPZs), the runway object free area (ROFA), navigational aid critical areas, areas required for terminal instrument procedures, and other areas necessary for meeting airport line-of-sight criteria.

Two primary factors contribute to the determination of the BRL: the type of runway (utility or other-than-utility) and the capability of the instrument approaches. Under the ultimate condition, Runway 8-26 is an other-than-utility (serving large aircraft over 12,500 pounds) non-precision instrument runway with visibility minimums not lower than 1-mile, while Runway 18-36 is a utility runway (serving aircraft less than 12,500 pounds) with visual approaches.

The BRL is the product of 14 CFR Part 77 transitional surface clearance requirements. These requirements stipulate that no object be located in the primary surface, which is defined as being 500 feet wide for other-than-utility runways with instrument approach minimums greater than ¾-mile, and 250-feet wide for utility runways with visual approaches. From the primary surface, the transitional surface extends outward at a slope of one vertical foot to every seven horizontal feet. For Runway 8-26, the 20-foot BRL is based upon a 500-foot-wide primary surface (250 feet on either side of the runway) set at 390 feet from the runway centerline. For Runway 18-36, the 20-foot BRL is based upon a 250-foot-wide primary surface (125 feet on either side of the runway) and set at 265 feet from the runway centerline. The BRL has been depicted at 57C for all landside development alternatives to be considered.

RUNWAY LENGTH

The runway length analysis in the previous chapter concluded that the existing length of Runway 8-26 (3,900 feet) is capable of safely accommodating up to 100 percent of small aircraft (less than 12,500 pounds) with fewer than 10 passenger seats; however, to accommodate 100 percent of small aircraft with 10 or more passenger seats, 4,200 feet of runway length is recommended.

The analysis concluded that Runway 8-26's current length of 3,900 feet is adequate for some business jet and turboprop aircraft for takeoffs up to 80 percent useful load. Few of the aircraft analyzed are able to operate at 90 or 100 percent useful load. During hot summer periods, most business jet and turboprop aircraft must depart from 57C with restricted payloads (less fuel/freight; fewer passengers), which can limit nonstop destination distances. Furthermore, when considering wet runway conditions, the landing length requirements of several business jets analyzed in Chapter Three often exceed the current runway

length. Of the aircraft analyzed, only the King Air 350 and Citation Sovereign can conduct landing operations with wet runway conditions while operating under Part 25, and the King Air 350 is the only aircraft able to conduct an operation under the 80 percent rule in wet runway conditions.

The facility requirements concluded that additional length on the primary runway may become necessary in the future, depending on how the business jet aircraft fleet mix changes and grows. For these reasons, the alternatives to follow consider extension options to the runway so that the airport is prepared in the future, should demand for an extension materialize. At a minimum, planning for runway extensions allows the Village of East Troy to develop land use and zoning policies that limit the potential for encroaching developments that would restrict future airport expansion. As discussed in Chapter Three, a runway length of 5,400 feet can accommodate 75 percent of the business jet fleet operating at 60 percent useful load. Additionally, a runway of this length could accommodate the King Air 350 for takeoff operations at 100 percent useful load under design day conditions and landing operations with a contaminated runway under the 60 percent rule. As such, analysis in this chapter will examine the potential impacts of an extension to Runway 8-26 up to a maximum of 5,400 feet, while considering the appropriate safety design standards.

Given that the turf crosswind Runway 18-36 is designed to accommodate A-I(S) aircraft only, the existing runway length is planned to be maintained.

TAXIWAY CONFIGURATION

The taxiway system at 57C primarily meets the recommended design and geometry standards set forth by the FAA; however, there are existing non-standard taxiway geometry conditions that need to be addressed:

- The midfield Taxiways A and B cross within the high-energy area of Runway 8-26;
- Taxiway B provides direct access to Runway 8-26 as it connects to the Runway 8 threshold; and
- The midfield Taxiway B entry/exit is acutely angled to Runway 8-26.

These conditions will be addressed in the following airside alternatives as they introduce various hazards and can lead to pilots inadvertently taxiing onto the runway, causing runway incursions and other potentially dangerous airfield safety concerns.

ANCILLARY IMPROVEMENTS

Runway Strength | An important feature of airfield pavement is its ability to withstand repeated use by aircraft. The strength rating of a runway does not preclude aircraft weighing more than the published strength rating from using the runway. Runway strength is based on design parameters that support a high volume of aircraft at or below the published weight, allowing the pavement to survive its intended useful life. The current pavement strength for Runway 8-26 is reported as 12,000 pounds single wheel loading (S). Given the number of turboprop and jet aircraft currently operating and forecast to operate

at 57C, future planning should consider increasing the pavement strength rating to 30,000 pounds S and 60,000 pounds dual wheel loading (D).

Visual Approach Aids | Runways 8 and 26 are currently equipped with two-box precision approach path indicators (PAPI-2s). Generally, four-box precision approach path indicators (PAPI-4s) are recommended for runways that are used by jet and turboprop aircraft; therefore, consideration should be given to upgrading the PAPI-2 systems to PAPI-4 systems.

Improved Instrument Approach Minimums | The instrument approach capabilities at an airport are an important consideration that directly impacts the utility of the airport, with lower visibility minimums increasing the utility of an airport. From an economic development standpoint, it is important to achieve the lowest possible visibility minimums. The best approach minimums possible will prevent aircraft from having to divert to another airport, which can create additional operating costs and time delays for aircraft operators as well as on-airport businesses. 57C is currently served by one-mile instrument approach minimums serving Runway 8-26.

Instrument approach capabilities are directly correlated with critical safety areas serving the runway environment as well as imaginary surfaces defined in 14 CFR Part 77, previously discussed. The most restrictive Part 77 imaginary surface is the primary surface, which extends 200 feet beyond the end of paved runways and maintains the same elevation of the nearest point along the runway centerline. The existing primary surface serving Runway 8-26 is 500 feet wide and centered upon the runway. If instrument approach capabilities serving Runway 8-26 were improved to ¾-mile, the width of the primary surface would increase to 1,000 feet wide. Such a change would require much of the existing landside development to be cleared of the primary surface and would severely limit and impact future airfield development. As such, airside alternatives to follow will be considered with instrument approach minimums of not lower than one-mile.

Airfield Signage | Airfield identification signs are lighted signs installed on the runway and taxiway system on the airfield. These assist a pilot in identifying their location on the airfield and directing them to their desired location. The signage system includes runway and taxiway designation, holding position, routing/directional, and runway exit signs. All existing signs should be maintained throughout the planning period. At present, there are no distance remaining signs serving 57C; at a minimum, consideration should be given to the addition of distance remaining signage on Runway 8-26. Airfield signage should be expanded or upgraded as airfield improvements are made.

AIRSIDE ALTERNATIVES

Three airfield alternatives have been prepared to address the airfield components outlined above. The details of each alternative are described below, along with the alternative's associated advantages and disadvantages. **It should be noted that all airside alternatives involving changes to existing runway ends are pending survey analysis. Any selected alternative may need to adjusted depending upon survey results.**

AIRSIDE ALTERNATIVE 1

Depicted on **Exhibit 4C**, Airside Alternative 1 considers improvements to the airfield to increase the current runway length, while meeting critical safety area design standards for RDC B-II-5000 on Runway 8-26. In addition, this alternative explores options to mitigate the existing direct access from Taxiway B as it connects to Runway 8, as well as realign the acute angled Taxiway B midfield connector and what could be considered a runway crossing through the high-energy area. This alternative maintains Runway 18-36 in its existing condition.

Runway 8-26 | A 300-foot extension to the east end of Runway 8-26 results in a length of 4,200 feet. A runway of this length would allow the ultimate critical aircraft (Beechcraft King Air 350) to take off at 100 percent maximum takeoff weight (MTOW) during the hottest periods of the summer and would satisfy runway length requirements to accommodate 100 percent of the small aircraft fleet with 10 or more passenger seats. Additionally, a runway of this length would allow the ultimate critical aircraft to perform landing operations under 14 CFR Part 25 and 91k with wet or contaminated runway conditions. Primary impacts associated with a runway extension of 300 feet on the Runway 26 end would include shifting the RPZ serving Runway 26 further to the east beyond the existing airport property boundary, encompassing approximately 7.9 acres of uncontrolled property. The existing RPZ serving Runway 8 will remain in its existing location, encompassing approximately 11.1 acres of uncontrolled property, as well as portions of Interstate 43 and County Highway L. However, this alternative does consider the removal and/or relocation of public use land (volleyball courts and picnic tables) currently located in the north-west corner of the Runway 8 RPZ. The proposed improvements to the runway would involve numerous connected projects, including:

- Extension of Taxiway A;
- Relocation of the runway end identifier lights (REILs) and precision approach path indicator (PAPI) system serving Runway 26;
- Acquisition (fee simple/easement) of approximately 7.9 acres of private, uncontrolled property within the ultimate Runway 26 RPZ;
- Removal and relocation of public land use within Runway 8 RPZ; and
- Mitigation of overgrown vegetation and gradient incompatibilities associated with the RSA, ROFA, and ROFZ.

Further analysis will be required at the time of construction of a runway extension.

Taxiway Geometry Improvements | This alternative considers the removal and relocation of Taxiway B as it connects to Runway 8. This would remove the existing (and unsafe) direct access provided from the aircraft storage hangars on the south side of the runway, and ultimately to the Runway 8 threshold. Additionally, the Taxiway B midfield connector is also removed and realigned to connect with Runway 8-26 at 90 degrees, thereby eliminating the acute angle Taxiway B midfield connection and what could be considered a runway crossing through the high-energy area. Furthermore, this alternative considers the removal of a small aircraft parking area located on the south side of the T-hangar nearest to Taxiway A, which obstructs the taxiway object free area (TOFA) of Taxiway A.

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Runway Design Code
Runway 8-26: B-II-5000
Runway 18-36: A-I(S)-VIS

NOTE: ALL RUNWAY ALTERNATIVES ARE PENDING SURVEY ANALYSIS. ANY SELECTED ALTERNATIVES MAY NEED TO BE ADJUSTED PENDING SURVEY RESULTS.

LEGEND

- Airport Property Line
- A — Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- High-Energy Area
- Runway Visibility Zone (RVZ)
- Uncontrolled RPZ
- AWOS Critical Area
- To be Removed
- ADG II TOFA (124')
- Ultimate Pavement

*Acreages are approximate.

4.3 Acres
L
43
St Peters Rd
Main St
Aircraft parking area to be removed
Public Use Land to be Removed/Relocated
11.1 Acres
A
A1
A
Runway 8-26 (3,900' x 75') (Ultimate 4,200' x 75')
240'
26
7.9 Acres
B
Turf Runway 18-36 (2,446' x 75')
300' Runway Extension
500'
20
43
Potential Industrial Development
7.5 Acres
20
Taxiway A TOFA Incompatibility Mitigation
124'
1"=200'
N
0
600
SCALE IN FEET
Photo: Martinez Geospatial 5/27/2024

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AIRSIDE ALTERNATIVE 2

As shown on **Exhibit 4D**, Airside Alternative 2 also considers improvements to the airfield to increase the current runway length, while meeting critical safety area design standards for RDC B-II-5000 on Runway 8-26. This alternative also explores additional taxiway layouts in an effort to create more efficient traffic flow while mitigating taxiway geometry deficiencies identified. Runway 18-36 is maintained in its existing condition under this scenario.

Runway 8-26 | A 600-foot extension to Runway 8-26 results in a length of 4,500 feet, which would satisfy the ultimate critical aircraft requirement for takeoff operations at 100 percent useful load, and landing operations under 14 CFR Part 25 or 91k with a wet or contaminated runway. This length would also increase the runway's overall utility for other business jets and turboprop aircraft. As such, this alternative considers a 600-foot runway extension to the east, and the necessary improvements to meet ultimate RDC B-II-5000 design standards. By extending the runway in this manner, the ROFA and RPZ serving Runway 26 would extend beyond the existing airport property boundary and encompass approximately 9.8 acres of property, which would need to be acquired in fee for the ROFA, while the RPZ could be acquired through avigation easement or fee simple acquisition. To meet ultimate RDC B-II-5000 design standards, consideration is given to the implementation of a threshold displacement on Runway 8, as well as declared distances to mitigate safety area deficiencies to the ultimate RPZ beyond the west end of the runway, which includes a public land use. Additionally, the implementation of declared distances would reduce the section of Interstate 43 currently encompassed by the Runway 8 RPZ.

Declared distances are used to define the effective runway length for landing and takeoff when a standard RSA/ROFA cannot be achieved or an RPZ needs to be relocated. The four declared distances are:

- **Takeoff Run Available (TORA) –** The runway length declared available and suitable for the ground run of an aircraft taking off (factors in the positioning of the departure RPZ).

- **Takeoff Distance Available (TODA) –** The TORA plus the length of any remaining runway or clearway beyond the far end of the TORA. The full length of the TODA may need to be reduced because of obstacles in the departure area.

- **Accelerate-Stop Distance Available (ASDA) –** The runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff (factors in the RSA/ROFA length beyond the runway end).

- **Landing Distance Available (LDA) –** The runway length declared available and suitable for landing an aircraft (factors in the RSA/ROFA length beyond the runway end and positioning of the approach RPZ).

The declared distances pertaining to the RSA and ROFA are the ASDA and LDA, while the TORA and LDA relate to the RPZs. The runway extension and declared distances presented in Alternative 2 reduce the LDA for Runway 8 and the TORA for Runway 26. The application of declared distances places the Runway 8 RPZ 200-feet closer to the runway end, which minimizes impacts to off-airport property. As such, the existing uncontrolled acreage amount and impacts to roadways (Interstate 43 and County Highway L) are reduced under this alternative, amounting to 8.5 total acres of uncontrolled property. Additionally, the RPZ is located in a manner that no longer encompasses the existing public use land. The resulting declared distances for this alternative are presented in **Table 4A**. The proposed improvements to the runway would involve several connected projects (listed below). Additionally, this alternative considers several other airfield improvements, including:

TABLE 4A| Airside Alternative 2 – Declared Distances

Runway 8-26 Declared Distances	8	26
Takeoff Run Available (TORA)	4,500'	4,300'
Takeoff Distance Available (TODA)	4,500'	4,500'
Accelerate-Stop Distance Available (ASDA)	4,500'	4,500'
Landing Distance Available (LDA)	4,300'	4,500'

Source: Coffman Associates analysis, April 2024.

- Extension of Taxiway A;
- Relocation of the REILs and PAPI system currently serving Runway 26;
- Acquisition of approximately 9.8 acres of uncontrolled property within the ultimate Runway 26 RPZ; and
- Mitigation of overgrown vegetation and gradient incompatibilities associated with the RSA, ROFA, and ROFZ.

Further analysis will be required at the time of construction of a runway extension.

Taxiway Geometry Improvements | To mitigate the existing (and unsafe) direct access provided by Taxiway B from the southern aircraft storage area to Runway 8, this alternative considers the construction of a partial parallel taxiway with a 240-foot runway to taxiway centerline separation on the south side of Runway 8-26. Ultimately, this would allow the existing Taxiway B to function as a taxilane serving the southern hangars. The partial parallel taxiway could be constructed in a manner that eliminates the direct access provided to the Runway 8 threshold and the acute angled Taxiway B midfield connector.

Additionally, this alternative considers the construction of an apron area along the western portion of Taxiway A. In doing so, Taxiway A could be re-routed to maintain a runway to taxiway centerline separation of 240 feet, thereby clearing the Taxiway A TOFA of the aircraft parking area located on the south side of the T-Hangar. Furthermore, the existing no-taxi island could be paved, ultimately providing more apron area.

AIRSIDE ALTERNATIVE 3

Airside Alternative 3, shown on **Exhibit 4E**, examines potential options to meet critical safety area design standards for RDC B-II-5000, while maximizing the usable runway length on Runway 8-26. A runway extension to an ultimate length of 5,400-feet is considered, which would accommodate the ultimate critical aircraft for both takeoff at 100 percent useful load and landing operations under 14 CFR Part 139

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Runway Design Code
Runway 8-26: B-II-5000
Runway 18-36 : A-I(S)-VIS

NOTE: ALL RUNWAY ALTERNATIVES ARE PENDING SURVEY ANALYSIS. ANY SELECTED ALTERNATIVES MAY NEED TO BE ADJUSTED PENDING SURVEY RESULTS.

LEGEND

- Airport Property Line
- A — Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- High-Energy Area
- Runway Visibility Zone (RVZ)
- Uncontrolled RPZ
- AWOS Critical Area
- To be Removed
- Ultimate Pavement

*Acreages are approximate.

St Peters Rd
Main St
43
20
L
4.3 Acres
8.5 Acres
9.8 Acres
7.5 Acres
Re-route Taxiway A
Displace threshold 200'
240′
240′
240′
A
A1
B
Runway 8-26 (3,900′ x 75′) (Ultimate 4,500′ x 75′)
26
Turf Runway 18-36 (2,446′ x 75′)
500′
600' Runway Extension
Potential Industrial Development

Runway 8-26 Declared Distances		
	8	26
Takeoff Runway Available (TORA)	4,500′	4,300′
Takeoff Distance Available (TODA)	4,500′	4,500′
Accelerate-Stop Distance Available(ASDA)	4,500′	4,500′
Landing Distance Available (LDA)	4,300′	4,500′

N
0 600
SCALE IN FEET

Photo: Martinez Geospatial 5/27/2024

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Runway Design Code
Runway 8-26: B-II-5000
Runway 18-36: A-I(S)-VIS

NOTE: ALL RUNWAY ALTERNATIVES ARE PENDING SURVEY ANALYSIS.
ANY SELECTED ALTERNATIVES MAY NEED TO BE ADJUSTED PENDING SURVEY RESULTS.

LEGEND

- Airport Property Line
- A — Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- High-Energy Area
- Runway Visibility Zone (RVZ)
- Uncontrolled RPZ
- AWOS Critical Area
- To be Removed
- Ultimate Pavement
- *Acreages are approximate.

7.5 Acres
L
43
St Peters Rd
Main St
Re-route Taxiway A
Shift Runway 200'
8.5 Acres
A
A1
240'
240'
Runway 8-26 (3,900' x 75') (Ultimate 5,400' x 75')
950' x 60'
240'
26
10.7 Acres
12.7 Acres
1,500' Runway Extension
500'
B
Runway 18-36 (2,950' x 150')
Pave Runway 18-36
20
43
Potential Industrial Development
20
8.1 Acres
N
0
600
SCALE IN FEET
Photo: Martinez Geospatial 5/27/2024

with wet runway conditions. This runway length also satisfies FAA requirements to accommodate 75 percent of the business jet fleet at 60 percent useful load. Additionally, this alternative follows the previous ALP, which proposed paving Runway 18-36. Options are also explored to mitigate the existing (and unsafe) direct access and acute angle taxiway connection provided to Runway 8-26.

Runway 8-26 | This alternative considers shifting the runway 200 feet to the east and extending it 1,500 feet to the east (1,700 feet of new pavement), which results in a total runway length of 5,400 feet. By shifting Runway 8-26 200 feet to the east, impacts to off-airport property to the west could be minimized. As such, the existing uncontrolled acreage amount and impacts to roadways (Interstate 43 and County Highway L) within the Runway 8 RPZ are reduced under this alternative, amounting to 8.5 total acres of uncontrolled property. Additionally, the RPZ is located in a manner that no longer encompasses the existing public use land. Primary impacts associated with a runway extension (total of 1,700 feet) on the Runway 26 end include shifting the RSA, ROFZ, ROFA, and RPZ serving Runway 26 beyond the existing airport property boundary, encompassing a total of 24.4 acres of uncontrolled property. It should be noted that approximately 11.7 acres within the extended Runway 26 RSA, ROFZ, and ROFA would have to be acquired in fee, while approximately 12.7 acres within the extended Runway 26 RPZ could be acquired either in fee or as an easement. The proposed improvements to the runway would involve several connected projects, including:

- Extension of Taxiway A;
- Relocation of the REILs and PAPI systems serving Runway 8-26;
- Acquisition of approximately 24.4 acres of uncontrolled property within the ultimate Runway 8-26 RSA, ROFZ, ROFA, and RPZ; and
- Mitigation of overgrown vegetation and gradient incompatibilities associated with the RSA, ROFA, and ROFZ.

Further analysis will be required at the time of construction of a runway extension.

Runway 18-36 | Airside Alternative 3 considers paving Runway 18-36, which was also considered on the previous ALP. Based upon the current wind coverage of Runway 8-26 (94.11 percent at 10.5 knots), a paved crosswind runway could be justified if local demand warrants. Under the existing and ultimate RDC A-I(S)-VIS standards, a runway length and width of 2,950 feet by 60 feet is considered. It should be noted that the minimum runway length recommended for pavement on Runway 18-36 is 3,300 feet. However, 2,950 feet is the maximum runway length that can be accommodated within the existing airport property boundary. Due to County Highway L and Highway 20, additional property could not readily be acquired without significant investment. This alternative also considers the potential for a full-length parallel taxiway serving the paved Runway 18-36, with a runway to taxiway centerline separation of 150 feet. The proposed improvements to the runway would involve several connected projects, including:

- Construction of a full-length parallel taxiway;
- Implementation of runway and taxiway lighting systems;

- Acquisition of approximately 7.5 and 8.1 acres of uncontrolled property within the ultimate Runway 18-36 RPZs;
- Potential relocation of existing roadways traversing the RPZs; and
- Mitigation of overgrown vegetation and gradient incompatibilities associated with the RSA, ROFA, and ROFZ.

Taxiway Geometry Improvements | To mitigate the existing (and unsafe) direct access provided by Taxiway B from the southern aircraft storage area to Runway 8, this alternative considers the construction of a partial parallel taxiway with a 240-foot runway to taxiway centerline separation on the south side of Runway 8-26. Ultimately, this would allow the existing Taxiway B to function as a taxilane serving the southern hangars. The partial parallel taxiway could be constructed in a manner that eliminates the direct access to the shifted Runway 8 threshold and the acute angled Taxiway B midfield connector.

Additionally, this alternative considers the construction of an apron area along the southern side of the western portion of Taxiway A. In doing so, Taxiway A could be re-routed to maintain a runway to taxiway centerline separation of 240 feet, thereby clearing the Taxiway A TOFA of the aircraft parking area located on the south side of the T-hangar, and allowing additional aircraft parking and storage opportunity along the north side of Taxiway A. Furthermore, the existing no-taxi island could be paved, ultimately providing more apron area.

AIRSIDE SUMMARY

The sections above address three planning alternatives for the airside facilities at 57C. The primary issues to consider on the airfield include addressing non-standard airfield geometry and increasing operational utility at the airport. It is important that the PAC, Village of East Troy, and the public offer their feedback so that the best combination of these alternatives is selected. Following discussion and review with these entities, a preferred recommended airside development concept will be drafted and presented in the next chapter.

LANDSIDE PLANNING CONSIDERATIONS

Generally, landside issues are related to those facilities necessary or desired for the safe and efficient parking and storage of aircraft; the movement of pilots, skydivers, and passengers to and from aircraft; airport support; and overall revenue support functions. Landside planning considerations, summarized previously on **Exhibit 4B**, will focus on strategies that follow a philosophy of separating activity levels. To maximize airport efficiency, it is important to place facilities that are intended to serve similar functions near one another. The best approach to landside facility planning is to treat the development like that of a community, in which land use planning is the guide. For an airport, land use in the terminal area should generally be dictated by aviation activity levels. Due to the amount of developable land available at 57C, some consideration will also be given to non-aviation uses that can provide additional revenue support to the airport and bolster economic development for the Village of East Troy.

Landside planning issues include facility-locating strategies, following a philosophy of separating activity levels; therefore, it is important to plan for an appropriate mix of smaller T-hangars, executive hangars, and larger conventional hangars at 57C.

The orderly development of the airport terminal area – those areas parallel to the runway and along the flight line – can be the most critical (and often the most difficult) development to control on an airport. A development approach of "taking the path of least resistance" can have a significant effect on the long-term viability of an airport. Allowing development to occur without regard to a functional plan can result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of the limited and highly valuable space adjacent to the flight line.

The alternatives presented are not the only options for development. In some cases, a portion of one alternative could be intermixed with another, and some alternative development concepts could be replaced with others. The final recommended plan only serves as a guide for the airport to aid in its strategic planning of available properties. Airport operators often change their plans to meet the needs of specific users. The goal in analyzing landside development alternatives is to define a schematic approach to accommodate appropriate future development so that the airport property can be maximized.

REVENUE SUPPORT LAND USES

Should the amount of land on airport property exceed the space needed for forecast aviation demand, consideration could be given for 57C to utilize portions of its property for indirect or non-aviation purposes. These could include commercial, industrial, or manufacturing development. It should be noted that the airport does not have the approval to use undeveloped property for non-aviation purposes at this time. Specific approval from the FAA will be required to utilize undeveloped airfield property for non-aviation uses. This planning document does not confirm any regulatory approval for non-aviation uses, even if these uses are ultimately included in the master plan and on the ALP. A separate request justifying the use of airport property for non-aviation uses will be required for the approval of the FAA; however, the information contained in this document can be a source for developing that justification.

An environmental determination will also be required. While FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, states that a release of an airport sponsor from federal obligations is normally categorically excluded – and would not typically require an environmental assessment (EA) – the issuance of a categorical exclusion is not an automatic action, and the FAA must determine that no extraordinary circumstances exist at the airport. Extraordinary circumstances would include a potentially significant environmental impact to any of the environmental resources governed by federal law. An EA may be required by the FAA if extraordinary circumstances are identified at 57C. The following generalized land use conditions outline topical subject areas that could present themselves on the airport.

On-Airport Land Use Obligations

The airport has accepted grants for capital improvements from the FAA in the past; as such, the Village of East Troy (airport sponsor) has agreed to certain grant assurances. Grant assurances related to land use guarantee that airport property will be reserved for aeronautical purposes. If the airport sponsor wishes to sell (release) airport land or lease airport land for a non-aeronautical purpose (land use change), the airport sponsor must petition the FAA for approval. The ALP and the airport property map must then be updated to reflect the sale or land use change of the identified property.

Release of Airport Property

A release of airport property would entail the sale of land that is not needed for aeronautical purposes currently or in the future. The following documentation is required to be submitted to the FAA for consideration of a land release:

1. What is requested?
2. What agreement(s) with the United States are involved?
3. Why is the release, modification, reformation, or amendment being requested?
4. What facts and circumstances justify the request?
5. What requirements of state or local law or ordinance should be provided for in the language of an FAA-issued document if the request is consented to or granted?
6. What property or facilities are involved?
7. How was the property acquired or obtained by the airport owner?
8. What is the present condition and what present use is made of any property or facilities involved?
9. What use or disposition will be made of the property or facilities?
10. What is the appraised fair market value of the property or facilities, and what appraisals or other types of evidence are required to establish fair market value?
11. What proceeds are expected from the use or disposition of the property, and what will be done with any net revenues derived?
12. What is the relative advantage or benefit to the airport from the sale or other disposition, compared to retention for rental income?

Each request should have a scaled drawing attached that shows all airport property and facilities that are currently obligated for airport purposes by agreements with the United States. Other exhibits supporting or justifying the request, such as maps, photographs, plans, and appraisal reports, should be attached as appropriate. No areas of East Troy Municipal Airport property are currently planned for release from obligation and/or sale.

Land Use Change

A land use change permits land to be leased for non-aeronautical purposes; it does not authorize the sale of airport land. Leasing airport land to produce revenue via non-aeronautical uses allows the land

to earn revenue for the airport and serve the interests of civil aviation by making the airport as self-sustaining as possible. Airport sponsors may petition for a land use change for the following purposes:

- So that land not needed for aeronautical purposes can be leased to earn revenue from non-aviation uses; this is land that is clearly surplus to the airport's aviation needs
- So that land that cannot be used for aeronautical purposes can be leased to earn revenue from non-aviation uses; this is land that cannot be used by aircraft, or where there are barriers or topography that prevent an aviation use
- So that land not presently needed for aeronautical purposes can be rented on a temporary basis to earn revenue from non-aviation uses

A land use change will not be approved by the FAA if the land has a present or future airport or aviation purpose, meaning the land has a clear aeronautical use. However, if land is not needed for aeronautical purposes until a long-term condition is met, a land use change may be justified and granted for a short- or mid-term use. Ordinarily, land on or in proximity to the flight line and airport operations area is needed for aeronautical purposes and should not be used or planned for non-aviation purposes. The proceeds derived from the land use change must be used exclusively for the benefit of the airport. They may not be used for a non-airport purpose, and they cannot be diverted to the airport sponsor's general fund or for general economic development unrelated to the airport.

Generally, a land use change of airport property will be reviewed on a case-by-case basis at the time the change is necessary; however, the airport land use drawing, which is included as part of the ALP set, shows areas that are likely eligible to be released from obligation.

AVIATION ACTIVITY LEVELS

The aviation development areas should be divided into high, medium, and low activity levels at the airport. The high activity area should be planned and developed to provide aviation services on the airport. Examples of high activity areas are the airport terminal, administration building, and adjoining aircraft parking apron, which provides tiedown locations and circulation for aircraft. In addition, large conventional hangars that are used for fixed base operators (FBOs), corporate aviation departments, or storing a large number of aircraft would be considered high activity use areas. The best location for high activity areas is along the flight line near mid-airfield for ease of access to all areas on the airfield. All major utility infrastructure would need to be provided to these areas.

The medium activity use category defines the next level of airport use and primarily includes smaller corporate aircraft, the owners of which may desire private executive hangar storage on the airport. The best location for medium activity use is off the immediate flight line but still readily accessible to aircraft (including corporate jets). Due to an airport's layout and other existing conditions, if this area is to be located along the flight line, it is best to keep it out of the mid-airfield area of the airport to avoid causing congestion with transient aircraft utilizing the airport. Parking and utilities (such as water and sewer) should also be provided in this area.

The low activity use category defines the area for storage of smaller single- and multi-engine aircraft. Low activity users are personal or small business aircraft owners who prefer individual space in linear box hangars or T-hangars. Low activity areas should be located in less conspicuous areas. This use category will require electricity, but generally does not require high-volume water or sewer utilities.

In addition to the functional compatibility of the aviation development areas, the proposed development concept should provide a first-class appearance for 57C. The airport serves as a vital link to the entire region for both business and recreational visitors. Consideration to building and landscape design, construction, and maintenance should be given high priority in all public areas, as the airport can serve as the first impression a visitor may have of the community.

To allow for maximum development of the airport while continuing to meet mandated safety design standards, it is crucial to devise an airport layout plan that allows for the orderly development of airport facilities. Typically, an airport will reserve property adjacent to the runway system exclusively for aviation-related activity, which allows for the location of taxiways, aprons, and hangars.

HANGAR DEVELOPMENT

Analysis in Chapter Three indicated that the airport should plan for the construction of additional aircraft hangars over the next 20 years. Hangar development can occur in a variety of sizes that correspond with several different intended uses.

Commercial general aviation activities are essential to providing the necessary services on an airport. This includes privately owned businesses involved with (but not limited to) aircraft rental and flight training, aircraft charters, aircraft maintenance, line service, skydiving, and aircraft fueling. These types of operations are commonly referred to as fixed base operators (FBOs) or specialized aviation service operators (SASOs). The facilities associated with such businesses are often large, conventional type hangars that hold several aircraft. High levels of activity often characterize these operations, along with a need for apron space for the storage and circulation of aircraft. These facilities are best placed along ample apron frontage with unobstructed visibility from the runway system for transient aircraft. Utility services and vehicle parking areas are necessary support uses for these types of facilities.

Aircraft hangars used for the storage of smaller aircraft primarily include T-hangars, shade hangars, or linear box hangars. Because storage hangars often experience lower levels of activity, these types of facilities can be located away from the primary apron areas in more remote locations on the airport. Limited utility services are needed for these areas.

Other types of hangar development can include executive hangars for accommodating either one large aircraft or multiple small aircraft. These types of hangars are typically used by corporations with company-owned aircraft, or by an individual or group of individuals with multiple aircraft. These hangar areas normally require all utilities as well as segregated roadway access.

Table 4B summarizes the aircraft hangar types, and the corresponding size and aviation uses that are typically associated with each facility. There is currently approximately 188,200 square feet of hangar space (including maintenance area) provided on airport property, comprised of a combination of the hangar types previously discussed.

TABLE 4B | Aircraft Hangar Types

Hangar Type	Typical Size	Aviation Uses
Conventional	Clear span hangars greater than 10,000 square feet	FBOs, SASOs, and other commercial aviation activities resulting in high activity uses
Executive	Clear span hangars less than 10,000 square feet	SASOs, corporate flight departments, and private aircraft storage resulting in medium to high activity uses
T-Hangar/Linear Box	Individual storage spaces offering 1,200 - 1,500 square feet	Private aircraft storage resulting in low activity uses

FBO = fixed base operator
SASO = specialized aviation service operator

Currently, the primary areas ideal for potential general aviation-related development include the main terminal area along the primary aircraft apron. This area could be redeveloped, and development could be continued on the north and south sides of Runway 8-26, along the west side of Runway 18-36. Given the development potential for these portions of existing airport property, the following alternatives will detail development options for the areas identified.

LANDSIDE ALTERNATIVES

The following section describes a series of landside alternatives as they relate to the considerations detailed above. The alternatives focus on current hangar developments and generalized land use. A generalized land use concept is beneficial because it allows flexibility in site development, enabling it to meet the needs of clients without predetermined layout constraints. Variations of future hangar developments are also presented to help visualize how these facilities could be integrated onto the airport campus or complex.

Three alternatives have been prepared for the landside development area. The existing airport property located near the primary apron area is largely developed. Given the limitations of space caused by existing landside and vehicle access facilities, the focus of the landside alternatives for new development is located on the north and south sides of Runway 8-26, along the west side of Runway 18-36. The alternatives provide potential development plans aimed at meeting the needs of general aviation through the long-term planning period and beyond.

The alternatives presented are not the only reasonable options for development. In some cases, a portion of one alternative could be intermixed with another, and some development concepts could be replaced with others. The overall intent of this exercise is to outline basic development concepts to spur collaboration for a final recommended plan. Even then, the final recommended plan only serves as a guide to aid the Village of East Troy in the strategic planning of airport property. Airport operators often change their plans to meet the needs of their specific users. The goal in analyzing

landside development alternatives is to bring future development into focus so that airport property can be maximized, and aviation activity can be protected.

The existing airport landside infrastructure is located on the west side of the airfield, along the north and south sides of Runway 8-26. Automobile access is provided on the northwest side of the airfield via the Airport Entrance Road, and existing vehicle parking is provided in various locations near the hangar facilities close to the airport entrance. A secondary entrance is provided via South Road, which allows access to the existing hangar development on the south side of Runway 8-26. The existing level of airside and landside access makes this portion of airport property an ideal location for continued airport development. The alternatives analysis presented on **Exhibits 4F, 4G,** and **4H** examines the potential options for continued development primarily along the west side of Runway 18-36.

LANDSIDE DEVELOPMENT ALTERNATIVE 1

Alternative 1, shown on **Exhibit 4F**, presents a potential layout that primarily carries forward a similar development proposed on the current ALP. On the northern side of the development area, 12 45- by 45-foot executive box-style hangars and supporting vehicle access and parking are proposed. These hangars would continue the existing development trend on the north side of Runway 8-26, maximizing hangar development potential on the northwest side of the airfield. Airside access to these hangars could be provided by a partial parallel taxiway serving the northern end of Runway 18-36, and could connect with Taxiway A. The proposed partial parallel taxiway along Runway 18-36 maintains a runway to taxiway centerline separation of 150 feet. This alternative also considers an additional airport access point on the north side of the airport, serving the proposed hangar development. Vehicle access through the proposed northern entrance could be provided through a controlled access gate.

Within existing hangar development, there is minimal opportunity for infill with additional hangar development, so further development is considered on the south side of Runway 8-26, west of Runway 18-36. From north to south, proposed development in this area considers the construction of eight 60- by 60-foot executive box hangars and seven 45- by 45-foot executive box hangars. Each proposed hangar development is served by an aircraft apron, as well as automobile parking and access. Finally, an additional airport access gate is planned on the south side of the airport, providing access from Highway 20. The planned hangar development and airport access is coordinated in a manner that could be compatible with a potential industrial development, as shown.

LANDSIDE DEVELOPMENT ALTERNATIVE 2

As depicted on **Exhibit 4G**, Landside Development Alternative 2 emphasizes additional development near the terminal area, with larger executive-style and T-hangars proposed on both the north and south side of Runway 8-26, and on existing developable airport property along the west side of Runway 18-36. Also included in this alternative is the consideration of nearly one acre of airport property for non-aeronautical land use.

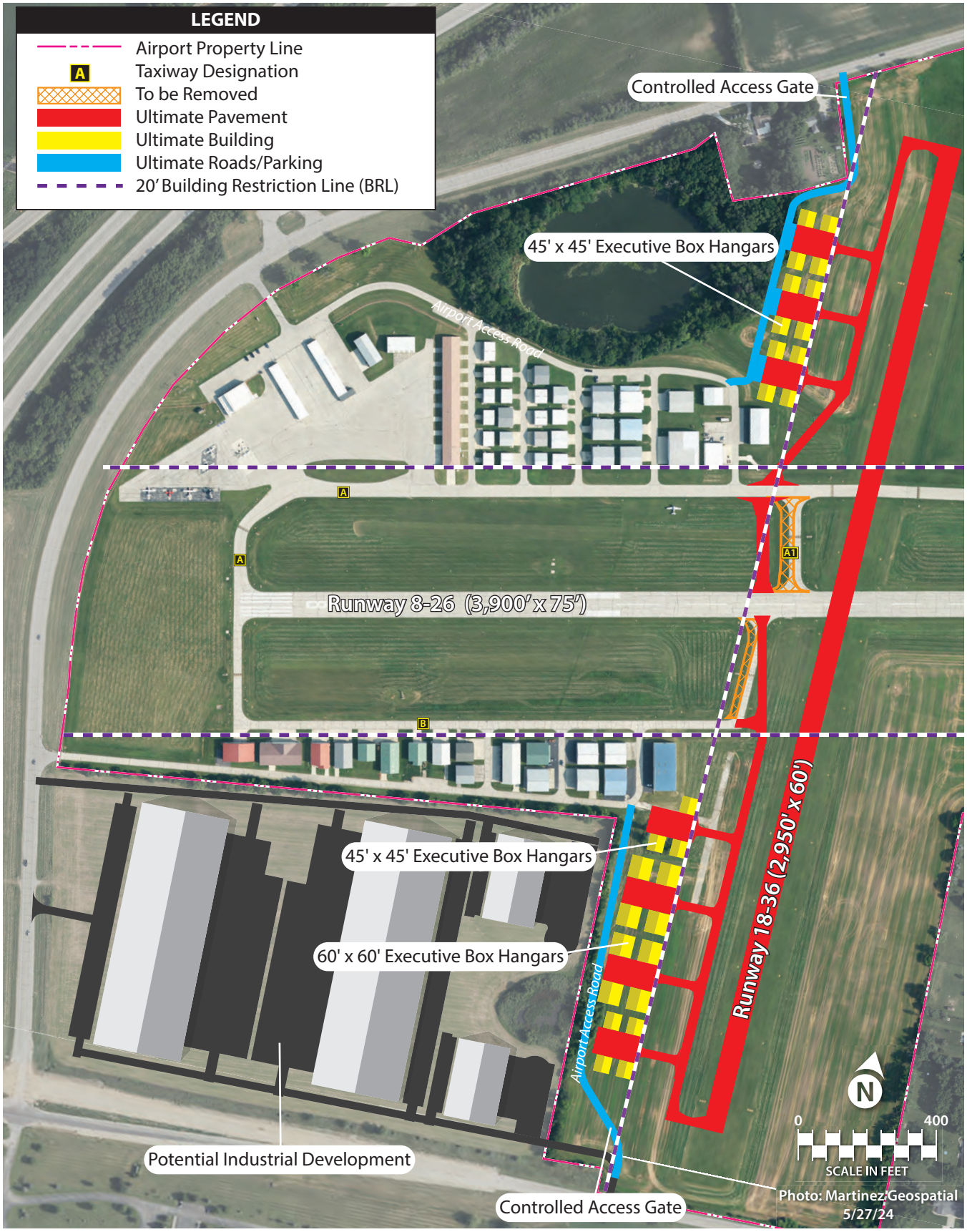


Exhibit 4F
LANDSIDE ALTERNATIVE 1

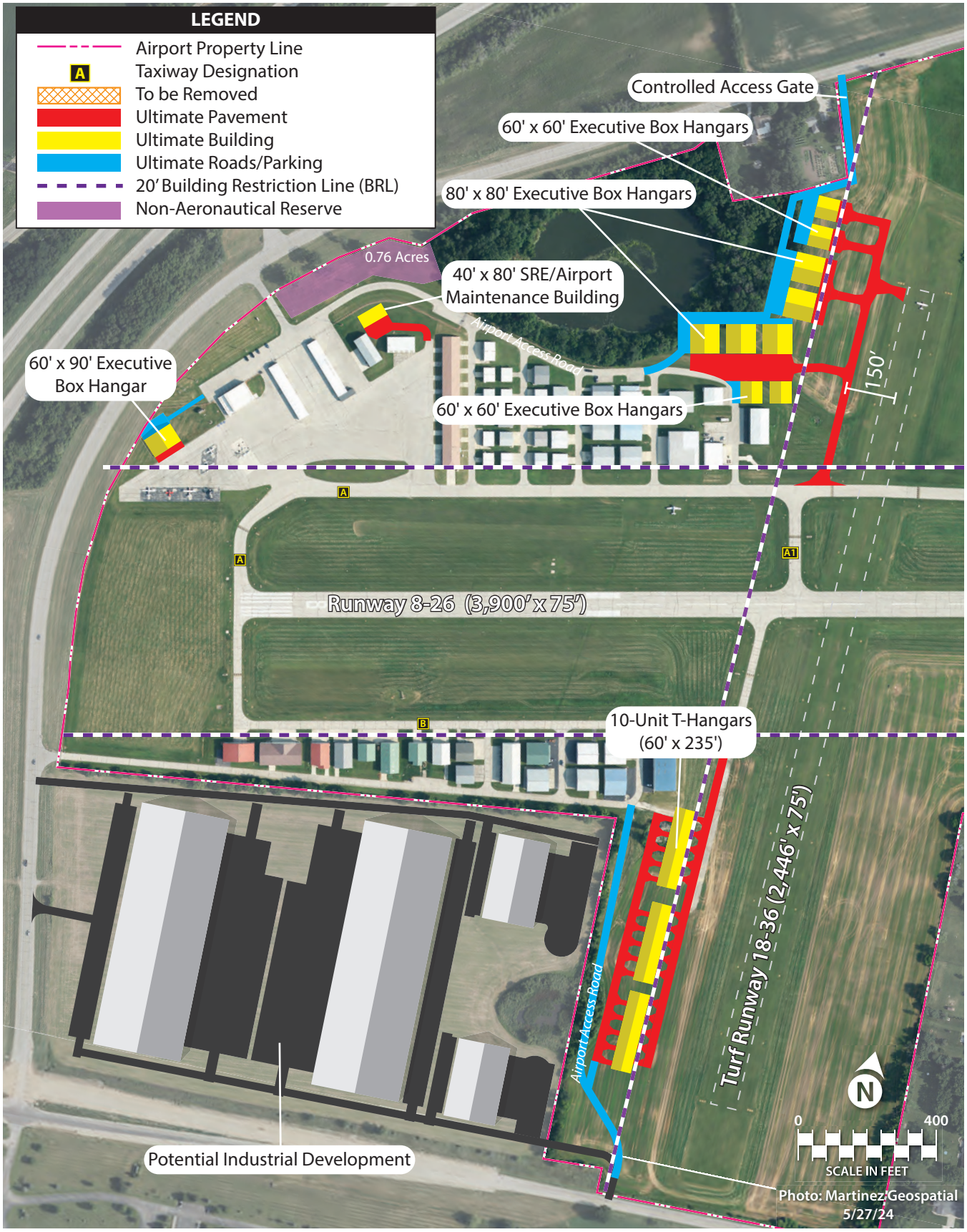


Exhibit 4G
LANDSIDE ALTERNATIVE 2

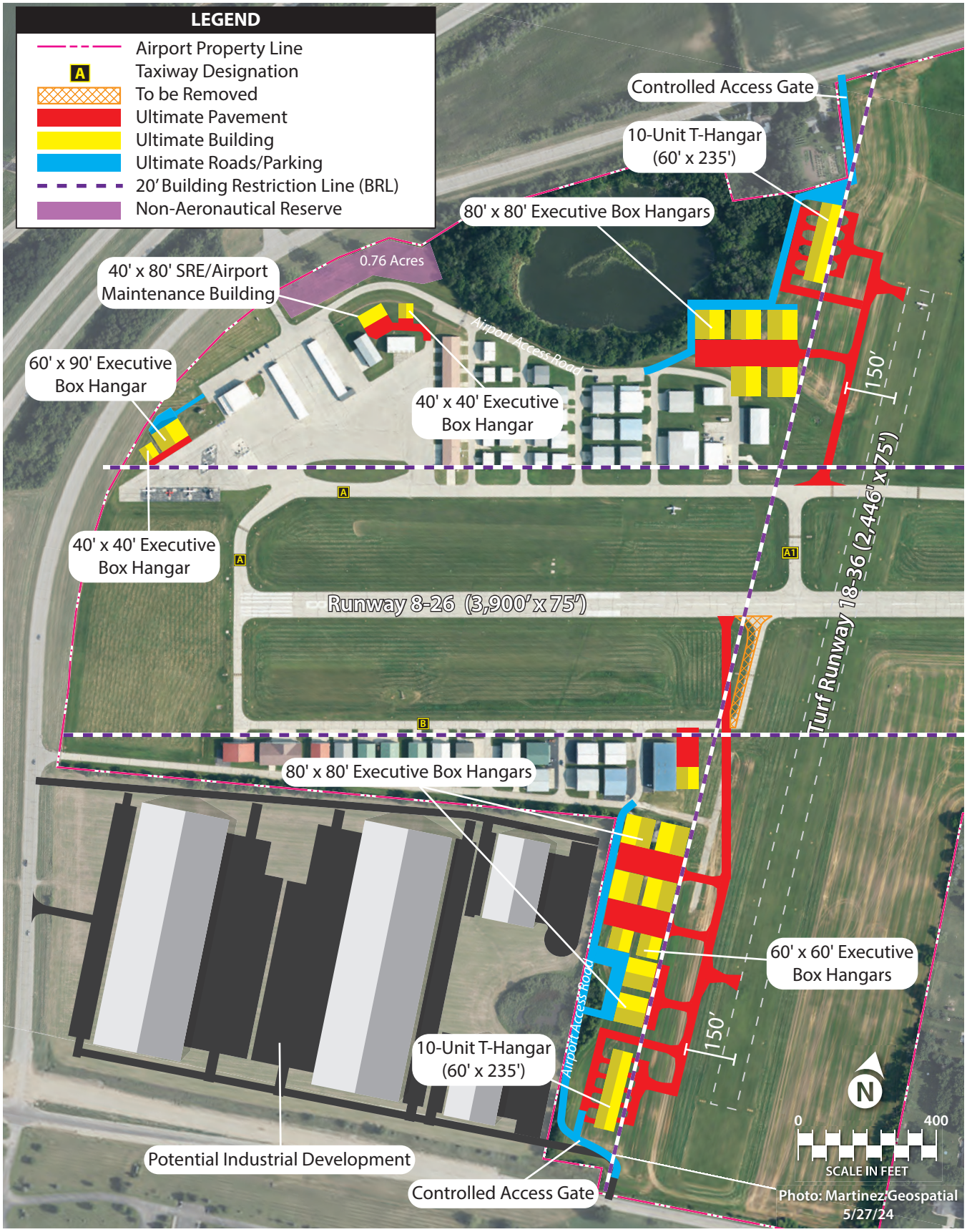


Exhibit 4H
LANDSIDE ALTERNATIVE 3

Beginning on the northwest side of the terminal area, the proposed development includes a 60- by 90-foot executive box hangar located on the existing apron area. Additionally, this alternative considers the construction of a 40- by 80-foot dedicated airport maintenance or snow removal equipment (SRE) building. On the northern side of the proposed SRE building and existing hangar access road, this alternative considers approximately one acre of existing airport property for future non-aeronautical reserve; the plans for its use could be further refined as future demand dictates.

Options to continue development on the north side of Runway 8-26 are also considered. The proposed development directly adjacent to existing hangars and continuing north along Runway 18-36 includes four 60- by 60-foot and five 80- by 80-foot executive box hangars. Supporting aircraft apron areas, and automobile parking and access, are considered near the proposed executive hangars as well. Airside access to these hangars could be provided by a partial parallel taxiway serving Runway 18-36, with a runway to taxiway centerline separation of 150 feet. Similar to Alternative 1, an additional airport access point could be provided on the northern side of the airfield. Access could then be limited via controlled access gates near the proposed entrance.

On the southwest side of the development area, consideration includes the construction of three 10-unit T-hangars. Each proposed hangar development is served by airside access points via taxilane, as well as automobile access from Highway 20, on the south side of the airfield, and is coordinated in a manner that could be compatible with a potential industrial development, as shown.

LANDSIDE DEVELOPMENT ALTERNATIVE 3

The third and final alternative option, presented on **Exhibit 4H**, considers two 40- by 40-foot and one 60- by 90-foot executive box hangars, as well as a 40- by 80-foot airport maintenance or SRE building, located on the northwest side of the existing landside development area. This alternative also considers nearly one acre of existing airport property for future non-aeronautical reserve; the plans for its use could be further refined as future demand dictates.

Continuing development on the north side of Runway 8-26, this alternative includes the development of five 80- by 80-foot executive hangars and one 10-unit T-hangar. Each proposed hangar development is served by supporting apron area and automobile parking and access. An additional airport access point is also considered on the north side of the airfield, and vehicle access could be limited through a controlled gate.

To complete the entirety of this buildout, development on the south side of Runway 8-26 considers three 60- by 60-foot and six 80- by 80-foot executive box hangars, a 10-unit T-hangar, as well as supporting aircraft access and apron areas. Airside access to the proposed development could be provided by a partial parallel taxiway serving Runway 18-36. Additional automobile access is provided through an additional access point extending from Highway 20, controlled by an access gate and coordinated in a manner that could be compatible with a potential industrial development.

LANDSIDE SUMMARY

The landside alternatives presented above are intended to accommodate an array of aviation activities that either currently occur or could be expected to occur at 57C in the next 20 years. There is existing demand for new facilities at 57C, and with a changing fleet mix of aircraft that includes more sophisticated airframes, this document will help the Village of East Troy refine its approach to developing its property in an organized and thoughtful way. Each of the three development options considers a long-term vision that would, in some cases, extend beyond the 20-year scope of this master plan; nevertheless, it is beneficial to provide a long-term vision to make sure the airport will adequately serve the East Troy community for years to come.

SUMMARY

This chapter is intended to present an analysis of various options that may be considered for specific airport elements. The need for alternatives is typically generated by projections of aviation demand growth and/or by the need to resolve non-standard airport conditions. FAA design standards are frequently updated, with the intent of improving the safety and efficiency of aircraft movement on and around airports, which can lead to certain pavement geometries now being classified as non-standard when they previously met such standards.

Several development alternatives related to both the airside and the landside facilities have been presented. For the airside, the major considerations involve correcting non-standard taxiway conditions and extending the length and/or upgrading the RDC of Runway 8-26. For the landside, alternatives were presented that included the previously planned hangar development, but also proposed additional aviation development near the terminal area and the north and south side of Runway 8-26. As the airport's fleet mix transitions to include more jets and turboprops, it will be important to clearly delineate development areas for facilities to accommodate those aircraft. Segregating jet and turboprop traffic from small aircraft operators contributes to operational safety and creates a more organized and efficient airport.

The next step in the master plan update process is to arrive at a recommended development concept. Participation of the PAC and the public will be important to the determination of the ultimate concept. Additional consultation with the FAA and BOA may also be required to ensure improvements are satisfactorily delineated and presented. Once a final development plan is identified, a 20-year airport capital improvement program will be presented, including a list of prioritized projects according to aviation demand and/or necessity. Finally, a financial analysis will be presented to identify potential funding sources and to quantify the Village of East Troy's approximate contribution needed to implement each project. In this manner, the Village of East Troy can adequately program matching funding in its own six-year capital improvement plan.

Chapter Five

Recommended Plan and Land Use Compatibility

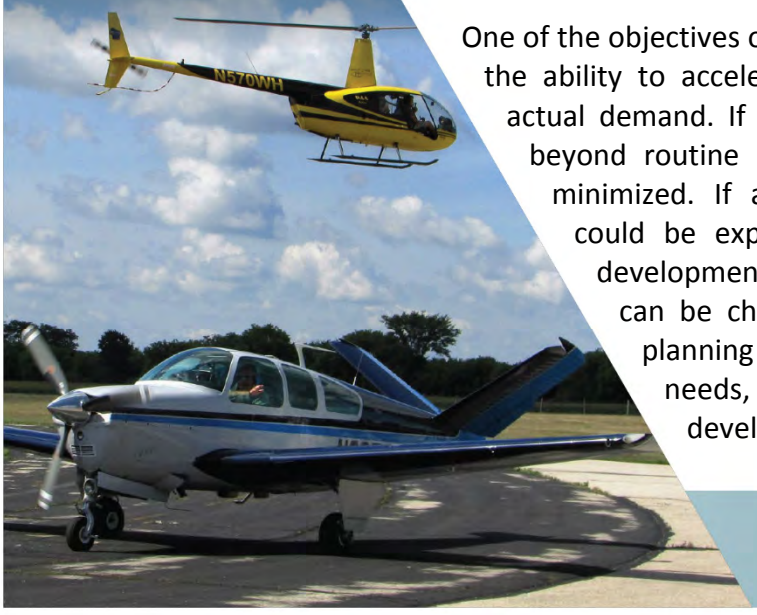
The Village of East Troy

Chapter 5

Recommended Plan and Land Use Compatibility

The preparation of this airport master plan has included technical efforts in the previous chapters that were intended to establish the role of East Troy Municipal Airport (57C), forecast potential aviation demand, establish airside and landside facility needs, and evaluate options for improving the airport to meet those facility needs. The planning process has included the development of draft working papers, which have been presented to the planning advisory committee (PAC). The PAC is comprised of stakeholders/constituents with investments or interests in the airport and surrounding area. This diverse group has provided extremely valuable input into the master plan. Additionally, a series of public information workshops was conducted as part of this planning process to provide interested members of the community with an opportunity to be involved in and educated about the study.

The alternatives that outlined future growth and development scenarios in Chapter Four have been refined into a recommended development concept for the master plan, which is presented in this chapter. An overview of environmental conditions that must be considered when development projects are undertaken is provided later in this chapter.



One of the objectives of the master plan is to allow decision-makers the ability to accelerate or slow development goals based on actual demand. If demand slows, development of the airport beyond routine safety and maintenance projects could be minimized. If aviation demand accelerates, development could be expedited. Any plan can account for limited development, but the lack of a plan for accelerated growth can be challenging; therefore, to ensure flexibility in planning and development to respond to unforeseen needs, the master plan concept considers balanced development potential for 57C.

MASTER PLAN DEVELOPMENT CONCEPT

57C is classified as a local general aviation airport within the Federal Aviation Administration's (FAA) *National Plan of Integrated Airport Systems* (NPIAS). Most of the airport's operations can be attributed to general aviation activities, including business aviation and some air taxi and charter operations that occur at the airport. NPIAS airports are considered important to the national aviation system and are eligible for development grant funding from the FAA. At the state level, the Wisconsin Department of Transportation (WisDOT) Bureau of Aeronautics (BOA) classifies 57C as a large general aviation (GA) airport. The airport's classifications are not anticipated to change because of the recommendations in this master plan, which fully supports the continued and necessary development of the airport to serve a local general aviation role within the NPIAS.

The master plan concept, as shown on **Exhibit 5A**, presents the recommended configuration for 57C, which preserves and enhances the role of the facility while meeting FAA design and safety standards (to the extent practicable). The concept provides for anticipated facility needs over the next 20 years and establishes a vision and direction for meeting facility needs beyond the 20-year planning period of this study. A phased program to achieve the master plan concept is presented in Chapter Six. When assessing development needs, this chapter separates the airport into airside and landside functional areas. The following sections describe the master plan concept in detail.

AIRSIDE DEVELOPMENT CONCEPT

The airside plan generally considers improvements related to the runway and taxiway system and often requires the greatest commitment of land area to meet the physical layout of an airport. Operational activity at 57C is anticipated to grow beyond the 20-year planning horizon of this master plan and the airport is projected to continue to serve the full range of general and business aviation operations, in addition to limited air taxi and charter activities. The principal airfield recommendations should always focus first on safety and security. Of key importance is to ensure proposed airfield improvements are designed to meet all appropriate FAA airport design standards. Recommendations are then designed to improve the operational efficiency, circulation, and capability of the airfield. The major airside issues addressed in the master plan concept include the following:

- Upgrade to ultimate runway design code (RDC) B-II standards on Runway 8-26 and maintain RDC A-I(S) design standards on Runway 18-36.

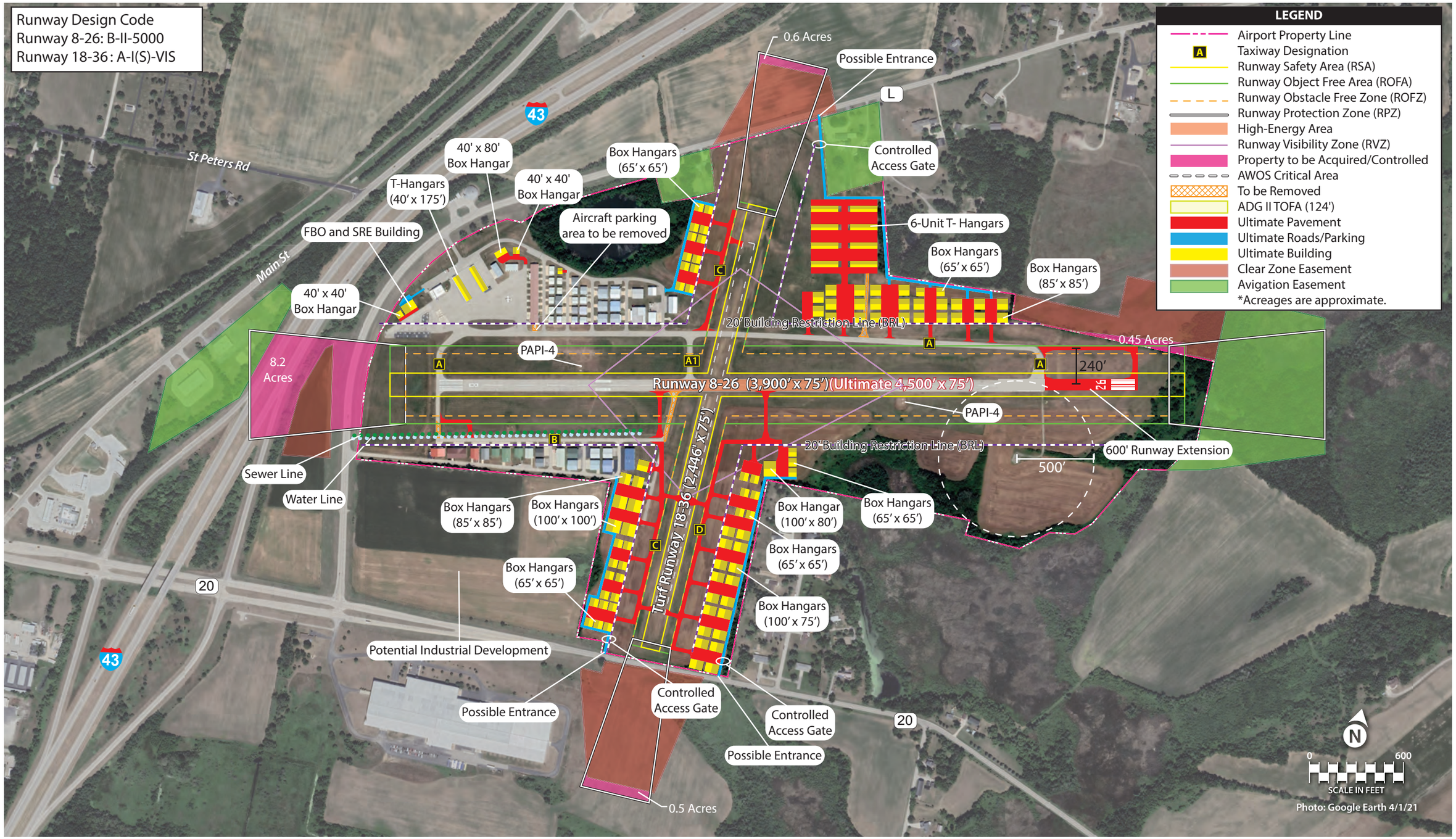
- Consider a runway extension of Runway 8-26 to an ultimate length of 4,500 feet to better accommodate turboprop and business jet operators, pending further justification and coordination with the WisDOT BOA and FAA.

- Address safety area deficiencies on Runway 8-26, which primarily include land acquisition, vegetation obstructions associated with upgrading Runway 8-26 to ultimate RDC B-II standards, and safety area incompatibilities introduced by the runway extension.

- Consider increasing the pavement strength on Runway 8-26 to 30,000 pounds single wheel loading (S) and 60,000 pounds dual wheel loading (D).

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Runway Design Code
Runway 8-26: B-II-5000
Runway 18-36 : A-I(S)-VIS



LEGEND

- Airport Property Line
- Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- High-Energy Area
- Runway Visibility Zone (RVZ)
- Property to be Acquired/Controlled
- AWOS Critical Area
- To be Removed
- ADG II TOFA (124')
- Ultimate Pavement
- Ultimate Roads/Parking
- Ultimate Building
- Clear Zone Easement
- Avigation Easement
- *Acreages are approximate.

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- Consider taxiway geometry enhancements to meet FAA taxiway design standards.
- Enhance visual approach aids serving Runway 8-26 with the installation of four-box precision approach path indicator (PAPI-4) systems and runway distance remaining signage.

RUNWAY DIMENSIONAL STANDARDS

The FAA has established design criteria to define the physical dimensions of the runways and taxiways, as well as the imaginary surfaces surrounding them, which protect the safe operation of aircraft at airports. These design standards also define the criteria for the placement of landside facilities.

As discussed in previous chapters, the design criteria primarily center on an airport's critical design aircraft. The critical design aircraft is the most demanding aircraft or family of aircraft that currently conducts (or is projected to conduct) 500 or more operations (takeoffs or landings) per year at an airport. Factors included in airport design are an aircraft's wingspan, approach speed, and tail height, and (in some cases) the instrument approach visibility minimums for each runway. The FAA has established the RDC to relate these design aircraft factors to airfield design standards. The most restrictive RDC is also considered the overall airport reference code (ARC) for an airport.

Analysis in Chapters Two and Three concluded that the existing RDC for Runway 8-26 is B-II(S). At a length of 3,900 feet, Runway 8-26 can accommodate most general aviation activities, including some small business jets, as well as air taxi and charter activity. Future planning considers numerous upgrades to the runway (to be discussed), as well as upgrading to an ultimate RDC of B-II for Runway 8-26.

The turf crosswind runway, Runway 18-36, is 2,446 feet long and is designed to accommodate lightweight single-engine aircraft. The existing and ultimate Runway 18-36 RDC is A-I(S).

Table 5A provides a summary of the RDCs for each runway based on the master plan concept. In addition to the physical and operational components of an aircraft, the RDC also considers the instrument approach capabilities of a runway, expressed in runway visual range (RVR) values. For Runway 8-26, the existing RVR value of 5000 indicates instrument approach visibility minimums not lower than one mile, which is also maintained under the ultimate condition. The approaches serving Runway 18-36 are planned to remain visual only and are represented by the RVR designation "VIS."

TABLE 5A | Runway Design Standards

	Runway 8-26 (Existing)	Runway 8-26 (Ultimate)	Runway 18-36 (Existing/Ultimate)
Runway Design Code	B-II(S)-5000	B-II-5000	A-I(S)-VIS
Visibility Minimums	1-mile	1-mile	Visual
RUNWAY DESIGN			
Runway Width	75	75	60
Blast Pad Length x Width	150 x 95	150 x 95	60 x 80
RUNWAY PROTECTION			
Runway Safety Area			
Width	150	150	120
Length Beyond Departure End	300	300	240
Length Prior to Threshold	300	300	240

(Continues)

TABLE 5A | Runway Design Standards (continued)

	Runway 8-26 (Existing)	Runway 8-26 (Ultimate)	Runway 18-36 (Existing/Ultimate)
Runway Object Free Area			
Width	500	500	250
Length Beyond Departure End	300	300	240
Length Prior to Threshold	300	300	240
Runway Obstacle Free Zone			
Width	250	400	250
Length Beyond Runway End	200	200	200
Approach Runway Protection Zone			
Runway End	8/26	8/26	18/36
Inner Width	250	500	250
Outer Width	450	700	450
Length	1,000	1,000	1,000
Acres	8.04	13.77	8.04
Departure Runway Protection Zone			
Inner Width	250	500	250
Outer Width	450	700	450
Length	1,000	1,000	1,000
Acres	8.04	13.77	8.04
RUNWAY SEPARATION			
Runway Centerline to:			
Hold Line Position	125	200	125
Parallel Taxiway	240	240	150
Aircraft Parking Apron	250	250	125
Note: All dimensions are in feet unless otherwise noted.			

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

RUNWAY 8-26

Runway 8-26 is 3,900 feet long, 75 feet wide, served by instrument approach visibility minimums not lower than one mile, and oriented in an east-west manner. The existing runway width should be maintained through the long-term planning horizon. The runway's existing pavement strength is 12,000 pounds single wheel loading (S). There is currently no strength rating for dual wheel loading (D) aircraft; however, because the future critical aircraft has a maximum takeoff weight (MTOW) greater than 12,500 pounds and the number of turboprops and jets utilizing the airport is forecasted to increase, the master plan will consider increasing the pavement strength rating to 30,000 pounds S and 60,000 pounds D.

Based on the results of the runway analysis presented in Chapter Three, the length and width of the runway are adequate to accommodate most of the aircraft operating at the airport and the runway is capable of handling 100 percent of small airplanes with fewer than 10 passenger seats; however, additional runway length could benefit operators of larger and faster business jets and turboprops by allowing aircraft to depart with more fuel, which would enable longer stage lengths and increased usable payload. Additional runway length would also improve landing situations for business jets and turboprops operating under Part 91k or Part 135, especially during wet or contaminated runway conditions. As such, the recommended plan includes an extension of ultimate Runway 8-26 by 600 feet to the east, to a planned length of 4,500 feet.

Analysis in Chapter Three indicated that the existing runway safety area (RSA), runway object free area (ROFA), and runway obstacle free zone (ROFZ) serving Runway 8-26 are free of obstructions or incompatibilities. Under existing B-II(S)-5000 conditions, the runway protection zones (RPZs) extend beyond the airport property boundary to the east and west, encompassing approximately 1.8 acres of property to the east and 6.6 acres to the west. In addition, the existing RPZ serving Runway 8 is traversed by County Highway L and Interstate 43 (I-43). Public roadways are generally considered incompatible uses within an RPZ; however, the FAA often considers existing roads to be grandfathered, so no corrective action is necessary in the current condition. Any change to the runway environment that alters the size or position of the RPZ may negate the grandfathered condition.

As shown on **Exhibit 5A**, the ultimate RSA and ROFA associated with future RDC B-II-5000 conditions maintain the same size and position in relation to the runway, while the ROFZ will increase in size to a width of 400 feet and extend 200 feet beyond each runway end. At the current runway length of 3,900 feet, the RDC B-II-5000 design standards for the RSA, ROFA, and ROFZ are currently met. Upon construction of the planned runway extension to the east, the safety areas corresponding to each runway end will also extend. The expanded RSA, ROFA, and ROFZ all mostly remain on airport property, with the exception of the northeast corner of the ultimate ROFA, which extends slightly beyond the current airport property boundary. Upon the extension of Runway 8-26 and its upgrade to ultimate RDC B-II-5000 standards, the ultimate RSA, ROFA, and ROFZ are recommended to be cleared of all obstructing vegetation and graded accordingly, and the unowned portion of the ROFA should be acquired in fee; however, this action should not be taken unless (or until) the airport can justify a runway extension.

Upon upgrading to ultimate B-II-5000 design standards, the RPZs serving each end of Runway 8-26 will increase in dimension to 500 feet at the inner portion, 700 feet at the outer portion, and 1,000 feet long. Although the RPZ serving ultimate Runway 8 will remain in its existing location, the size of the RPZ will increase to encompass 11.1 total acres beyond the airport property boundary and will be traversed by County Highway L and I-43, which is now generally considered an incompatible land use by the FAA; however, because the interim guidance only addresses new or modified RPZs, existing or historically planned incompatibilities are typically considered grandfathered conditions. For example, roads that are in the current RPZ are typically allowed to remain grandfathered unless the runway environment changes. Given that Runway 8-26 has historically been planned to B-II design standards, the existing location of County Highway L and I-43 should be acceptable. It should be noted that the airport owns easements beyond the west end of Runway 8 and the only remaining uncontrolled property within the RPZ is situated on the roadway corridor for I-43 and County Highway L. Additionally, under ultimate conditions, the RPZ serving Runway 26 would extend to the east beyond the existing airport property boundary. The ultimate RPZ serving Runway 26 and the ultimate ROFA would encompass approximately 9.8 total acres. The entirety of this property is owned in easement; however, the ROFA must be under the direct ownership of the airport sponsor. As such, approximately 0.45 acres of property should be acquired in fee prior to the extension of Runway 8-26.

Airport management and the Village of East Troy should continue to monitor activity within the existing and proposed safety areas and RPZs serving Runway 8-26 and maintain them free of incompatible land uses, to the extent practicable. Continued coordination with WisDOT BOA and FAA officials will be important when implementing any projects that could require changes to the existing RPZs at 57C.

RUNWAY 18-36

As the crosswind runway, Runway 18-36 is designed to accommodate the small aircraft that utilize 57C, as high crosswind conditions impact them more. Turf Runway 18-36 is 2,446 feet long and 75 feet wide, oriented in a north-south manner, with visual approaches. Given that Runway 18-36 is unpaved, its load-bearing strength capacity is unknown; however, the runway is generally capable of accommodating small aircraft that weigh less than 12,500 pounds. At its existing length, Runway 18-36 does not meet the FAA length requirement of 3,300 feet to accommodate 95 percent of the small general aviation aircraft fleet; however, Runway 18-36 is currently constrained by County Highway L to the north and Highway 20 to the south. Due to the existing constraints on each end of Runway 18-36, extension options for the turf crosswind runway are cost-prohibitive. Moreover, the current fleet of small aircraft (category A-I[S]) that utilize the runway for crosswind purposes can operate in a safe and efficient manner. As such, Runway 18-36 is planned to remain at a length of 2,446 feet and maintained under RDC A-I(S)-VIS design standards.

Under existing and ultimate RDC A-I(S) standards, the RSA, ROFA, and ROFZ serving Runway 18-36 should be maintained clear of obstructions and graded according to FAA standards. As discussed in Chapter Three and presented on **Exhibit 5A**, the existing and ultimate RPZ serving the Runway 18 end extends beyond airport property to the north, encompassing approximately 4.3 acres of property, and is traversed by County Highway L. Furthermore, the existing and ultimate Runway 36 RPZ extends beyond airport property to the south, encompassing approximately 7.5 acres of property, and is traversed by Highway 20. The airport currently owns easements beyond each end of Runway 18-36. Under ultimate conditions, the master plan development concept considers the acquisition of avigation easements for 0.6 acres of uncontrolled property within the existing and ultimate Runway 18 RPZ and 0.5 acres of uncontrolled property within the existing and ultimate Runway 36 RPZ.

BUILDING RESTRICTION LINE

Although achieving the lowest instrument approach visibility minimums is advantageous for airport operations, multiple safety area requirements are tied to the minimums associated with a runway's instrument approach procedure(s). As a result, impacts to the airport environment imposed by the ultimate instrument approach visibility minimums need to be addressed. The runway type and capability of the instrument approach minimums contribute to the determination of the building restriction line (BRL), which is a product of Title 14 Code of Federal Regulations (CFR) Part 77 primary and transitional surface clearance requirements and identifies suitable building locations on the airport.

Because the ultimate strength rating for Runway 8-26 is over 12,500 pounds, the runway is classified as an "other-than-utility" runway under Part 77. Runway 18-36 is classified as a "utility" runway, as it is designed to accommodate aircraft under 12,500 pounds. The width of the primary surface for other-than-utility visual and non-precision instrument runways with minimums greater than ¾ statute mile is 500 feet (250 feet to each side of the runway centerline), which is the condition for Runway 8-26. The width of the primary surface serving utility runways with visual-only approaches is 250 feet (125 feet to each side of the runway centerline), which is the condition for Runway 18-36.

The recommended concept for long-term planning at 57C maintains the instrument approach procedures of not lower than one-mile minimums serving each end of Runway 8-26, and Runway 18-36 is planned to remain a utility runway with visual approaches. As such, the primary surface serving Runway 8-26 will remain 500 feet and 250 feet wide for Runway 18-36. The transitional surface extends out and up from the edge of the primary surface at a ratio of seven feet laterally for every one-foot increase. Based on these criteria and using a planned building height, the BRL or obstructions to the BRL can be determined. **Exhibit 5A** presents the ultimate BRL separation at 390 feet from the runway centerline for Runway 8-26 and 265 feet from the runway centerline for Runway 18-36, based on the approach capabilities of each runway and the selected allowable structure height of 20 feet.

As shown on the master plan concept, no structures are currently located or planned within the ultimate 20-foot BRL.

INSTRUMENT APPROACHES

As previously discussed, 57C has two published instrument approaches: a localizer performance (LP) instrument approach is available to the Runway 8 end and a localizer performance with vertical guidance (LPV) via an area navigation (RNAV) global positioning system (GPS) instrument approach is available to the Runway 26 end. The approaches have visibility minimums down to one mile for categories A and B aircraft but are not available to categories C and D aircraft.

Chapter Four discussed the enhancement of the instrument approaches serving each runway end. Ultimately, if instrument approach capabilities serving Runway 8-26 were improved to ¾-mile, the width of the primary surface would increase to 1,000 feet wide. Such a change would require much of the existing landside development to be cleared of the primary surface and would severely limit and impact future airfield development. As such, the existing instrument approach minimums of not lower than one mile serving each end of Runway 8-26 are maintained in the ultimate condition. Similarly, the approaches to Runway 18-36 are maintained as visual only in the ultimate condition.

VISUAL APPROACH AIDS

Future planning considers various enhancements to visual approach aids serving the runway system at 57C, as depicted on **Exhibit 5A**. Runways 8 and 26 are currently served by two-box precision approach path indicators (PAPI-2s) and Runway 18-36 is not served by visual approach aids. Ultimately, PAPI-4s are planned to serve Runways 8 and 26 to further enhance the use of each runway, as well as overall airfield safety, by providing pilots with improved visual approach guidance information during landing phases of flight. Existing Runways 8 and 26 are also served by runway end identifier lights (REILs), which are flashing lights located at the runway threshold end that facilitate rapid identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway thresholds and distinguish the runway end lighting from other lighting on the airport and in the approach areas. As such, the existing REILs are planned to be maintained through the planning horizon.

WEATHER REPORTING AIDS AND COMMUNICATION

At present, 57C is served by an automated weather observation system (AWOS), which provides weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. This information is then transmitted at regular intervals (usually once per hour). Aircraft in the vicinity can receive the information if their radios are tuned to the correct frequency (118.125 megahertz [MHz]). The AWOS is surrounded by an FAA-defined critical area with a radius of 500 feet. Although buildings and objects are permissible within this area, they must not obstruct the operation of the AWOS sensors. As such, the ultimate development concept maintains the existing location of the AWOS and critical area, as depicted on **Exhibit 5A**.

57C is also served by a lighted wind cone and wind tee, which are located near the Runway 8 threshold and adjacent to Taxiway B. In addition, three supplemental wind cones are positioned at various locations on the airfield. These facilities should all be maintained through the long-term planning horizon.

TAXIWAY DESIGN, MARKING, AND SIGNAGE

While no significant airfield capacity improvements should be necessary during the planning period, the development concept considers improving the taxiway system through the implementation of additional taxiway connectors and extended taxiways. Taxiway A and associated connectors are planned to maintain taxiway design group (TDG) 2A standards at a taxiway width of 35 feet; however, the development concept considers the removal of a small aircraft parking area located on the south side of the T-hangar nearest Taxiway A because it obstructs the TDG 2A taxiway object free area (TOFA) of Taxiway A. Partial parallel Taxiway B, which serves the existing hangar development on the southwest side of Runway 8-26, is 25 feet wide and adheres to TDG 1A. Existing Taxiways A and B are 35 and 25 feet wide, respectively, and should be maintained. In addition, it is recommended that taxiway fillets be upgraded to the most current taxiway fillet geometry standards on an as-needed basis or when taxiway rehabilitation projects are scheduled to occur.

At present, the taxiway system serving 57C is adequate for meeting current and future air traffic demand, and the existing airfield taxiway geometry is largely consistent with the current taxiway design standards established in FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*; however, existing Taxiway B provides direct access from the aircraft storage hangars area on the south side of the runway as it connects to the Runway 8 threshold, which is a non-standard condition. Under future conditions, the existing Taxiway B connection to Runway 8 is planned to be removed and relocated in a manner that eliminates the existing direct access. Additionally, the Taxiway B midfield connector is planned to be removed and realigned to connect with Runway 8-26 at 90 degrees, thereby eliminating the acute-angle Taxiway B midfield connection and what could be considered a runway crossing through the high-energy area.

The recommended development concept also considers the potential for a full-length parallel taxiway serving the west side of Runway 18-36 and a partial parallel taxiway serving the southeast side of Runway 18-36. Each of the proposed taxiways serving Runway 18-36 would allow for enhanced access to proposed landside development (to be discussed). The proposed full-length and partial parallel taxiways serving Runway 18-36 would maintain a runway-to-taxiway centerline separation of 150 feet, which is in accordance with existing and ultimate A-I(S)-VIS design standards.

As discussed in Chapter Three, holding position markings are placed on taxiways that lead to runways to indicate where pilots should stop and hold prior to entering an active runway. Currently, the holding position markings serving Runway 8-26 are situated at least 200 feet from the runway centerline and meet the ultimate FAA design standard of 200 feet for RDC B-II-5000 runways. It should be noted that the existing hold line positions serving each end of Runway 8-26 are acutely angled to the runway at other than 90 degrees. Furthermore, analysis in Chapter Three identified that the holding positions situated on Taxiway A at the Runway 18-36 crossing are placed approximately 122 feet from the runway centerline. The existing and ultimate A-I(S)-VIS design standards for Runway 18-36 call for holding positions to be separated from the runway centerline by 125 feet. As future pavement reconstruction and marking projects take place, the airport should reorient the respective holding position markings to 90 degrees perpendicular to Runway 8-26 and ensure proper separation from the Runway 18-36 centerline. Additionally, taxiway signage and designations should be updated to standard nomenclature (e.g., A1, A2, A3, etc.), which could be planned with cohesive projects.

LANDSIDE DEVELOPMENT CONCEPT

The primary goals of landside facility planning are to provide adequate space to meet reasonably anticipated aviation needs while optimizing operational efficiency and land use. Achieving these goals yields a development scheme that segregates functional uses and maximizes the airport's revenue potential. Chapters Three and Four identified several opportunities to improve the existing landside facilities to better accommodate future aviation demand. This section specifies the recommended improvements pertaining to landside facilities. Landside facilities can include terminal buildings, hangars, aircraft parking aprons, and aviation support services, as well as the utilization of remaining airport property to provide revenue support and benefit the economic well-being of the regional area. Also important is identification of the overall land use classification of airport property to preserve the aviation purpose of the facility well into the future. **Exhibit 5A** presents the planned landside development for 57C.

As a local general aviation airport, most of the landside development proposed within the master plan concept will accommodate the general aviation owners and operators at 57C, as well as current and future service providers. At present, general aviation landside facilities are located on the west side of the airfield on the north and south sides of Runway 8-26 and include 54 separate hangar facilities that provide approximately 188,200 square feet (sf) of hangar capacity, as well as approximately 16,400 total square yards (sy) of aircraft apron space.

Multiple layouts of potential landside facilities were presented in Chapter Four, including hangar development, aircraft apron layouts, and the placement of aviation support services. The master plan concept provides a compilation of proposed landside facilities that attempts to maximize potential aviation development space on the airfield. New development is primarily planned near existing facilities to take advantage of existing infrastructure availability and reduce future development costs; however, long-term landside development also considers new development locations that could help meet forecasted demands.

The major landside issues addressed in the master plan concept include the following objectives:

- Designate areas that can accommodate aviation development potential near the existing terminal area, within the continued development west of Runway 18-36 on the north and south sides of Runway 8-26, and within the eastern development areas located immediately east of Runway 18-36 on the north and south sides of Runway 8-26.

- Provide a site for a new airport terminal/fixed base operator (FBO) building and dedicated airport maintenance and snow removal equipment (SRE) building.

- Designate areas for additional automobile parking and new airport access extending from County Highway L and Highway 20.

AIRCRAFT STORAGE HANGARS AND FUTURE AVIATION DEVELOPMENT

Analysis in Chapter Three indicated that an additional 81,200 sf of aircraft storage hangar capacity may be needed to meet potential aviation demand through the long-term planning period. Recommended hangar development is proposed in the form of T-hangars and executive box hangars, although future demand will ultimately dictate the size(s) and type(s) of hangar facilities that could be built. Ultimately, the master plan concept seeks to maximize hangar development potential along the flight line and contiguous to existing hangar development while identifying locations on existing airport property for future development. If continued demand for aircraft hangar storage materializes, the development concept also identifies an area on the northeast side of the airfield that could accommodate significant hangar development. The proposed landside development areas to be discussed have been categorized into two separate development areas: the western development area and the eastern development area. The western development area is comprised of the existing terminal area and hangar development on the north and south sides of Runway 8-26, located on the western side of Runway 18-36. The eastern development area is located on the north and south sides of Runway 8-26 and east of Runway 18-36.

Western Development Area

As presented on **Exhibit 5A**, the development concept considers significant aviation-related improvements and redevelopment within the existing airport terminal area, which is located on the northern side of the main aircraft apron. Automobile parking and access are provided on the north side of the terminal area via the airport entrance road.

There is minimal opportunity for infill with significant hangar development within the existing airport terminal area; as such, the existing T-hangar buildings near the airport entrance are planned to be demolished and redeveloped. At present, the existing T-hangars in this location do not have paved flooring, are of smaller size, and have minimal amenities available for their tenants. The current spacing of these hangars would allow for the construction of larger and more sophisticated T-hangar facilities if they were built to the proper ADG I separation criterion of 79 feet. As such, the recommended development concept considers the demolition and redevelopment of the aforementioned T-hangars at dimensions of 40 by 175 feet and a building separation of 79 feet between the two T-hangars. Within the terminal area,

the recommended development concept also considers two 40- by 40-foot executive box hangars, one 30- by 40-foot executive box hangar, and one 40- by 80-foot executive box hangar, as well as a 60- by 90-foot airport maintenance or SRE building, which could also house an FBO if demand warrants.

The recommended development concept continues development on the northwest side of Runway 8-26 and proposes 12 65- by 65-foot executive box-style hangars. Supporting vehicle access and parking are also proposed. These hangars would continue the existing development trend on the north side of Runway 8-26 and maximize hangar development potential on the northwest side of the airfield. Airside access to these hangars is provided by a parallel taxiway that serves the northern end of Runway 18-36 and connects with Taxiway A.

There is minimal opportunity for infill with additional hangar development on the northwest side of the airfield, so further development is considered on the south side of Runway 8-26, west of Runway 18-36. From north to south, proposed development in this area considers the construction of three 85- by 85-foot executive box hangars, four 100- by 100-foot executive box hangars, and 14 65- by 65-foot executive box hangars. Each proposed hangar development is served by an aircraft apron, as well as automobile parking and access, while airside access is provided via the parallel taxiway serving Runway 18-36. Finally, an additional airport access gate is planned on the south side of the airport to provide access from Highway 20.

Eastern Development Area

As previously mentioned, the recommended master plan concept presents areas located on existing airport property that would be suited for future aviation development if demand warrants. Multiple development layouts were explored through the alternatives process. The eastern development area consists of proposed development located on the north and south sides of Runway 8-26. These development areas are ideal because they would provide airside access via Taxiway A and the proposed partial parallel taxiway serving the southeast side of Runway 18-36, while landside access could be provided from County Highway L and Highway 20 (pending further justification). **Exhibit 5A** presents the recommended master plan concept as it relates to the eastern development area.

On the northeast side of the airfield, the recommended development concept considers the construction of eight six-unit nested T-hangars, two 65- by 65-foot executive box hangars, and 24 85- by 85-foot executive box hangars. The proposed hangar development could be accessed from the airside via Taxiway A and would be supported by aircraft apron and movement areas, while landside access is proposed via an entrance road connecting to County Highway L.

At present, the proposed development on the southeast side of the airfield is somewhat isolated from the existing taxiway/taxilane access points on the airfield. As such, the recommended master plan concept considers the addition of a partial parallel taxiway to serve the southeast side of Runway 18-36 and a taxiway/taxilane to provide access to the southeast side of the airfield. Proposed hangar development in this location includes 18 100- by 75-foot executive box hangars, nine 65- by 65-foot executive box hangars, and one 100- by 80-foot executive box hangar. Vehicle access is proposed via an entrance road that would connect to Highway 20.

SUPPORT FACILITIES

As mentioned in Chapter Three, support facilities are integral to the operation of the airport; however, these facilities are not categorized as airside or landside facilities. The facility requirements analysis identified several improvements that will ultimately contribute to the airport's ability to accommodate the forecasted aviation activity levels.

Airport Maintenance and Snow Removal Equipment Facility | At present, the Village of East Troy conducts the airport maintenance and snow removal at the airport. Airport maintenance equipment and SRE are currently stored in a hangar adjoined to the terminal/FBO building. The recommended development concept considers the addition of a dedicated airport maintenance and SRE building on the northwest side of the aircraft apron. The construction of a dedicated facility would allow the Village of East Troy to lease the space adjoined to the existing terminal/FBO building.

Aviation Fuel Storage | Jet A and AvGas are currently stored in 12,000-gallon underground storage tanks adjacent to the aircraft apron (12,000 gallons each). Additionally, auto fuel (which is approved for use in certain aircraft) is dispensed from a 5,000-gallon tank. Fuel is dispensed via a self-serve system that is co-located with the tanks. Analysis in Chapter Three indicated the current Jet A and AvGas fuel storage capacity is adequate to meet the 14-day supply criterion through the long-term planning horizon but could be increased if significant demand materializes. Ultimately, the need for additional fuel storage capacity will be determined by the airport sponsor.

Airport Utilities | At this time, any significant landside development could be limited by the existing utility infrastructure (or lack thereof), particularly in the eastern development area. Minimum water flow requirements for sprinkler and firefighting purposes may vary depending on the type(s) of hangars and facilities built and the water storage and pumping capabilities they require. All future development should consider enhancements to utility infrastructure, which could include increased water storage and pumping capacity, sewer improvements, and improved electrical and natural gas capabilities. In addition to utilities, the airport should also evaluate the existing drainage system prior to any significant landside development to ensure it will adequately support development.

ENVIRONMENTAL OVERVIEW

An analysis of potential environmental impacts associated with proposed airport projects is an essential consideration in the airport master plan process. The primary purpose of this discussion is to review the recommended development concept (**Exhibit 5A**) and associated capital program at the airport to determine whether projects identified in the airport master plan could individually or collectively impact existing environmental resources in a significant way. Information contained in this section was obtained from previous studies, official websites, and analysis by the consultant.

The environmental inventory included in Chapter One of this master plan provides baseline information about the airport environs. This section provides an overview of potential impacts to existing resources that could result from implementation of the planned improvements outlined on the recommended development concept.

If the FAA retains approval authority over a project, the project is typically subject to the *National Environmental Policy Act* (NEPA). For projects not categorically excluded under FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, or under the new categorical exclusions provided in the recent *FAA Reauthorization Act of 2024*, compliance with NEPA is generally satisfied through the preparation of an environmental assessment (EA). For instances in which significant environmental impacts are expected, an environmental impact statement (EIS) may be required.

The *FAA Reauthorization Act of 2024* introduced a variety of updated and new environmental guidelines. The primary updates related to environmental considerations are outlined in three sections: Section 743, Section 783, and Section 788.

Section 743 details the FAA's authority to regulate uses of airport property. This section details the FAA's authority over projects on land acquired without federal assistance and outlines limitations imposed on non-aeronautical review. Section 743 also states that a notice of intent for proposed projects outside FAA jurisdiction should be submitted to the FAA by an airport sponsor.

Section 783 outlines that airport capacity enhancement projects, terminal development projects, and general aviation airport improvement projects will be subject to coordinated and expedited environmental review requirements. Section 783 also introduces a new process for determining which safety-related projects should be prioritized during the environmental review process.

Section 788 establishes two new NEPA categorical exclusions that would cover environmental impacts for the following types of projects:

(a) Categorical Exclusion for Projects of Limited Federal Assistance – for projects that receive less than $6 million of federal funds and do not involve extraordinary circumstances or special purpose laws, or have a total anticipated cost of not more than $35 million, with federal funds that comprise less than 15 percent of the total estimated project cost

(b) Categorical Exclusion in Emergencies – for the repair or reconstruction of any airport facility, runway, taxiway, or improvement similar in structure that is in operation or under construction when damaged by a state-declared emergency, or for an emergency declared by the U.S. president pursuant to the *Robert. T. Stafford Disaster Relief and Emergency Assistance Act*

The following portion of the airport master plan is not designed to satisfy the NEPA requirements for a specific development project, but it provides a preliminary review of environmental issues that may need to be considered in more detail within the environmental review processes. It is important to note that the FAA is ultimately responsible for determining the level of environmental documentation required for airport actions.

Table 5B summarizes potential environmental issues that are associated with implementation of the recommended development concept for 57C. Analysis under NEPA includes the effects or impacts a proposed action or alternative may have on the human environment (see Title 40 CFR §1508.1). *Effects* have been recently defined in the Council of Environmental Quality (CEQ) guidelines as foreseeable environmental effects of a proposed action, reasonably foreseeable adverse environmental effects that cannot be avoided, and a reasonable range of alternatives to the proposed action.[1]

TABLE 5B | Summary of Potential Environmental Concerns

AIR QUALITY	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the United States (U.S.) Environmental Protection Agency (EPA) under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.*
Potential Environmental Concerns	**No Impact.** An increase in operations could occur over the 20+ year planning horizon of the master plan that would likely result in additional emissions. Walworth County is currently in attainment for all federal criteria pollutants and is in maintenance for one-hour ozone (1979). For construction and operational emissions, project-specific qualitative or quantitative emissions inventories or the application of screening thresholds may be required under NEPA, depending on the type of environmental review needed for specific projects defined on the development plan concept. *Source: U.S. EPA, Green Book, Wisconsin Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants (https://www3.epa.gov/airquality/greenbook/anayo_wi.html), data current as of December 31, 2024*
BIOLOGICAL RESOURCES (INCLUDING FISH, WILDLIFE, AND PLANTS)	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) determines the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.* *The FAA has not established a significance threshold for non-listed species; however, factors to consider include whether an action would have the potential for:* • *Long-term or permanent loss of unlisted plant or wildlife species;* • *Adverse impacts to special status species or their habitats;* • *Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or populations; or* • *Adverse impacts on a species' reproductive rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.*
Potential Environmental Concerns	<u>Federally Protected Species</u> **Potential Impact.** Based on the USFWS Information for Planning and Consultation (IPaC) report, there is potential for seven endangered, threatened, proposed threatened, and experimental species at 57C: • northern long-eared bat – endangered • whooping crane – experimental population, non-essential • eastern massasauga (=rattlesnake) – threatened • monarch butterfly – proposed threatened • rusty patched bumble bee – endangered • western regal fritillary – proposed threatened • eastern prairie fringed orchid – threatened *(Continues)*

[1] Federal Register, Vol. 88, No. 145, Proposed Rules, July 31, 2023

TABLE 5B | Summary of Potential Environmental Concerns (continued)

Potential Environmental Concerns	*(Continued)* Of these seven species, the northern long-eared bat, whooping crane, monarch butterfly, western regal fritillary, and eastern prairie fringed orchid may occur at the airport. Impacts to these species should be assessed prior to development at the airport. <u>Designated Critical Habitat</u> **No Impact.** There are no designated critical habitats within airport boundaries. <u>Non-Listed Species</u> **Potential Impact.** Non-listed species of concern include those protected by the *Migratory Bird Treaty Act* (MBTA) and the *Bald and Golden Eagle Protection Act.* No eagles are expected to use the airport environs. Bird species protected by the MBTA could be adversely affected if construction occurs during the nesting and breeding seasons (March to August). Pre-construction surveys of vegetated areas at the airport are recommended for projects that involve ground clearing unless such projects occur outside the nesting and breeding seasons. *Source: USFWS, IPaC (https://ipac.ecosphere.fws.gov/location/index)*
CLIMATE	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Climate. Refer to FAA Order 1050.1F, Desk Reference, and/or the most recent FAA Aviation Emissions and Air Quality Handbook for the most up-to-date methodology for examining impacts associated with climate change.*
Potential Environmental Concerns	**Unknown.** An increase in greenhouse gas (GHG) emissions could occur over the 20+ year planning horizon of the airport master plan. A project-specific analysis may be required based on the parameters of the individual projects; however, the FAA does not have an impact threshold to use to determine significance under NEPA at this time.
COASTAL RESOURCES	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Coastal Resources. Factors to consider include whether an action would have the potential to:* • *Be inconsistent with the relevant state coastal zone management plan(s);* • *Impact a coastal barrier resources system unit;* • *Pose an impact on coral reef ecosystems;* • *Cause an unacceptable risk to human safety or property; or* • *Cause adverse impacts on the coastal environment that cannot be satisfactorily mitigated.*
Potential Environmental Concerns	**No Impact.** The airport is not located within a coastal zone. The closest National Marine Sanctuary is the Thunder Bay National Marine Sanctuary, located 279 miles away. *Source: National Oceanic and Atmospheric Administration, National Marine Sanctuaries (https://sanctuaries.noaa.gov/)*
***DEPARTMENT OF TRANSPORTATION ACT*, SECTION 4(F)** (NOW CODIFIED IN TITLE 49 UNITED STATES CODE [USC] § 303)	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; and publicly or privately owned land from a historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.*
Potential Environmental Concerns	**No Impact.** No wilderness areas, public recreation facilities, or National Register of Historic Places (NRHP)-listed resources would be impacted by proposed development at the airport. The closest Section 4(f) resource is East Troy Dog park, located 0.85 miles from the airport. Due to the distance of this resource from the airport, airport improvements delineated in the recommended concept plan will not result in physical or constructive use of Section 4(f) properties.

(Continues)

TABLE 5B | Summary of Potential Environmental Concerns (continued)

FARMLANDS	

FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The total combined score on Form AD-1006, Farmland Conversion Impact Rating, ranges between 200 and 260. (Form AD-1006 is used by the U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] to assess impacts under the Farmland Protection Policy Act [FPPA].)*
	
	The FPPA applies when airport activities meet the following conditions:
	• *Federal funds are involved;*
	• *The action involves the potential for the irreversible conversion of important farmlands to non-agricultural uses (important farmlands include pastureland, cropland, and forest considered to be prime, unique, or statewide/locally important land); or*
	• *None of the exemptions to the FPPA apply. These exemptions include:*
	  ○ *Land that is not considered farmland under the FPPA, such as land that is already developed or already irreversibly converted (these instances include when land is designated as an urban area by the U.S. Census Bureau or the existing footprint includes rights-of-way);*
	  ○ *Land that is already committed to urban development;*
	  ○ *Land that is committed to water storage;*
	  ○ *Construction of non-farm structures necessary to support farming operations; and*
	  ○ *Construction/land development for national defense purposes.*

Potential Environmental Concerns	**Potential Impact.** A significant portion of airport property is classified as *all areas are prime farmland*, *prime farmland if drained*, and *farmland of statewide importance* (Exhibit 1F). Proposed changes to the airside and landside areas of the airport (i.e., proposed hangars, pavement, roads/parking, and a 600-foot extension to Runway 26) would occur in areas identified as farmland. Because project areas are in non-urbanized areas and important farmlands are identified, the FPPA may apply. As part of the NEPA process associated with airport projects, coordination with the USDA-NRCS on the completion of Form AD-1006 may be required. *Source: USDA-NRCS, Web Soil Survey (https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)*
HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention; however, factors to consider include whether an action would have the potential to:* • *Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;* • *Involve a contaminated site;* • *Produce an appreciably different quantity or type of hazardous waste;* • *Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or* • *Adversely affect human health and the environment.*
Potential Environmental Concerns	**Potential Impact.** The airport has a fuel farm and provides opportunities for aircraft maintenance activities that involve fossil fuels or other types of hazardous materials or wastes. These operations are regulated and monitored by the appropriate regulatory agencies, such as the U.S. EPA and Wisconsin Department of Natural Resources (DNR). The recommended development concept plan does not include land uses that would produce an appreciably different quantity or type of hazardous waste; however, if this type of land use is proposed, further NEPA review and/or permitting will be required. There are currently no known hazardous material or waste contamination sites on airport property. A solid waste and recycling assessment that establishes formal guidelines and recommendations was prepared to guide solid waste, electronic waste, and recycling efforts at the airport in compliance with the *FAA Modernization and Reform Act of 2012.* This report is included later in this chapter.

(Continues)

TABLE 5B | Summary of Potential Environmental Concerns (continued)

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Historical, Architectural, Archaeological, and Cultural Resources. Factors to consider include whether an action would result in a finding of adverse effect through the Section 106 process; however, an adverse effect finding does not automatically trigger the preparation of an EIS (i.e., a significant impact).*
Potential Environmental Concerns	**Potential Impact.** As identified in Chapter One, there is potential for historic-age buildings to be present on the northwestern end of the airport; however, proposed airport projects delineated on Exhibit 5A would not alter or remove these buildings.
LAND USE	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Land Use and there are no specific independent factors to consider. The determination that significant impacts exist is normally dependent on the significance of other impacts.*
Potential Environmental Concerns	**Potential Impact.** Proposed airport improvements include new box and T-hangars, taxilanes, a 600-foot runway extension for Runway 26, new vehicular roads/parking, and an FBO and SRE building. Additionally, there are new proposed entrances to the airport south of Road L and north of Highway 20 to grant access to the proposed hangar development areas. The closest residential areas abut the southern boundary of the airport across from Highway 20. The nearest proposed development (i.e., box hangars, new aircraft pavement, and a vehicular access road) to these residents would be located less than 300 feet from the closest residence. An increase in traffic along Highway 20 may occur and could impact local traffic during the construction of proposed airport development. Additionally, there are proposed land acquisitions within the uncontrolled portions of the RPZ. The RPZs for the approach ends of Runway 8, Runway 18, and Runway 36 all contain public roads that traverse the RPZs.
NATURAL RESOURCES AND ENERGY SUPPLY	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Natural Resources and Energy Supply; however, factors to consider include whether the action would have the potential to cause demand to exceed the available or future supplies of these resources.*
Potential Environmental Concerns	**No Impact.** Planned development projects at the airport could increase demands on energy utilities, water supplies and treatment, and other natural resources during construction; however, significant long-term impacts are not anticipated. If long-term impacts become a concern, coordination with local service providers is recommended.
NOISE AND NOISE-COMPATIBLE LAND USE	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action would increase noise by a day-night average sound level (DNL) of 1.5 decibels (dB) or more for a noise-sensitive area that is exposed to noise at or above the 65-dB DNL (65 DNL) noise exposure level, or that will be exposed at or above the 65 DNL due to a 1.5-dB DNL or greater increase when compared to the no-action alternative for the same timeframe.* *Another factor to consider is that special consideration should be given to the evaluation of the significance of noise impacts on noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in Title 14 CFR Part 150 are not relevant to the value, significance, and enjoyment of the area in question.*
Potential Environmental Concerns	**No Impact. Exhibit 5B** shows existing noise contours and **Exhibit 5C** shows anticipated noise contours for the airport. As shown on **Exhibit 5B** for existing conditions, the 65 DNL noise exposure (green) is contained within airport property. In the ultimate noise contours, the 65 DNL expands outside property boundaries on the northeastern edge of the airport. There are no residential units or other noise-sensitive land uses (such as residential land uses, places of worship, schools, and medical facilities) located within the 65 DNL noise contour. Ultimate development at the airport is not expected to change the overall noise environment by more than the 1.5-dB threshold; however, this should be confirmed prior to implementing a runway extension on Runway 26. It is important to note that operational growth will not result in noise impacts under FAA Order 1050.1F unless tied to a specific project. Impacts to noise-sensitive land uses are only identified through NEPA documentation for specific projects or through the voluntary Part 150 process.

(Continues)

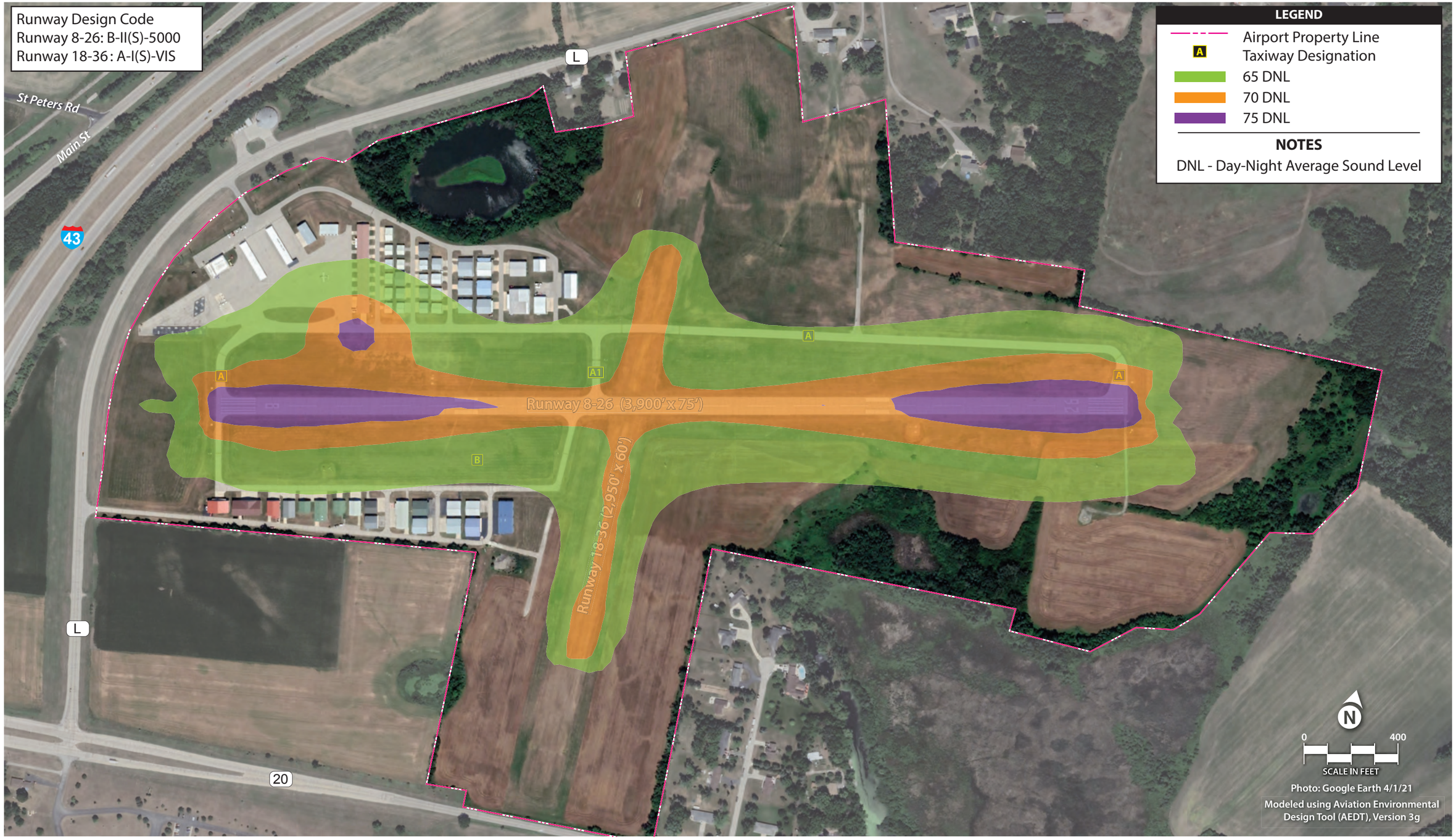
TABLE 5B | Summary of Potential Environmental Concerns (continued)

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS	
Socioeconomics	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Socioeconomics; however, factors to consider include whether an action would have the potential to:* • *Directly or indirectly induce substantial economic growth in an area (e.g., through establishing projects in an undeveloped area);* • *Disrupt or divide the physical arrangement of an established community;* • *Cause extensive relocation when sufficient replacement housing is unavailable;* • *Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;* • *Disrupt local traffic patterns and substantially reduce the levels of service of roads serving the airport and its surrounding communities; or* • *Produce a substantial change in the community tax base.*
Potential Environmental Concerns	No Impact. Proposed development would not relocate or disrupt current businesses or residents. No division of existing neighborhoods or relocation of housing/businesses would occur due to the proposed development on the airport. Future airport projects would result in temporary disruption of local traffic patterns along Highway 20 and County Road L.
Environmental Justice	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Environmental Justice; however, factors to consider include whether an action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population) due to:* • *Significant impacts in other environmental impact categories; or* • *Impacts on the physical or natural environment that affect an environmental justice population in a way the FAA determines is unique to and significant to that population.*
Potential Environmental Concerns	**No Impact.** Only a small percentage of low-income (10 percent) and minority (five percent) populations have been identified in the vicinity of the airport. The closest residential areas abut the southern boundary of the airport across from Highway 20. The nearest proposed development (i.e., box hangars, new aircraft pavement, and a vehicular access road) to these residents would be located less than 300 feet from the closest residence; however, it is unlikely implementation of the proposed improvements outlined in the development concept plan would affect low-income and minority populations in a disproportionate manner.
Children's Health and Safety Risks	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Children's Environmental Health and Safety Risks; however, factors to consider include whether an action would have the potential to lead to a disproportionate health or safety risk to children.*
Potential Environmental Concerns	**No Impact.** No disproportionately high or adverse impacts are anticipated to affect children living, playing, or attending school near the airport because of the proposed ultimate development. The airport is an access-controlled facility and children are not allowed within the fenced portions of the airport without adult supervision. All construction areas should be controlled to prevent unauthorized access. The closest school is 0.90 miles from the airport.
VISUAL EFFECTS	
Light Emissions	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Light Emissions; however, a factor to consider is the degree to which an action would have the potential to:* • *Create annoyance or interfere with normal activities due to light emissions; or* • *Affect the nature of the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.*

(Continues)

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Runway Design Code
Runway 8-26: B-II(S)-5000
Runway 18-36 : A-I(S)-VIS



EAST TROY MUNICIPAL AIRPORT MASTER PLAN

Runway Design Code
Runway 8-26: B-II-5000
Runway 18-36 : A-I(S)-VIS

LEGEND

- Airport Property Line
- A — Taxiway Designation
- 65 DNL
- 70 DNL
- 75 DNL

NOTES

DNL - Day-Night Average Sound Level

St Peters Rd
Main St
43
L
A
A1
B
Runway 8-26 (Ultimate 4,500' x 75')
26
Runway 18-36 (2,950' x 60')
L
20

N
0 400
SCALE IN FEET

Photo: Google Earth 4/1/21
Modeled using Aviation Environmental Design Tool (AEDT), Version 3g

TABLE 5B | Summary of Potential Environmental Concerns (continued)

Potential Environmental Concerns	**No Impact.** The existing lighting at the airport at the airport includes medium intensity runway/ taxiway lighting and lighting used for navigation along Runway 8-26. These lights would be extended an additional 600 feet east if the proposed runway extension is constructed. The closest residential areas abut the southern boundary of the airport across from Highway 20 and are shielded from potential light spillage by nearby trees that act as a buffer from airport lighting. Proposed lighting would include building security lights for the proposed hangars; however, these lights would be directed downward to help minimize light spillage off airport property. PAPI-4s are also proposed along Runway 8-26; however, these are not anticipated to impact nearby residences, as there are currently PAPI-2s located along Runway 8-26.
Visual Resources/Visual Character	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Visual Resources/Visual Character; however, a factor to consider is the extent to which an action would have the potential to:* • *Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;* • *Contrast with the visual resources and/or visual character in the study area; and* • *Block or obstruct the views of the visual resources, including whether these resources would still be viewable from other locations.*
Potential Environmental Concerns	**No Impact.** The proposed runway extension for the approach end of Runway 26 is not anticipated to visually alter the line of sight to the runway for nearby land uses, as the parcels of land bordering this runway approach are vacant and inhabited by mature vegetation that may act as a visual buffer from runway improvements to nearby parcels.
WATER RESOURCES	
Wetlands	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action would:* • *Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;* • *Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;* • *Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety, or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);* • *Adversely affect the maintenance of natural systems that support wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;* • *Promote the development of secondary activities or services that would cause the circumstances listed above to occur; or* • *Be inconsistent with applicable state wetland strategies.*
Potential Environmental Concerns	**No Impact.** As shown on Exhibit 1H, there are freshwater forested shrub wetlands on the southeastern and eastern boundaries of the airport, as well as a freshwater pond near the northern boundary of the airport; however, none of the projects identified on **Exhibit 5A** would occur within these areas. If wetlands are encountered within proposed project areas, coordination with the U.S. Army Corps of Engineers may be required. Removal or relocation of wetlands may require a Section 404 permit under the *Clean Water Act*, which regulates the discharge of dredged or fill material into waters of the United States, including wetlands. *Source: USFWS, National Wetlands Inventory (https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/)*

(Continues)

TABLE 5B | Summary of Potential Environmental Concerns (continued)

Floodplains	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of U.S. Department of Transportation Order 5650.2, Floodplain Management and Protection.*
Potential Environmental Concerns	**No Impact.** Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the majority of the airport is identified as an area of minimal flood hazard, with the exception of a small portion of the airport along the southern airport boundary that has been classified as a 100-year floodplain (Exhibit 1H). Proposed projects depicted on the recommended development concept plan would not traverse the portion of the airport within the 100-year floodplain. *Source: FEMA, Flood Map Service Center (https://msc.fema.gov/portal/search?AddressQuery=east%20troy%20airport)*
Surface Waters	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action would:* • *Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or* • *Contaminate public drinking water supply such that public health may be adversely affected.*
Potential Environmental Concerns	**Potential Impact.** The airport is located within the Spring-Creek Honey-Creek watershed. Honey Creek is an impaired waterbody within this watershed and is located 0.30 miles south of the airport. Within airport boundaries, there is one freshwater pond located northeast of the terminal building. Long-term impacts to water quality from the proposed airfield improvements may need to be assessed depending on the extent of net new impervious surfaces and how stormwater runoff is conveyed to airport stormwater infrastructure. A National Pollutant Discharge Elimination System (NPDES) general construction permit would be required for all projects that involve ground disturbance over one acre. FAA AC 150/5370-10G, *Standards for Specifying Construction of Airports*, Item P-156, *Temporary Air and Water Pollution, Soil Erosion, and Siltation Control*, should also be implemented during construction projects at the airport. *Source: U.S. EPA, How's My Waterway (https://mywaterway.epa.gov/community/east%20troy%20municipal%20airport/overview)*
Groundwater	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The action would:* • *Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies; or* • *Contaminate an aquifer used for public water supply such that public health may be adversely affected.* *Factors to consider are when a project would have the potential to:* • *Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;* • *Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or* • *Present difficulties based on water quality impacts when obtaining a permit or authorization.*
Potential Environmental Concerns	**Potential Impact.** Based on the Wisconsin DNR's *Well Construction Reports*, over 10 wells are located at the airport. Proposed development would occur over areas located atop some of these groundwater resources. *Source: Wisconsin DNR, Well Construction Reports (https://wi-dnr.maps.arcgis.com/apps/LocalPerspective/index.html?appid=0cc1b8d9c40749ba9b9e5c2c90848e23)*

(Continues)

TABLE 5B | Summary of Potential Environmental Concerns (continued)

Wild and Scenic Rivers	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	*The FAA has not established a significance threshold for Wild and Scenic Rivers. Factors to consider are when an action would have an adverse impact on the values for which a river was designated (or is considered for designation) through:* • *Destroying or altering a river's free-flowing nature;* • *A direct and adverse effect on the values for which a river was designated (or is under study for designation);* • *Introducing a visual, audible, or other type of intrusion that is out of character with the river or would alter outstanding features of the river's setting;* • *Causing the river's water quality to deteriorate;* • *Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor; or* • *Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) or a Section 5(d) river that is not included in the NRI from being included in the National Wild and Scenic Rivers System or causing a downgrade in its classification (e.g., from wild to recreational).*
Potential Environmental Concerns	No Impact. There are no wild and scenic rivers or rivers listed on the NRI near the airport. The closest designated wild and scenic river identified is the Pere Marquette River, located 126 miles from the airport in Michigan. The nearest NRI feature is a segment of the Fox River, located six miles from the airport. Projects delineated on the proposed development concept would not have adverse effects on the outstanding remarkable values of these water resources. (i.e., scenery, recreation, geology, fish, wildlife, and history). *Sources: National Wild and Scenic Rivers System (https://www.rivers.gov/); National Park Service, Nationwide Rivers Inventory (https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm)*

OFF-AIRPORT LAND USE COMPATIBILITY

Land use planning around 57C occurs through regulatory and non-regulatory means. The primary regulatory tools for directing land uses are the village and county zoning ordinances, which limit the types, sizes, and densities of land uses in various locations surrounding the airport. Examples of land use types addressed through regulatory tools include residential, commercial, industrial, and agricultural land uses. Zoning regulations may include airport hazard zoning ordinances or overlays that are intended to restrict unsafe development surrounding airports.

Non-regulatory land use control is accomplished through the comprehensive or future land use planning process. Comprehensive plan documents can be adopted for multiple jurisdictions, a single municipality, or specific areas within a city. In most states, including Wisconsin, zoning ordinances are required to be created in accordance with each jurisdiction's comprehensive plan.

It is important to note the distinction between primary land use concepts used in evaluating development within the airport environs and existing land use, comprehensive plan land use, and zoning land use:

- Existing land use refers to property improvements as they exist today, according to city records.
- Zoning identifies the type of land use permitted on a given piece of property, according to city zoning ordinances and maps. Local governments are required to regulate the subdivision of all lands within their corporate limits. Zoning ordinances should be consistent with the general plan, where one has been prepared. In some cases, the land use prescribed in the zoning ordinance or depicted in the general plan may differ from the existing land use.

- The comprehensive plan land use map identifies the projected or future land use, according to the goals and policies of the locally adopted comprehensive plan. This document guides future development within the city planning area and provides the basis for zoning designations.

The following sections describe the applicable land use policies for the area within the vicinity of the airport. Specifically, these sections pertain to the lands within the 65-decibel day-night average sound level metric (DNL) contours and the Title 14 CFR Part 77 approach surface restricted to one mile from the runway ends.

EXISTING LAND USE

As discussed in Chapter One, East Troy Municipal Airport is located within the municipal boundary of the Village of East Troy, Wisconsin. The airport property boundary aligns with the northeast limits of the municipality and the airport is surrounded by unincorporated Walworth County to the north and east. Portions of all four approach surfaces (extended out to one mile) fall within the land use jurisdiction of Walworth County.

Due to the airport's proximity to I-43, portions of the approach surfaces to Runway 8 and Runway 18 include highway rights-of-way. Wisconsin State Highway 20 (WIS 20) is also adjacent to airport property to the south and bisects land within the approach surfaces to Runway 8 and Runway 36.

South of the airport along WIS 20, land uses include an existing manufacturing development and a single-family residential development, as well as several vacant parcels. To the east, single-family homes on large lots are present along County Road L. Significant portions of land are vacant to the south and east of I-43 within the approach surfaces to Runway 36 and Runway 26. North of I-43 in the approach surface to Runway 18, there are existing residential and commercial land uses, primarily surrounding Army Lake and along the County Highway ES corridor. To the west of I-43 in the approach surface to Runway 8, the Village of East Troy land use is developed as a single-family residential subdivision. Land uses in unincorporated Walworth County west of the I-43 corridor are largely vacant; commercial and residential uses are present on large lots.

ZONING

Zoning regulations are used in conjunction with subdivision regulations and are essential tools for achieving the goals and policies outlined in the comprehensive plan of each city and county. These regulations divide land into districts (or zones), regulate land use activities in those districts, and specify permitted uses, the intensity and density of each use, and the bulk size of each building. Traditional zoning ordinances separate land into four basic uses: residential, commercial (including office), industrial, and agricultural.

The Village of East Troy's current zoning regulations were adopted on April 18, 2011, by the Village Board of the Village of East Troy, under authority granted to it by the State of Wisconsin.[2] The current zoning code for unincorporated Walworth County, Wisconsin, was adopted by the Board of Supervisors of

[2] Wisconsin State Legislature § 61.35

the County of Walworth, Wisconsin, on September 4, 2014, under separate authority granted to it by the State of Wisconsin.[3]

Exhibit 5D depicts the 57C approach surfaces out to one mile overlaid on the official zoning maps for the Village of East Troy, WI, and unincorporated Walworth County. As shown on the exhibit, the following zoning districts are present within the 57C approach surfaces clipped to one mile:

- Industrial
- Commercial
- Business
- Residential
- Agricultural
- Conservation
- Recreational/park
- Rural holding
- Shoreland wetland

Table 5C summarizes the type of land use allowed in each zoning district and the maximum density or maximum lot coverage, maximum allowable height, and overall minimum lot size, where applicable.

TABLE 5C | Zoning Classifications Within the Ultimate Approach Surfaces Out to One Mile

Village of East Troy, WI Zoning Classifications	Residential Allowed?	Maximum Density/Intensity[1]	Maximum Allowable Height	Minimum Lot Area
SR-4 – Suburban Residential	Yes	4 du per acre	35 feet	10,000 sf
RH-35 – Rural Holding	Yes	1 du per 35 acres	40 feet	40,000 sf
GI – General Industrial	No	75% of net lot area	45 feet	40,000 sf
LI – Light Industrial	No	75% of net lot area	45 feet	40,000 sf
Unincorporated Walworth County, WI Zoning Classification	**Residential Allowed?**	**Maximum Lot Coverage**	**Maximum Allowable Height**	**Maximum Lot Size**
A-1 – Prime Agricultural Land	Yes	N/A	Varies[3]	35 acres
A-2 – Agricultural Land	Yes	N/A	Varies[3]	20 acres
C-1 – Lowland Resource Conservation	No	N/A – no buildings or structures permitted		
C-2 – Upland Resource Conservation	Yes	N/A	45 feet	5 acres
P-1 – Recreational Park	No	N/A	45 feet	None
P-2 – Institutional Park	No	N/A	45 feet	10,000 sf
B-4 – Highway Business	Yes[2]	N/A	45 feet	40,000 sf
C-4 – Shoreland Wetland (Shoreland Zoning)	No	N/A – no buildings or structures permitted		

[1]For guidance on calculating maximum density (residential land uses expressed in dwelling units per acre) or intensity (non-residential land uses), see Article VII, *Density & Intensity*, of the Village of East Troy Zoning Ordinance (https://ecode360.com/27769104).
[2]One residential dwelling unit is allowed as a conditional use when located outside the principal business structure.
[3]Dwelling unit maximum height is 45 feet; agricultural structure maximum height is two times the distance from nearest lot lines, per Division 9 of the Walworth County, WI Code of Ordinances.
du = dwelling units
sf = square feet

Sources: Village of East Troy, WI, Land Use and Development Code (https://ecode360.com/35565475), accessed January 2025; Walworth County, WI, Code of Ordinances, Chapter 74, Zoning (https://library.municode.com/wi/walworth_county/codes/code_of_ordinances?nodeId=WACOCOOR_CH74ZO), accessed January 2025; Coffman Associates analysis

[3] Wisconsin State Legislature § 59.69; 59.694; 87.30; Chapter 91 and amendments thereto

Although the Village of East Troy land use and development code does not specifically address airport land use compatibility for 57C, airport-specific height limitations are established in the Village of East Troy, Wisconsin, Code of Ordinances § 510-69, *Airport Height Restriction Overlay District*.[4] The ordinance height limitations for structures surrounding the airport are identified on the *Height Limitation Zoning Map, East Troy Municipal Airport, Walworth County, Wisconsin* (dated November 17, 1988). An outline of the overlay zone is depicted as an inset on the zoning map shown on **Exhibit 5D**. The ordinance was amended on December 5, 2022, to include the following exemptions:

- Objects less than 35 feet in height above ground level (AGL) within 0.5 miles of airport property
- Objects less than 50 feet AGL between 0.5 miles to 3.0 miles from the airport boundary
- When the FAA determines the structure does not pose a hazard to air navigation

Walworth County, WI, has not adopted an airport overlay district to regulate the height of structures in relation to the Part 77 surfaces of 57C. Regarding modifications to district height limitations, the county's standard and shoreline zoning standards state that "any structure located within an area surrounding an existing airport and which is subject to additional height regulations, shall not exceed the heights therein established." The restriction applies to height exceptions for structures that exceed the maximum allowable heights (shown in **Table 5C**).[5]

SUBDIVISION REGULATIONS

Subdivision regulations are legal devices employed to administer the process of dividing land into two or more lots, parcels, or sites for the building, location, design, and installation of supporting infrastructure. The subdivision regulations are one of two instruments commonly employed to carry out the goals and policies outlined in the comprehensive plan. The development standards for subdivision design and improvement in the Village of East Troy are codified within Chapter 495, *Subdivision of Land*, of the city's zoning and development code.[6] Subdivision regulations for unincorporated Walworth County, WI, are contained within Chapter 58, *Subdivisions*, of the county's code of ordinances.[7]

Subdivision regulations can be used to specify requirements for airport-compatible land development by requiring developers to plat and develop land to minimize noise impacts or reduce noise exposure to new development. Subdivision regulations can also be used to protect the airport proprietor from litigation for noise impacts at a later date. The most common requirement is the dedication of a noise or avigation easement to the airport sponsor by the land developer as a condition of the development approval. Easements typically authorize overflights of property with noise levels attendant to such operations.

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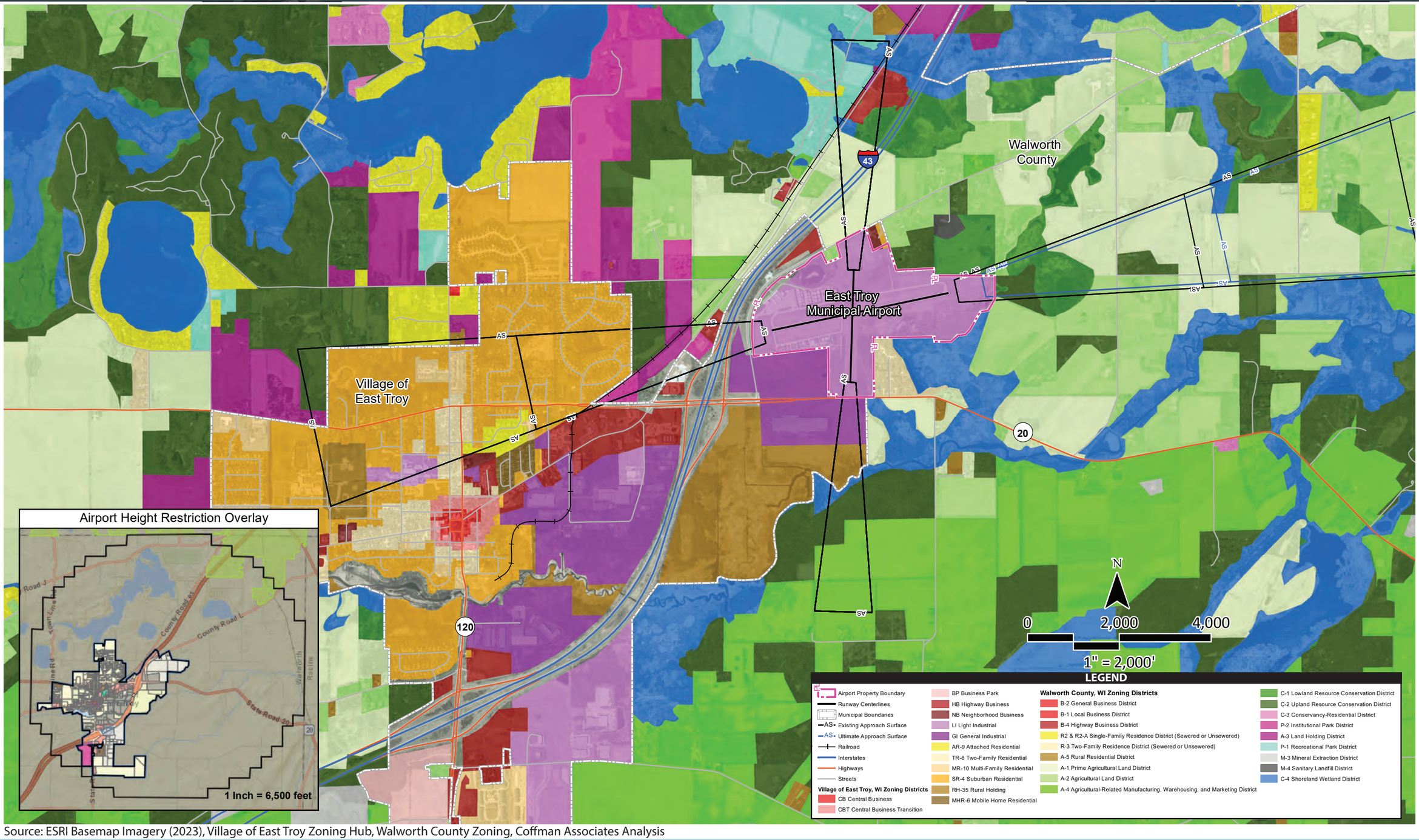
[4] Village of East Troy, WI, Code of Ordinances § 510-69, Airport Height Restriction Overlay District, as amended (https://ecode360.com/27769241), accessed January 2025

[5] Walworth County, WI, Code of Ordinances § 74-102, Height (https://library.municode.com/wi/walworth_county/code/code_of_ordinances?nodeId=WACOCOOR_CH74ZO_ARTIIZOOR_DIV9MO_S74-102HE), accessed January 2025.

[6] Village of East Troy, WI, Code of Ordinances, Chapter 495, Subdivision of Land (https://ecode360.com/27767242), accessed January 2025

[7] Walworth County, WI, Chapter 58, Subdivisions (https://library.municode.com/wi/walworth_county/codes/code_of_ordinances?nodeId=WACOCOOR_CH58SU), accessed January 2025.

EAST TROY MUNICIPAL AIRPORT MASTER PLAN



Airport Height Restriction Overlay

Source: ESRI Basemap Imagery (2023), Village of East Troy Zoning Hub, Walworth County Zoning, Coffman Associates Analysis

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BUILDING CODE

Building codes are established to provide minimum standards to safeguard life, limb, health, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures. Building codes may require sound insulation in new residential, office, and institutional buildings when warranted by existing or potential high aircraft noise levels.

For residential properties, the building codes for the Village of East Troy and Walworth County are comprised of the State of Wisconsin's Uniform Dwelling Code (UDC), as amended by each jurisdiction.[8] The UDC generally does not include noise attenuation requirements in building codes. Jurisdictions can pass regulations in their building codes for additional building requirements, such as reactivity to unique threats of regional natural disasters. This practice helps ensure structures are built accordingly from the beginning of construction, as they can be expensive and difficult to change later in the process. For new construction near an airport, incorporating noise attenuation can be especially important. Noise attenuation measures can include increased thickness of windows or sound-absorbing building materials.

FUTURE LAND USE PLANS

The future land use plan is a general policy document used by a government agency to identify and describe a community's characteristics, articulate goals and policies, and explore alternative plans for future growth. These aspects will be used to produce zoning ordinances and subdivision regulations to carry out the plan's goals. A municipality will often incorporate goals and policies for its airports in a future land use plan, which is typically separate from an airport master plan. Generally, the future land use plan guides local decision-makers through complications they may face during the development process or maintenance issues. Current planning documents of this type for the land near 57C are the *Village of East Troy Comprehensive Plan: 2020-2040* (adopted March 16, 2020), and the *Multi-Jurisdictional Comprehensive Plan Update for Walworth County* (adopted June 11, 2019).

VILLAGE OF EAST TROY COMPREHENSIVE PLAN: 2020-2040

The *Village of East Troy Comprehensive Plan: 2020-2040* identifies future land uses on Map 5A, *Future Land Use Map*. Airport property is included in the plan as institutional and public service, the surrounding land to the south is designated as general commercial and industrial, and the land to the east is designated as agricultural/open space. The plan identifies 57C as being capable of handling small business aircraft and the airport is noted as a strength for economic development (Policy Document, page 27). Policy 13 of the plan indicates that the community plans to increase efficiency of regional transit to the park and ride facility at the airport or relocate the park and ride facility to increase usage and efficiency of the facilities.

[8] Village of East Troy, WI, Code of Ordinances § 510-69, State Uniform Dwelling Code (https://ecode360.com/27765056), accessed January 2025

Regarding uses near the airport, the plan designates general industrial land use for areas "near the airport where outdoor, low intensity industrial activity will not interfere with airport operations" (Policy Document, page 24). Height restrictions surrounding the airport are not discussed in the plan; however, cell towers (including location, height, and appearance) are identified as an existing and emerging low-priority land use issue (Policy Document, page 5).

MULTI-JURISDICTIONAL COMPREHENSIVE PLAN UPDATE FOR WALWORTH COUNTY

Chapter IX, *Land Use Element*, of the *Multi-Jurisdictional Comprehensive Plan Update for Walworth County* classifies the future land use of 57C in the transportation, communication, and utility category. Although the plan document does not outline policies and programs specific to the county's airports, the land use categories depicted on the land use map near East Troy Municipal Airport are described in detail. Development estimates for each category are also provided within the Land Use Element.

Chapter XII, *Transportation Element*, of the *Multi-Jurisdictional Comprehensive Plan Update for Walworth County* identifies two public and three private airports in the county that are considered during the county's comprehensive planning efforts. Airports in the county plan include East Troy Municipal Airport and Burlington Municipal Airport (public airports) and Grand Geneva Resort Airport, Lake Lawn Airport, and Big Foot Airport (private airports); however, the Transportation Element does not contain any airport-specific transportation goals, objectives, policies, or programs.

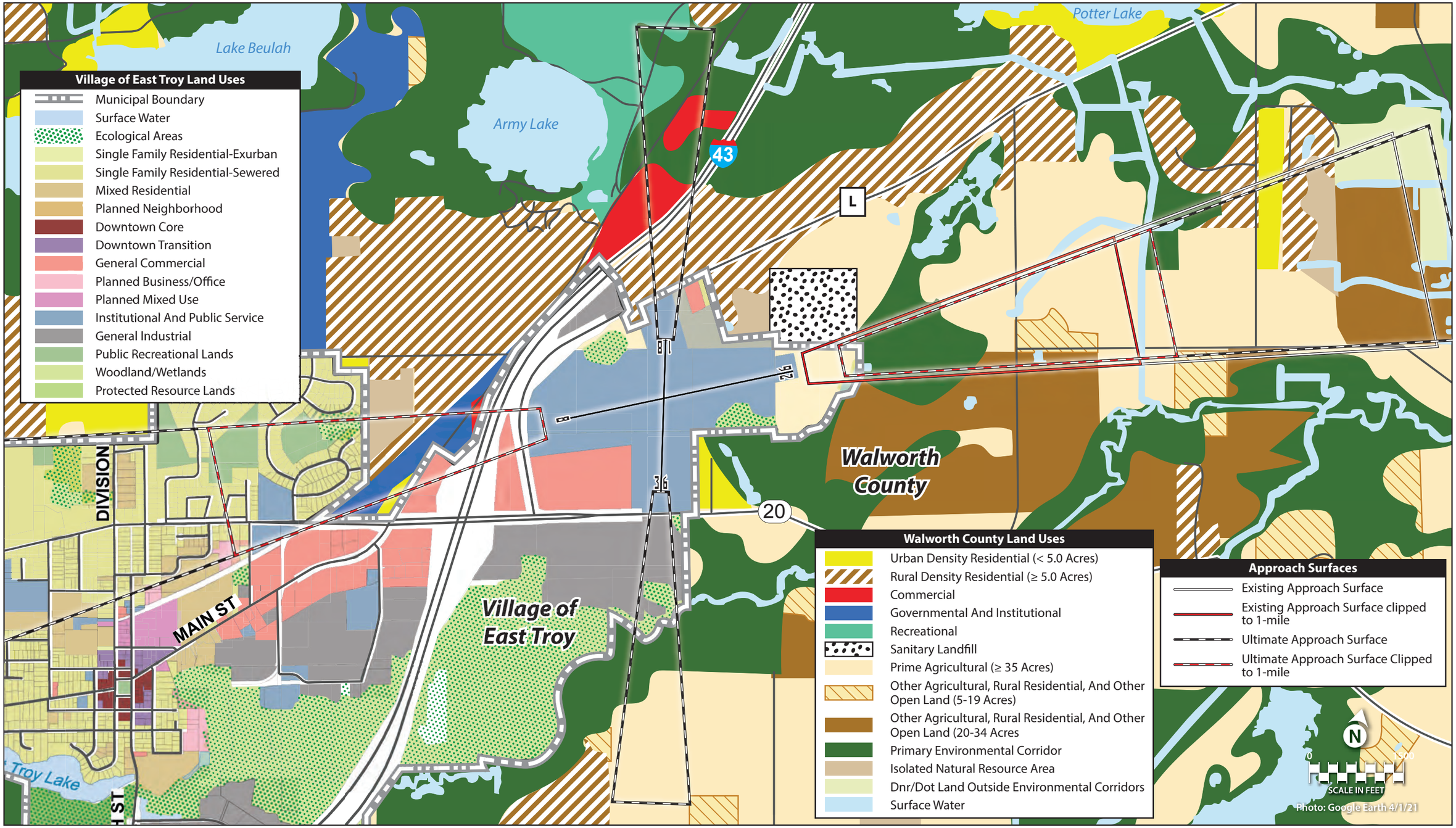
Exhibit 5E depicts the comprehensive plan land use designations within the airport's existing and ultimate Part 77 approach surfaces out to one mile. Future land uses within the approach surfaces out to one mile are industrial, commercial, mixed use, and open space. **Table 5D** presents the runway approach location where each land use is planned, as well as the purpose of each land use designation as stated in the comprehensive plan.

TABLE 5D | Future Land Use Designations Within the Ultimate Approach Surfaces Out to One Mile

VILLAGE OF EAST TROY, WI
Ecological Areas
Location: Runways 8 & 36 **Description:** The Environmental Corridor category includes generally continuous open space systems based on lands that have sensitive natural resources and limitations for development. This designation includes Wisconsin DNR-identified wetlands subject to existing state-mandated zoning, FEMA-designated floodplains, shoreland setback areas, and slopes of 20 percent or greater. Much of the undeveloped land within the village (primarily land associated with Honey Creek) is in the Environmental Corridor category, as is much of the land north of the village surrounding the lakes.
Single Family Residential – Sewered
Location: Runway 8 **Description:** This future land use category is mainly intended for single-family housing consistent with the village's historical urban densities. New development in these designated areas is not intended to be less dense than 4.5 units per acre, and no residential lot should exceed 15,000 square feet in area. As depicted, it is recommended that most existing Single Family Residential (Urban) development remain. New Single Family Residential (Urban) development is recommended for areas north of the village near the lakes and as a transition to the existing unsewered homes in the Town of East Troy. This future land use category is also recommended for vacant lots and infill areas adjacent to existing similar housing. Other areas for single-family housing are included in the Mixed Residential land use category (described elsewhere in this plan). Small public and institutional uses (such as parks, schools, and churches) may also be built within this designation.

(Continues)

EAST TROY MUNICIPAL AIRPORT MASTER PLAN



Sources: Village of East Troy Comprehensive Plan: 2020-2040, adopted March 16, 2020 (see 5A Future Land Use Map) and a Multi-Jurisdicational Comprehensive Plan Update for Walworth County adopted June 11, 2019. See Chapter 5, (see Map 5.1 Land Use Plan for Walworth County: 2050.)

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TABLE 5D | Future Land Use Designations Within the Ultimate Approach Surfaces Out to One Mile (continued)

Planned Neighborhood
Location: Runway 8 **Description:** This future land use designation is mapped over the planned northern and eastern neighborhood growth areas of the village. Traditional neighborhoods should include a carefully planned mix of predominantly single-family residential development combined with one or more of the following land use categories: two-family/townhouse residential, mixed residential, neighborhood office, neighborhood commercial, institutional, and/or park and open space facilities. This category is intended to accommodate the Traditional Neighborhood Development (TND) forms of development. Approximately 70 percent of the dwelling units in the Planned Neighborhood area should be single-family detached units, approximately 10 percent should be two-family units, and 20 percent should be multi-family units.
General Commercial
Location: Runway 8 **Description:** This category is intended for a broad range of uses, including commercial, office, community facility, outdoor display and sales (e.g., cars, boats, RVs, etc.), low-intensity warehousing and distribution, and small-scale (usually accessory) light industrial uses. These commercial use areas are characterized by moderate attention to landscaping, screened storage areas, lighting and signage, and compliance with design standards. New General Commercial areas are planned primarily east of the village near the airport and along I-43 north of County Highway ES.
Institutional and Public Service
Location: Runways 8 & 18 and Airport Property **Description:** This designation includes the East Troy Village Hall, public schools, the library, the East Troy Fire Department, utility uses, private institutional uses (e.g., churches and parochial schools), specialized housing and care facilities, East Troy Municipal Airport, power plants and substations, and the East Troy Railroad Yard. Future small-scale institutional uses may be located in areas planned for residential, business, office, industrial, mixed, or traditional neighborhood uses, while larger-scale institutional uses should generally be avoided in planned residential or traditional neighborhood areas.
General Industrial
Location: Runways 18 & 36 **Description:** This designation includes more intensive indoor manufacturing, warehousing, distribution, and office uses that often involve significant outdoor storage or processing of materials. Uses in this future land use category have characteristics that make them less compatible with most other uses and may require additional separation, screening, and buffering. New development should adhere to high-quality building design, generous landscaping, modest lighting, screened storage and processing areas, and limited and attractive signage. These areas should be located near arterial roads but away from existing or planned residential areas and high-visibility community gateways, whenever possible. This designation is mainly mapped over developed portions of the village's industrial parks and for areas near the airport where outdoor/ low-intensity industrial activity will not interfere with airport operations, as well as south of I-43 along Honey Creek Road.
Public Recreational Lands
Location: Runway 8 **Description:** This category generally includes all publicly owned land designated as state parks, scenic areas, conservation areas, village parks, or other recreational facilities owned by public or non-profit agencies. In addition to the areas currently designated in the village as Public Recreation Areas (future land use category), the plan recommends that additional public parks and other preserved open space be reserved within the Planned Neighborhood future land use category in accordance with the recommendations for parks found in Chapter 5: Utilities and Community Facilities (*A Multi-Jurisdictional Comprehensive Plan Update for Walworth County*). Public Recreation Areas may also be accommodated within other land use categories.
Agricultural/Open Space
Location: Runways 1 & 2 **Description:** This designation acts as a "holding district" and is intended to preserve productive agricultural lands in the long term, protect existing farm operations from encroachment by incompatible uses (including town subdivisions), promote further investments in farming, maintain eligibility for farming incentive programs, and ensure development does not landlock the village. This designation focuses on lands actively used for farming and/or lands with productive agricultural soils and topographic conditions suitable for farming. It also includes woodlands and other open space areas not otherwise shown as ecological areas. Lands in this category also include farmsteads, cottage industries, agriculture-related businesses, "value-added" farm production, and limited residential development at densities at or below one home per 35 acres.

(Continues)

TABLE 5D | Future Land Use Designations Within the Ultimate Approach Surfaces Out to One Mile (continued)

UNINCORPORATED WALWORTH COUNTY, WI
Urban Density Residential (< 5.0 Acres)
Location: Runway 8 **Description:** Under the plan, much of the new urban density residential development would occur as infill in areas already committed to such use and adjacent to similar existing development. Determination of a specific density within the overall density range would depend on the availability of sanitary sewer service, as well as town and county goals and objectives for the area concerned. In sewered areas, urban residential development could be accommodated through a number of residential zoning districts; the maximum single-family density allowed for new development (excluding legal substandard lots) is at least 15,000 square feet per dwelling in the R-2 Single-Family Residence zoning district. In unsewered areas, urban residential development should only be accommodated in areas identified for such uses on the land use plan map and through the R-1 Single-Family Residence zoning district (at least 40,000 square feet per dwelling), and (to a lesser extent) through the C-3 Conservancy-Residential zoning district (at least 100,000 square feet per dwelling) or R-5 Planned Residential Development zoning district (at least 40,000 square feet per dwelling).
Rural Density Residential (≥ 5.0 Acres)
Location: Runways 8 & 18 **Description:** Two towns, East Troy and Sugar Creek, specifically designate certain areas for future rural density residential use with a maximum density of no more than one dwelling per five acres. Such development would be accommodated through the C-2 Upland Resource Conservation zoning district. The identified rural density residential land encompasses about 3,170 acres (1.2 percent of the county's plan update area).
Commercial
Location: Runways 8 & 18 **Description:** These areas include designated commercial areas that would serve as neighborhood centers, town commercial centers, or commercial gateways to urban centers. Commercial development in the identified areas would generally be accommodated through the B1 Local Business zoning district, B-2 General Business zoning district, B-3 Waterfront Business zoning district, or B-4 Highway Business zoning district.
Governmental and Institutional
Location: Runway 8 **Description:** These areas are mostly comprised of lands in the P-2 Institutional Park zoning district and include areas that are wholly or partially developed as schools, churches, and government buildings (e.g., town halls, fire stations, and cemeteries).
Recreational
Location: Runway 18 **Description:** These areas primarily consist of parks, golf courses, campgrounds, and similar outdoor recreation uses and are generally accommodated in the P-1 Recreational Park zoning district. Wetlands and woodlands within such recreational sites are generally identified on the plan map as part of an environmental corridor or isolated natural resource area.
Prime Agricultural (≥ 35 Acres)
Location: Runways 26 & 36 **Description:** Prime agricultural land largely consists of agricultural lands covered by Capability Class I, II, and III soils, as identified by the U.S. Department of Agriculture's Natural Resources Conservation Service. The prime agricultural lands shown on the land use plan map generally correspond to the county's A-1 Prime Agricultural Land zoning district with certain exclusions in areas where the respective town plans recommend future urban or rural development. The prime agricultural land area includes scattered home sites and vacant lots within essentially agricultural areas that have been "blended in" as a mapping convention.
Other Agricultural, Rural Residential, and Other Open Land (5-19 Acres)
Location: Runway 26 **Description:** The overriding recommendation for these areas is that they be retained in rural use (agricultural use, other open use, or rural residential development). Rural residential development may be accommodated at densities between five and 19 acres per dwelling.

(Continues)

TABLE 5D | Future Land Use Designations Within the Ultimate Approach Surfaces Out to One Mile (continued)

Other Agricultural, Rural Residential, and Other Open Land (20-34 Acres)
Location: Runway 26 **Description:** The overriding recommendation for these areas is that they be retained in rural use (agricultural use, other open use, or rural residential development). Rural residential development may be accommodated at densities between 20 and 34 acres per dwelling.
Primary Environmental Corridor
Location: Runways 18, 26, & 36 **Description:** Environmental corridors, which are more fully described in Chapter 3 (*A Multi-Jurisdictional Comprehensive Plan Update for Walworth County*), are linear areas in the landscape that contain concentrations of wetlands, woodlands, wildlife habitat, surface water, and other natural resource features. Primary environmental corridors are the largest of these and are defined as being at least 400 acres in area, two miles in length, and 200 feet in width.
Isolated Natural Resource Area
Location: Runway 8 **Description:** Isolated natural resource areas, which are more fully described in Chapter 3, are comprised of tracts of wetlands, woodlands, and surface water, defined as being at least five acres in area and 200 feet in width, that are separated from the environmental corridors.
du = dwelling units

Sources: Village of East Troy Comprehensive Plan: 2020-2040, adopted March 16, 2020; A Multi-Jurisdictional Comprehensive Plan Update for Walworth County, adopted June 11, 2019; Coffman Associates analysis

NON-COMPATIBLE DEVELOPMENT ANALYSIS

In addition to areas with the potential for non-compatible development based on zoning and future land use plans, the airport's noise exposure contours have been evaluated in comparison with the recommended height restrictions within the Part 77 approach surfaces out to one mile. This was accomplished by evaluating city-adopted land use plans and zoning designations for parcels encompassed by the noise contours to determine if noise-sensitive land uses could be developed in those areas. Noise contours and height restrictions within the Part 77 approach surface area are addressed in this section.

NOISE EXPOSURE CONTOURS

The standard methodology for analyzing noise conditions at airports involves the use of a computer simulation model. The purpose of the noise model is to produce noise exposure contours that are overlain on a map of the airport and vicinity to graphically represent aircraft noise conditions. When compared to land use, zoning, and general plan maps, the noise exposure contours may be used to identify areas that are currently (or have the potential to be) exposed to aircraft noise.

To achieve an accurate representation of an airport's noise conditions, the noise model uses a combination of industry-standard information and user-supplied inputs specific to the airport. The software provides noise characteristics, standard flight profiles, and manufacturer-supplied flight procedures for aircraft that commonly operate at 57C. Each aircraft has different design and operating characteristics (number and type of engines, weight, and thrust levels) and emits different noise levels. The most common way to spatially represent the noise levels emitted by an aircraft is a noise exposure contour.

Airport-specific information is also used in modeling inputs, including runway configuration, flight paths, aircraft fleet mix, runway use distribution, local terrain and elevation, average temperature, and numbers of daytime and nighttime operations.

Based on assumptions provided by the user, the noise model calculates average 24-hour aircraft sound exposure within a grid covering the airport and surrounding areas. The grid values represent the DNL at each intersection point on the grid and signify a noise level for that geographic location. To create noise contours, an isoline similar to those on a topographic map is drawn that connects points of the same DNL noise value. In the same way a topographic contour represents equal elevation, the noise contour identifies areas of equal noise exposure.

DNL is the metric currently accepted by the FAA, U.S. Environmental Protection Agency (EPA), and Department of Housing and Urban Development (HUD) as an appropriate measure of cumulative noise exposure. These three agencies have identified the 65 DNL noise contour as the threshold of incompatibility.

The guidelines summarized in Table 1 of Title 14 CFR Part 150 indicate that all land uses are acceptable in areas below 65 DNL.[9] At or above the 65 DNL threshold, residential uses (including RV parks and campgrounds), educational and religious facilities, health and childcare facilities, and outdoor sport, recreation, and park facilities are all incompatible. As with residential development, communities can make policy decisions that these uses are acceptable with appropriate sound attenuation measures. Hospitals and nursing homes, places of worship, auditoriums, and concert halls are structures that are generally compatible if measures to achieve noise level reduction are incorporated into the design and construction of such structures. Outdoor music shells and amphitheaters are not compatible and should be prohibited within the 65 DNL noise contour. Additionally, agricultural uses and livestock farming are generally considered compatible except related residential components of these uses, which should incorporate sound attenuation measures.

As part of this master plan, noise exposure contours were prepared for 57C for a baseline condition (2024) and a long-range condition (2044). The resulting contours are shown on **Exhibits 5B** and **5C**.

HEIGHT RESTRICTIONS

To analyze the potential for non-compatible development of land off airport property, zoning within the Part 77 approach surface area out to one mile from the end of the runways was evaluated. **Table 5C** notes the maximum height limit for zoning of the underlying permitted land uses, which range from 40 feet to unlimited height. Additional height restrictions are placed on the approach surfaces by the previously discussed Village of East Troy airport hazard zoning ordinance.

[9] Title 14 CFR Part 150 (https://www.ecfr.gov/current/title-14/chapter-I/subchapter-I/part-150)

RECOMMENDATIONS

Based on the previously presented information and the non-compatible development analysis, the following recommendations are provided to maintain airport land use compatibility in the vicinity of 57C. The following recommendations are in accordance with the recently published FAA Advisory Circular (AC) 150/5190-4B, which identifies compatible land use development tools, resources, and techniques to protect surrounding communities from adverse effects associated with airport operations.[10]

- **Update Airport Height Restriction Overlay Zoning Ordinance & Maps |** The airport height restriction overlay zoning ordinance adopted by the Village of East Troy could be reviewed and updated to reflect the existing and ultimate conditions for 57C. The current airport hazard zoning ordinance references the Part 77 surfaces for the airport, which may change over time as the Part 77 airspace drawing for the airport is updated. The hazard zoning maps for each jurisdiction could also be updated.

- **Encourage Surrounding Cities to Adopt Airport Hazard Area Zoning Ordinance & Maps |** Walworth County, WI, does not currently enforce zoning ordinances for the safety of land uses surrounding 57C in unincorporated Walworth County. Due to the proximity of 57C to vacant land in the county, there is potential for land development that could create hazards to flight or to persons and property on the ground. It is recommended that surrounding jurisdictions adopt airport hazard zoning ordinances consistent with the Village of East Troy's *Airport Height Restriction Overlay Zoning Ordinance & Maps*.

- **Implement Use of the FAA Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) Tool |** The city and county airport hazard zoning ordinances and/or building permit application process could be modified so airport hazards are identified through an FAA 7460-1 airspace analysis. The FAA notice criteria tool allows users (airport sponsor, developer, and local municipality) to input location and dimensional information about a proposed development to determine if filing a notice with the FAA is required. If a notice is required, the proponent would then be required to submit FAA Form 7460-1, *Notice of Construction or Alteration*, to the FAA for review as a local project review standard pursuant to each jurisdiction's existing airport hazard ordinance.

- **Consult FAA Advisory Circular for Wildlife Hazard Review |** Certain land uses that attract birds and other wildlife hazards should not be permitted on or near the airport, according to FAA AC 15/5200-33C.[11] Land uses that increase the potential for bird strikes could be addressed more specifically in the airport hazard overlay district zoning regulations.

- **Modify Special Exceptions/Conditional Uses |** In its most recent advisory circular, the FAA advises that if a community located near an airport allows some land use control through conditional uses, that community should make certain such uses do not create a hazard for the

[10] FAA AC 150/5190-4B, Airport Land Use Compatibility Planning, September 16, 2022

[11] FAA AC 15/5200-33C, Hazardous Wildlife Attractants On or Near Airports, February 21, 2020

community, the airport, or the user of the subject property. The Village of East Troy could modify the change of zone requirements and/or conditional use requirements within the airport's vicinity to have a designation that triggers extraordinary review of these exceptions because of a property's location near an airport.

- **Adopt Fair Disclosure Requirements for Real Estate Transactions within the Vicinity of 57C |** Fair disclosure regulations in real estate transactions are intended to ensure prospective buyers of property are informed that a property is or will be exposed to potentially disruptive aircraft noise or overflights. Around even the busiest airports, it is not uncommon for newcomers to report having bought property without having been informed about airport noise levels. At the most formal level, fair disclosure can be implemented through a city or county ordinance that requires a deed notice for property within the vicinity of the airport based on an existing boundary, such as the Part 77 horizontal imaginary surface. The following is an example of deed notice language that would notify a property owner of the proximity of the airport and expectations for living in the vicinity of the airport:

  The subject property is within the vicinity of East Troy Municipal Airport, located at 2085 Highway L, East Troy, WI 53120. Properties within this area are routinely subject to overflights by aircraft using this public-use airport; as a result, residents may experience inconvenience, annoyance, or discomfort arising from the noise of such operations. Residents should also be aware that the current volume of aircraft activity may increase in response to the population and economic growth within the East Troy Municipal Airport vicinity. Any subsequent deed conveying this parcel or subdivisions thereof shall contain a statement in substantially this form.

- **Increase Airport and FAA Participation in Local and Regional Planning |** The authority to develop, implement, and enforce land use programs and decisions rests predominantly with local governments; therefore, it is recommended that airport operators be involved in the preparation of city, county, and regional comprehensive plans so they can advocate for airport interests and provide their specialized expertise to the planning team. Airport coordination with local governments ensures they are routinely provided with information about proposed development activity in the airport environs, which allows the airport operators the opportunity to review and comment on those proposals and engage with all jurisdictions in the airport vicinity.

AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION

The primary objective of this section is to provide the Village of East Troy and its airport administration with recommendations for future improvements and processes that promote sustainable principles in addressing airport operations and aviation demand. Making sustainability a priority in the planning process will aid the airport in identifying ways to reduce its overall environmental impact. By implementing sustainability best management practices into the master plan process, the airport can become a more environmentally friendly economic hub.

REGULATORY GUIDELINES

FAA Modernization and Reform Act of 2012 | The *FAA Modernization and Reform Act of 2012* (FMRA), which amended Title 49 United States Code (USC), included several changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling, reuse, and waste reduction at airports:

- Section 132(b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and local recycling laws, including the cost of a waste audit."

- Section 133 of the FMRA added a provision that requires an airport that has or plans to prepare a master plan and receives AIP funding for an eligible project to ensure the new or updated master plan addresses issues related to solid recycling at the airport, including the following:

    - The feasibility of solid waste recycling at the airport
    - Minimizing the generation of solid waste at the airport
    - Operation and maintenance requirements
    - A review of waste management contracts
    - The potential for cost savings or the generation of revenue

State of Wisconsin Solid Waste Management | In the State of Wisconsin, the Wisconsin Department of Natural Resources (DNR) aids in managing solid waste, along with local governments, private industries, and other organizations, to minimize waste and encourage reuse and recycling.[12]

Wisconsin also has a strong history of recycling and composting; as a result, Wisconsin has a comprehensive set of laws that ban the disposal and incineration of certain materials in local landfills (**Exhibit 5F**). Wisconsin also has a database that tracks statewide collection areas for recyclables and compostable items, known as the *Wisconsin Recycling Markets Directory*.

Village of East Troy | The Village of East Troy utilizes John's Disposal Service Inc. for both waste and recycling collection. Additionally, a compost site is available to the Village of East Troy for disposal of brush (woody plants) and branches. The village may dispose of leaves at a wastewater treatment plant located at 2104 Young Street.

SOLID WASTE

Airport sponsors typically have purview over waste handling services in facilities they own and operate, such as passenger terminal buildings, sponsor-owned hangars, aircraft rescue and firefighting (ARFF) stations, and maintenance facilities. Tenants of airport-owned buildings/hangars or tenants that own their facilities are typically responsible for coordinating their own waste handling services.

[12] Wisconsin DNR, Solid Waste Management in Wisconsin (https://dnr.wisconsin.gov/topic/Waste/Solid.html)

Wisconsin Recycles

The following items are **banned** from landfills and incinerators statewide and should be reused, recycled or composted.

Containers

- #1 and #2 plastic bottles and jars
- Aluminum containers
- Bi-metal cans
- Glass containers
- Steel (tin) cans

Paper and Cardboard

- Corrugated cardboard
- Magazines, catalogs, and other materials on similar paper
- Newspaper and newsprint materials
- Office paper

Yard Materials

- Grass clippings
- Debris and brush under 6" in diameter
- Leaves

Vehicle Items

- Lead-acid vehicle batteries
- Tires *
- Used oil filters
- Waste oils *

**These items may be burned in a solid waste treatment facililty with energy recovery.*

Appliances

- Air conditioners
- Boilers
- Clothes dryers
- Clothes washers
- Dehumidifiers
- Dishwashers
- Freezers
- Furnaces
- Microwaves
- Ovens
- Refrigerators
- Stoves
- Water heaters

Electronics

- Cell phones
- Computers – desktop, laptop, netbook, tablet
- Computer monitors
- Computer keyboards and mice
- Computer scanners
- Computer speakers
- Desktop printers (including those that fax and scan)
- DVD players, VCRs, DVRs and all other video players
- External hard drives
- Fax machines
- Flash drives/USBs
- Other items that plug into a computer
- Televisions

Why ban items from the landfill and incinerator?

The items on this list are made of materials that can be reused in new products. Some also have toxic components that we do not want in our groundwater, air or soil. Recycling and composting allow landfills to last longer, provide markets with valuable reusable materials, create jobs, and prevent pollution.

Why not ban more materials?

Corrugated cardboard is banned while waxed cardboard is not. Some things with plugs, like computers, are banned, while others, like toasters, are not. Why? Current bans cover some of the most easily reusable or most toxic materials on the market today. Eventually more items may be added to this list as new recycling markets develop or the types of materials we throw away change.

Some communities go above and beyond what is required by state law. Check with your local government or recycling service provider to find out what additional materials are accepted for recycling in your area. For more information about Wisconsin's recycling program, search "recycle" at dnr.wi.gov. Wisconsin's recycling requirements apply to everyone in the state at all residences and places of work or play.

Wisconsin Department of Natural Resources
Bureau of Waste and Materials Management
P.O. Box 7921, Madison, WI 53707 • (608) 266-2111
DNRWasteMaterials@wisconsin.gov

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For airports, waste can generally be divided into eight categories:[13]

- **Municipal solid waste (MSW)** is more commonly known as trash or garbage and consists of everyday items that are used and then discarded, such as product packaging.

- **Construction and demolition waste (C&D)** is considered non-hazardous trash resulting from land clearing, excavation, demolition, and renovation or repair of structures, roads, and utilities. C&D waste includes concrete, wood, metals, drywall, carpet, plastic, pipe, cardboard, and salvaged building components. C&D is also generally labeled MSW.

- **Green waste** is a form of MSW yard waste that consists of tree, shrub, and grass clippings, as well as leaves, weeds, small branches, seeds, and pods.

- **Food waste** includes unconsumed food products or waste generated and discarded during food preparation and is also considered MSW.

- **Deplaned waste** is waste removed from passenger aircraft. Deplaned waste includes bottles, cans, mixed paper (e.g., newspapers, napkins, and paper towels), plastic cups, service ware, food waste, and food-soiled paper/packaging.

- **Lavatory waste** is a special waste that is emptied through a hose and pumped into a lavatory service vehicle. The waste is then transported to a triturator[14] facility for pretreatment prior to discharge in the sanitary sewage system. Chemicals in lavatory waste can present environmental and human health risks if mishandled; therefore, caution must be taken to ensure lavatory waste is not released to the public sanitary sewage system prior to pretreatment.

- **Spill clean and remediation wastes** are special wastes generated during cleanup of spills and/or the remediation of contamination from several types of sites on an airport.

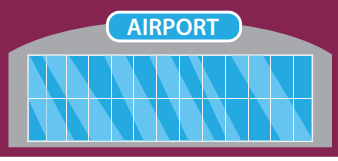
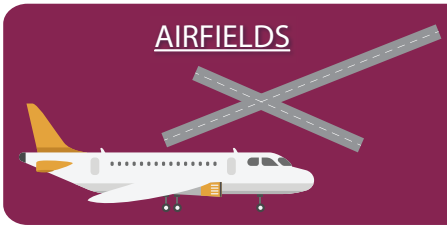
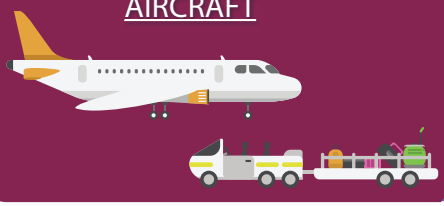
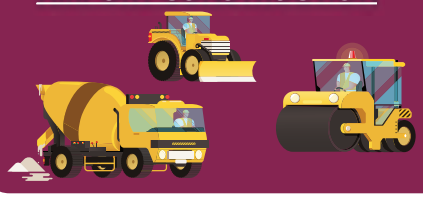
- **Hazardous wastes** are governed by the *Resource Conservation and Recovery Act* (RCRA) and the regulations in Title 40 CFR Subtitle C, Parts 260 to 270. The U.S. EPA developed less stringent regulations for certain hazardous waste, universal waste, which are described in 40 CFR Part 237, *The Universal Waste Rule*.

As shown on **Exhibit 5G**, there are multiple areas where the airport potentially contributes to the waste stream, including the passenger terminal building, flight kitchens, on-airport tenants (e.g., FBOs, SRE/airport maintenance building, etc.), hangars, airfields, aircraft ground support equipment, and airport construction projects. To create a comprehensive waste reduction and recycling plan for the airport, all potential inputs must be considered.

[13] FAA, Recycling, Reuse, and Waste Reduction at Airports, April 24, 2013

[14] A triturator turns lavatory waste into fine particulates for further processing.

AIRPORT WASTE STREAMS

AIRPORT AREA	POTENTIAL INPUTS	POTENTIAL OUTPUTS
TERMINALS 	Restaurants Shops Passengers Employees	Food Waste, Paper Plastic, Aluminum Cans Trash, Grease & Oil Green Waste Deplaned Waste
AIRFIELDS 	Aircraft Operations	Runway Rubber Green Waste
AIRCRAFT 	Aircraft Ground Support Equipment (GSE)	Vehicle Waste Plastic Wastewater Hazmat
AIRPORT CONSTRUCTION 	Construction Re-Construction Demolition	Reused Concrete Reused Asphalt Vehicle Waste Soils, Building Materials Wood, General Waste
ADMINISTRATIVE OFFICES 	Employees	Food Waste Paper, Plastic Aluminum Cans Trash

Source: Recycling, Reuse, and Waste Reduction at Airports, FAA (April 24, 2013)

EXISTING SERVICES

The Village of East Troy manages solid waste through various dumpsters located throughout the airport that are provided by John's Disposal Service Inc. Tenants are responsible for overseeing their own solid waste. Currently, there is no recycling program established at the airport.

SOLID WASTE MANAGEMENT SYSTEM

Airports generally utilize either centralized or decentralized waste management systems. The differences between the two methods are described below and summarized on **Exhibit 5H**.

- **Centralized Waste Management System |** With a centralized management system, the airport provides receptacles for the collection of waste, recyclable materials, or compostable materials and contracts for their removal by a single local provider.[15] The centralized waste management system allows for more participation from airport tenants that may not be incentivized to recycle on their own and can reduce the overall cost of service for all involved. A centralized strategy can be inefficient for some airports, as it requires more effort and oversight on the part of airport management; however, a centralized system is advantageous in that it requires fewer working components involved in the overall management of the solid waste and recycling efforts. It also allows greater control by the airport sponsor over the type(s), placement, and maintenance of dumpsters, thereby saving space and eliminating the need for tenants to have individual containers.

- **Decentralized Waste Management System |** Under a decentralized waste management system, the airport provides waste containers and contracts for the hauling of waste materials in airport-operated spaces only and airport tenants (such as FBOs, retail shops, and others) manage the waste from their leased spaces with separate contracts, billing, and hauling schedules. A decentralized waste management system can increase the number of receptacles on airport property and the number of trips by a waste collection service provider if the collection schedules of the airport and tenants differ.

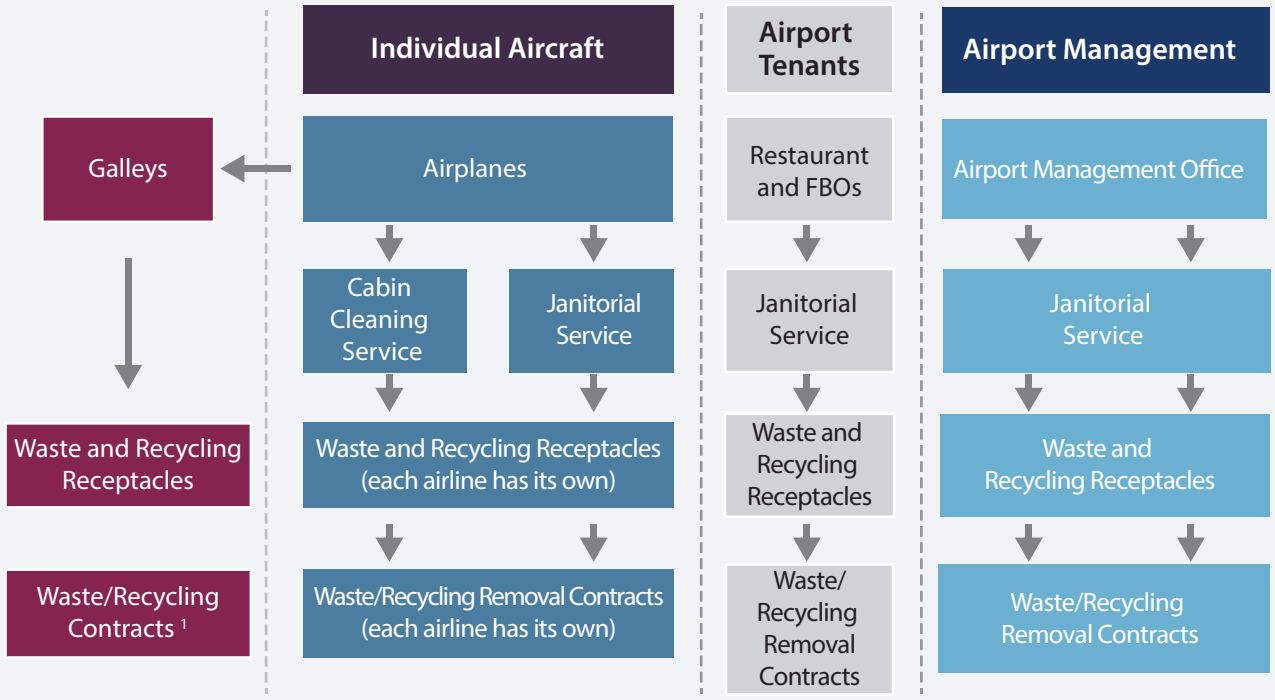
GOALS AND RECOMMENDATIONS

Solid Waste and Recycling Goals

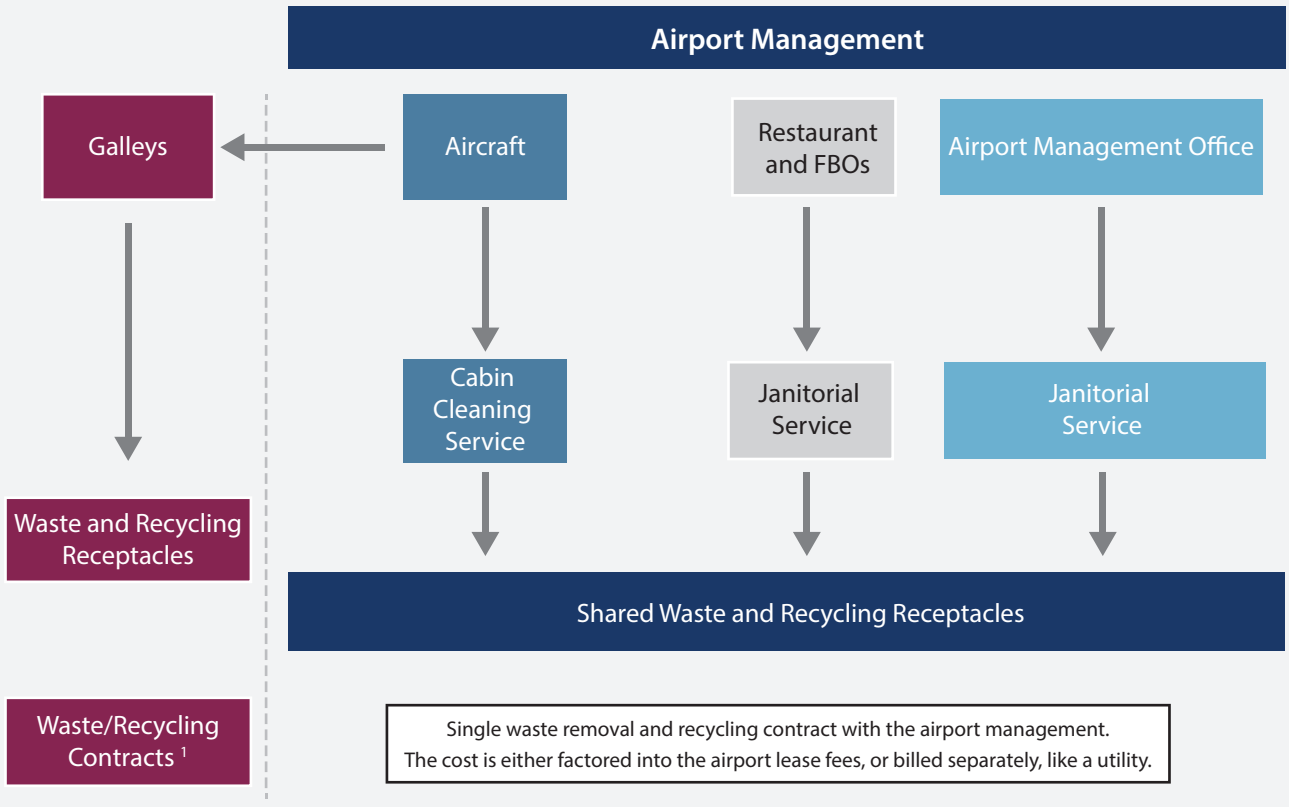
Table 5E outlines objectives that could help reduce waste generation and increase recycling efforts at the airport. To increase the effectiveness of tracking progress at the airport, a baseline state of all suggested metrics should be established to provide a comparison over time.

[15] National Academies of Sciences, Engineering, and Medicine, Airport Cooperative Research Program, Synthesis 92, Airport Waste Management and Recycling Practices, 2018

Components of a Decentralized Airport Waste Management System



Components of a Centralized Airport Waste Management System



[1] Galleys usually manage their own waste even if an airport relies on a centralized system

Source: Natural Resources Defense Council, Trash Landings: How Airlines and Airports Can Clean Up Their Recycling Programs, December 2006.

TABLE 5E | Waste Management and Recycling Goals – East Troy Municipal Airport, Wisconsin

Goal	Objectives
Create a centralized waste management system	• Audit existing waste management practices. • Improve waste and data management.
Create a recycling program	• Implement recycling marketing and promotion efforts at the FBO. • Require recycling services in all areas of the airport. • Incorporate recycling requirements and/or recommendations into tenant lease agreements. • Require contractors to implement strategies to reduce, reuse, and recycle construction and demolition (C&D) waste. • Eliminate the purchase of items that are not recyclable (e.g., Styrofoam, plastic bags).

Source: Coffman Associates, Inc.

Recommendations

The following recommendations are made to maximize waste reduction and increase recycling efforts at the airport:

- *Create a centralized waste management system at the airport*. 57C currently participates in a decentralized waste management system because airport tenants are responsible for overseeing their own waste management. Airport staff could consider engaging tenants to create a centralized waste management system at the airport to streamline waste management and recycling efforts at 57C.

- *Assign the responsibility of waste management to a dedicated individual or group*. Having one person or a group of people oversee and manage solid waste and recycling at the airport will create efficient and cost-saving solid waste management solutions. People dedicated to this operational aspect of the airport will be familiar with processes and will help identify areas of improvement and cost-saving measures.

- *Audit the current waste management system*. The continuation of an effective program requires accurate data on current waste and recycling rates. An airport can gain insight into its waste stream in several ways, such as requesting weights from the hauler, tracking waste volume, or reviewing the bills; however, managing the waste system starts with a waste audit, which is an analysis of the types of waste produced. A waste audit is the most comprehensive and intensive way to assess waste stream composition, opportunities for waste reduction, and capture of recyclables, and should include the following actions:

    - Examination of records

        - Review waste hauling and disposal records and contracts
        - Inspect supply and equipment invoices
        - Identify other waste management costs (commodity rebates, container costs, etc.)
        - Track waste from the point of origin
        - Establish a baseline for metrics

  - Facility walk-through conducted by the airport
    - Gather qualitative waste information to determine major waste components and waste-generating processes
    - Identify the locations on the airport that generate waste
    - Identify what types of waste are generated by the airport to determine what can be reduced, reused, or recycled
    - Improve understanding of waste pick-up and hauling practices
  - Conduct waste sort
    - Provides quantitative data on total airport waste generation
    - Allows problem-solving design/enhances the recycling program for the airport

- *Create a tracking and reporting system*. Track solid waste generated to allow the airport the opportunity to identify areas where a significant amount of waste is generated, which will help the airport estimate annual waste volumes. Understanding the cyclical nature of waste generation will allow the airport to estimate costs and identify areas of improvement.

- *Reduce waste through controlled purchasing practices and the consumption of nonessential products*. The airport can control the amount of waste generated by prioritizing the purchase of items or supplies that are reusable, recyclable, compostable, or made from recycled materials.

- *Create a recycling program at the airport*. To guarantee the airport reduces the amount of waste hauled to the landfill, materials that cannot be reused or avoided should be recycled, if possible. The village should review internal procedures to ensure there are no unacceptable items contaminating recycling containers or recyclables thrown in the trash. Clearly marked signage that indicates what is and is not accepted, placed near the solid waste and recycling containers, is another significant component of a consistent, effective recycling program.

- *Provide education for airport employees*. To minimize waste within the airport, it is vital to inform and provide airport employees with a thorough education on waste management at both individual and group levels. As part of the onboarding process, new employees should be given the tools needed to achieve a thorough understanding of the airport's solid waste and recycling goals.

- *Provide tenant education*. It is crucial to encourage tenant participation to ensure buy-in of the airport's recycling efforts. To ensure recycling is part of the airport's everyday business, airport administration should provide training and education to support personnel, tenants, and others who conduct business at the airport. In-person meetings with airport tenants could be held to create mutual understanding of the airport's solid waste and recycling goals and how tenants play a vital role in the airport's overall success.

- *Recycle electronic waste (e-waste)*. To guarantee the airport continues to reduce the amount of waste hauled to the landfill, materials that cannot be reused or avoided should be recycled, if possible. Recyclable materials (such as paper, aluminum, plastics, electronics, etc.) should be sorted from the airport's solid waste. 57C and its tenants should consider utilizing the Village of

East Troy's e-waste program, to which electronics can be sent as needed. Wisconsin also has a statewide manufacturer-funded program, E-Cycle Wisconsin, that provides various collection drop-off sites for electronics across the state.[16]

SUMMARY

This chapter was prepared to help the airport sponsor make decisions on the future growth and development of 57C by narratively and graphically describing the development concept. The plan represents an airfield facility that fulfills aviation needs for the airport while conforming to safety and design standards, to the extent practicable. It also provides a guide for a landside complex that can be developed as demand dictates.

Flexibility will be crucial to future development at the airport, as activity may not occur as predicted. The development concept provides airport stakeholders with a general guide that, if followed, can maintain the airport's long-term viability and allow the airport to continue to provide general aviation services for the region. The next chapter of this master plan will consider strategies for funding the recommended improvements and will provide a reasonable schedule for undertaking the projects over the next 20 years and beyond, based on safety and demand.

[16] Wisconsin Department of Natural Resources (https://dnr.wisconsin.gov/topic/Ecycle)

Chapter Six

Financial Management and Development Program

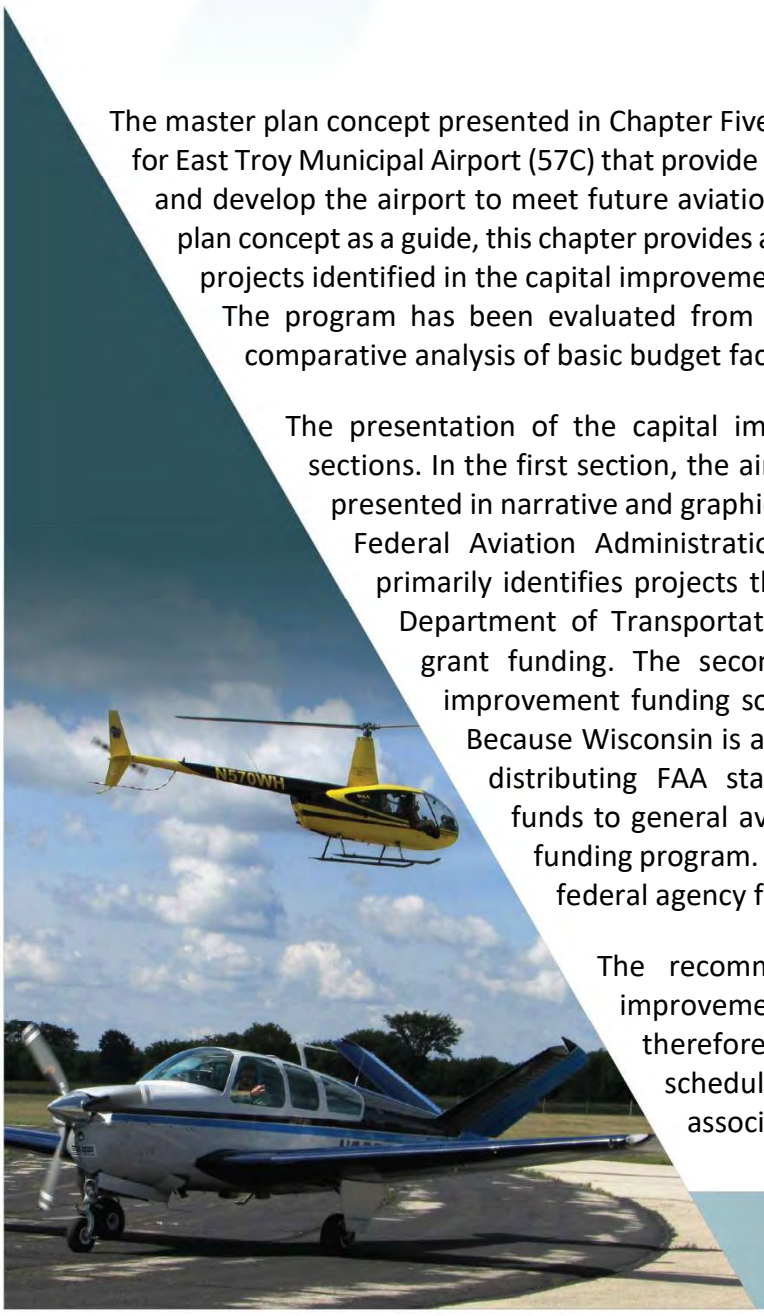
The Village of East Troy

Chapter 6

Financial Management and Development Program

The master plan concept presented in Chapter Five outlined airside and landside improvements for East Troy Municipal Airport (57C) that provide the Village of East Troy with a plan to preserve and develop the airport to meet future aviation demands. Using the recommended master plan concept as a guide, this chapter provides a description and overall cost estimates for the projects identified in the capital improvement program (CIP) and development schedule. The program has been evaluated from a variety of perspectives and represents a comparative analysis of basic budget factors, demand, and priority assignments.

The presentation of the capital improvement program is organized into two sections. In the first section, the airport's CIP and associated cost estimates are presented in narrative and graphic form. The CIP has been developed following Federal Aviation Administration (FAA) guidelines for master plans and primarily identifies projects that are likely eligible for FAA and Wisconsin Department of Transportation (WisDOT) Bureau of Aeronautics (BOA) grant funding. The second section identifies and discusses capital improvement funding sources at the federal, state, and local levels. Because Wisconsin is a block grant state, the BOA is responsible for distributing FAA state apportionment and discretionary grant funds to general aviation (GA) airports, as well as its own state funding program. As such, the BOA serves as both the state and federal agency for grants at 57C.



The recommended concept and specific needs and improvements for the airport have been established; therefore, the next step is to determine a realistic schedule for project implementation and the associated costs for the plan.

The Village of East Troy

The capital improvement program considers the interrelationships among the projects to determine an appropriate sequence of development while remaining within reasonable fiscal constraints.

The CIP is programmed by planning horizons and has been developed to cover the short-term (1-5 years), intermediate-term (6-10 years), and long-term (11-20 years) planning horizons. By using planning horizons instead of specific years, the Village of East Troy will have greater flexibility to adjust capital needs as demand dictates. **Table 6A** summarizes the key aviation demand milestones projected at 57C for each planning horizon.

TABLE 6A | Planning Horizon Activity Levels

	Base Year (2024)	Short Term (1-5 Years)	Intermediate Term (6-10 Years)	Long Term (11-20 Years)
BASED AIRCRAFT				
Single-Engine	65	66	67	71
Multi-Engine	3	3	3	1
Turboprop	2	4	5	8
Jet	0	1	2	4
Helicopter	8	8	9	11
TOTAL BASED AIRCRAFT:	**78**	**82**	**86**	**95**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Air Taxi	277	270	290	320
General Aviation	20,299	22,000	22,900	24,900
Total Itinerant	20,776	22,470	23,390	25,420
Local				
General Aviation	20,299	22,200	23,500	26,400
Total Local	20,299	22,200	23,500	26,400
TOTAL OPERATIONS:	**41,075**	**44,670**	**46,890**	**51,820**

Source: Coffman Associates analysis

A key aspect of this planning document is the use of demand-based planning milestones. The short-term planning horizon contains the items of highest need and/or priority, some of which have been previously defined by airport management and existing CIP schedules. As short-term horizon activity levels are reached, the intermediate term can be planned for based on the next activity milestones. Likewise, the long-term activity milestones can be planned for when the intermediate milestones are reached.

Many development items included in the recommended concept will need to follow these demand indicators. For example, the plan includes utility infrastructure expansion and site preparation for the construction of new landside facilities to support aircraft activity. Demand for new based aircraft will be a primary indicator for these projects. If based aircraft growth occurs as projected, additional hangars should be constructed to meet the demand. If growth slows or does not occur as forecasted, some projects may be delayed. As a result, capital expenditures are planned to be made on an as-needed basis, which will lead to more responsible use of capital assets. Some development items do not depend on demand, such as airfield improvements to meet FAA design standards. These projects need to be programmed in a timely manner, regardless of changes in demand indicators, and should be monitored regularly by airport management.

At 57C, some hangars are owned and managed by the airport sponsor and leased to individual tenants, while others are privately owned and managed on land leased from the airport sponsor. Because of economic realities, many airports rely on private developers to construct new hangars. In some cases, private developers can keep construction costs lower, which lowers the monthly lease rates necessary to amortize a loan. **The CIP for 57C assumes development for many landside facilities will primarily be constructed privately through ground lease agreements with the sponsor**. This assumption does not preclude the possibility of the airport sponsor constructing new hangars. Furthermore, the airport sponsor may decide to provide the site preparation projects necessary to facilitate hangar construction, such as grading and utility installation. Ultimately, the Village of East Troy will determine whether to self-fund landside facility development or rely on private developers based on demand and the specific needs of potential developers.

Because a master plan is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural and/or engineering analysis. Moreover, some projects may require additional infrastructure improvements (e.g., drainage, extension of utilities, etc.) that may increase the estimated project cost or timeline for completion.

Once a list of necessary projects was identified and refined, project-specific cost estimates were prepared. These estimates include design, construction, administration, and contingency costs that may arise for each project. **Capital costs presented here should be viewed only as order-of-magnitude estimates that are subject to further refinement during any engineering and/or architectural design**; nevertheless, they are considered sufficient for planning purposes. Cost estimates for each development project in the CIP are based on present-day construction, design, and administration costs. Adjustments will need to be applied over time to account for inflation and changes in construction and capital equipment costs. Cost estimates for all projects are in current (2025) dollars.

Exhibit 6A presents the proposed 20-year CIP for 57C with a beginning year of 2026, as projects from that year are not yet complete. Most of the projects identified are eligible for federal and/or state grant funding but may not meet the eligibility funding threshold due to low priority rating. Projects that may not fully meet funding eligibility requirements are otherwise noted on **Exhibit 6A**. The point of the analysis is to identify possible funding opportunities, which should be decided on a project-by-project basis.

BOA-funded projects utilize FAA block grant funds and are eligible for up to 90 percent of the total project cost. The remaining share (10 percent) must be funded locally by the airport sponsor; however, it should be noted that the State of Wisconsin maintains its own aviation funding program, which will match up to 50 percent of the airport or local share of all eligible items contained in BOA-funded projects.

The *FAA Reauthorization Act of 2024* (enacted May 16, 2024) authorized the FAA's Airport Improvement Program (AIP) at $4.0 billion for fiscal years (FY) 2025 through 2028. Section 708 of this act increases the federal share of allowable AIP-funded project costs at nonhub and nonprimary airports to 95 percent for FY 2025 and FY 2026. After FY 2026, the federal share will revert to 90 percent for AIP-funded projects; as such, state and local funding responsibility will be 2.5 percent for AIP projects during FY 2025 and FY 2026.

The BOA uses the FAA priority ranking system to help objectively evaluate potential airport projects. Projects are weighted toward safety, infrastructure preservation, standards, and capacity enhancement.

The BOA will participate in the highest-priority projects before considering lower-priority projects, even if a lower-priority project is considered a more urgent need by the local sponsor; nevertheless, such projects should remain a priority for the airport and funding support should continue to be requested in subsequent years.

The most important feature of the CIP is that future projects for which the airport may request BOA funding are included on the list. On a biennial basis, the CIP is updated and reviewed with the BOA. Projects on the CIP will be moved up and down depending on priority and funding availability. Periodically, new projects will arise that can be added to the CIP and presented to the BOA.

Some projects identified in the CIP will require environmental documentation. The level of required documentation for each project must be determined in consultation with the FAA and BOA. There are three major levels of environmental review to be considered under the *National Environmental Policy Act* (NEPA): categorical exclusion (CatEx), environmental assessment (EA), and environmental impact statement (EIS). Each level requires more time to complete and more detailed information. Guidance on what level of documentation is required for a specific project is outlined in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The environmental overview presented in Chapter Five addresses NEPA and provides an evaluation of various environmental categories for 57C.

The following sections describe the projects identified for the airport over the next 20 years in greater detail. The projects are grouped based on a detailed evaluation of existing and projected demand, safety, rehabilitation needs, and local priority. While the CIP identifies the priority ranking of the projects, the list should be evaluated and revised on a regular basis. It is also important to note that projects are listed separately for purposes of evaluation in this study, but certain projects could be combined with other projects during the time of construction/implementation.

SHORT-TERM PROGRAM (1-5 YEARS)

The short-term projects are anticipated to be needed during the first five years of the 20-year CIP. The projects listed are subject to change based on federal and state funding priorities. Projects relating to safety and maintenance generally have the highest priority. The short-term program presents 17 projects for the planning period between 2026 and 2030, as presented on **Exhibit 6A** and depicted on **Exhibit 6B**.

FY 2026 PROJECTS

Project #1: Conduct Airport Master Plan – Phase 2 (Airport Layout Plan)

Description: This project is for the completion of an updated airport layout plan (ALP) drawing set as part of ongoing airport planning.

Cost Estimate: $92,000.00

Funding Eligibility: FAA/BOA – 95 percent[1] / State Match – 2.5 percent / Airport/Local – 2.5 percent

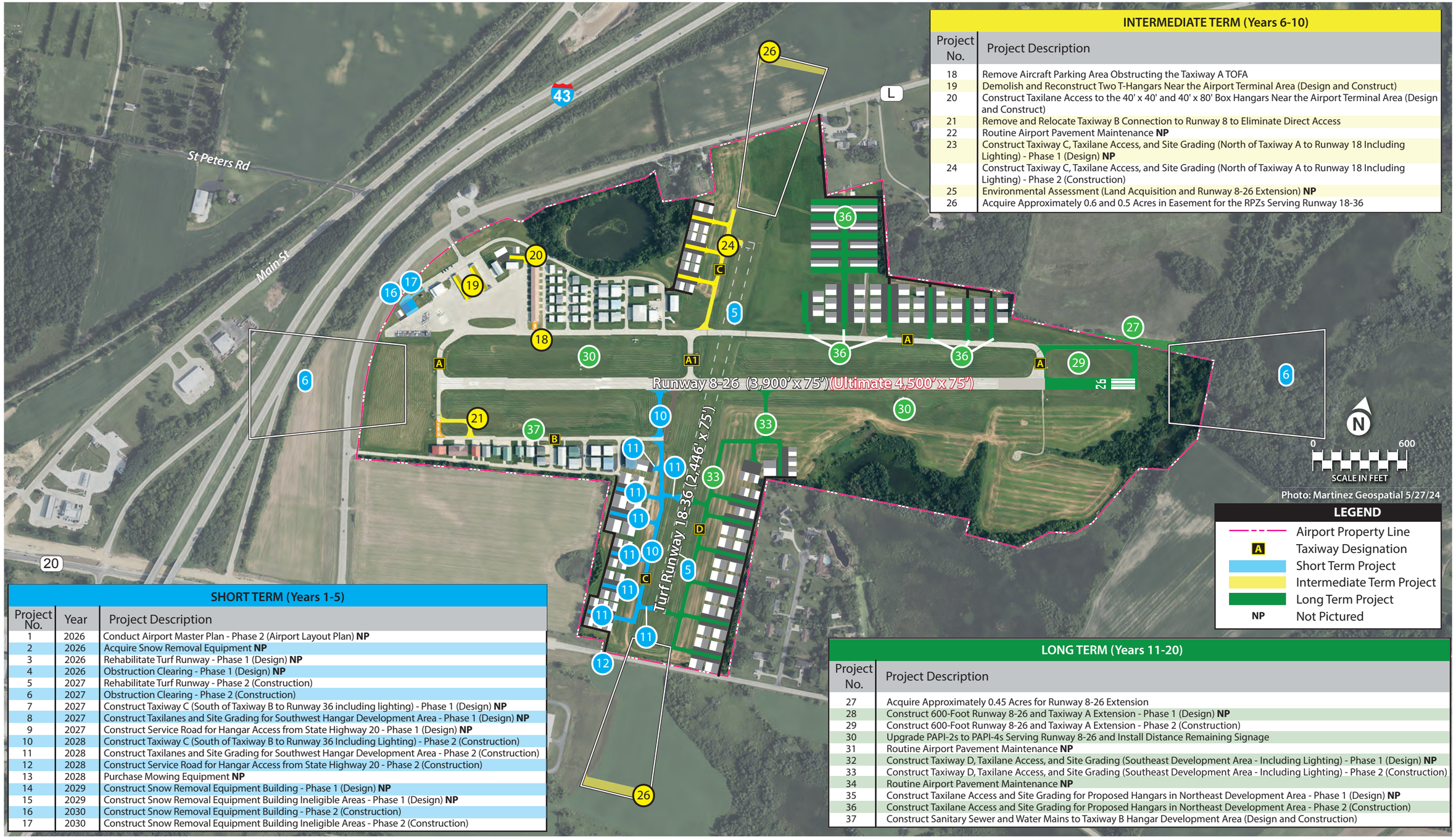
[1] The FAA Reauthorization Act of 2024 sets AIP funding at general aviation airports to 95 percent for FY 2025 and FY 2026.

EAST TROY MUNICIPAL AIRPORT MASTER PLAN

#	Project Description	Estimated Cost	Federal Share	State / BOA Share	Airport Sponsor/ Local Share
	SHORT TERM (1-5 Years)				
	FY2026				
1	Conduct Airport Master Plan - Phase 2 (Airport Layout Plan)	$92,000.00	$87,400.00	$2,300.00	$2,300.00
2	Acquire Snow Removal Equipment	$215,000.00	$204,250.00	$5,375.00	$5,375.00
3	Rehabilitate Turf Runway - Phase 1 (Design)	$25,000.00	$23,750.00	$625.00	$625.00
4	Obstruction Clearing - Phase 1 (Design)	$15,000.00	$14,250.00	$375.00	$375.00
	FY2027				
5	Rehabilitate Turf Runway - Phase 2 (Construction)	$100,000.00	$90,000.00	$5,000.00	$5,000.00
6	Obstruction Clearing - Phase 2 (Construction)	$100,000.00	$90,000.00	$5,000.00	$5,000.00
7	Construct Taxiway C (South of Taxiway B to Runway 36 including lighting) - Phase 1 (Design)	$200,000.00	$180,000.00	$10,000.00	$10,000.00
8	Construct Taxilanes and Site Grading for Southwest Hangar Development Area - Phase 1 (Design)	$150,000.00	$135,000.00	$7,500.00	$7,500.00
9	Construct Service Road for Hangar Access from State Highway 20 - Phase 1 (Design)	$20,000.00	$18,000.00	$1,000.00	$1,000.00
	FY2028				
10	Construct Taxiway C (South of Taxiway B to Runway 36 Including Lighting) - Phase 2 (Construction)	$1,800,000.00	$1,620,000.00	$90,000.00	$90,000.00
11	Construct Taxilanes and Site Grading for Southwest Hangar Development Area - Phase 2 (Construction)	$1,000,000.00	$900,000.00	$50,000.00	$50,000.00
12	Construct Service Road for Hangar Access from State Highway 20 - Phase 2 (Construction)	$150,000.00	$135,000.00	$7,500.00	$7,500.00
13	Purchase Mowing Equipment	$25,000.00	$-	$20,000.00	$5,000.00
	FY2029				
14	Construct Snow Removal Equipment Building - Phase 1 (Design)	$130,000.00	$117,000.00	$6,500.00	$6,500.00
15	Construct Snow Removal Equipment Building Ineligible Areas - Phase 1 (Design)	$50,000.00	$-	$-	$50,000.00
	FY2030				
16	Construct Snow Removal Equipment Building - Phase 2 (Construction)	$850,000.00	$765,000.00	$42,500.00	$42,500.00
17	Construct Snow Removal Equipment Building Ineligible Areas - Phase 2 (Construction)	$300,000.00	$-	$-	$300,000.00
	Short-Term CIP Subtotal	**$5,222,000.00**	**$4,379,650.00**	**$253,675.00**	**$588,675.00**
	INTERMEDIATE TERM (6-10 Years)				
18	Remove Aircraft Parking Area Obstructing the Taxiway A TOFA	$5,000.00	$4,500.00	$250.00	$250.00
19	Demolish and Reconstruct Two T-Hangars Near the Airport Terminal Area (Design and Construct)*	$2,200,000.00	$-	$-	$2,200,000.00
20	Construct Taxilane Access to the 40' x 40' and 40' x 80' Box Hangars Near the Airport Terminal Area (Design and Construct)	$85,000.00	$76,500.00	$4,250.00	$4,250.00
21	Remove and Relocate Taxiway B Connection to Runway 8 to Eliminate Direct Access	$234,000.00	$210,600.00	$11,700.00	$11,700.00
22	Routine Airport Pavement Maintenance	$500,000.00	$450,000.00	$25,000.00	$25,000.00
23	Construct Taxiway C, Taxilane Access, and Site Grading (North of Taxiway A to Runway 18 Including Lighting) - Phase 1 (Design)	$150,000.00	$135,000.00	$7,500.00	$7,500.00
24	Construct Taxiway C, Taxilane Access, and Site Grading (North of Taxiway A to Runway 18 Including Lighting) - Phase 2 (Construction)	$1,500,000.00	$1,350,000.00	$75,000.00	$75,000.00
25	Environmental Assessment (Land Acquisition and Runway 8-26 Extension)	$200,000.00	$180,000.00	$10,000.00	$10,000.00
26	Acquire Approximately 0.6 and 0.5 Acres in Easement for the RPZs Serving Runway 18-36	$15,000.00	$13,500.00	$750.00	$750.00
	Intermediate -Term CIP Subtotal	**$4,889,000.00**	**$2,420,100.00**	**$134,450.00**	**$2,334,450.00**
	LONG TERM (11-20 Years)				
27	Acquire Approximately 0.45 Acres for Runway 8-26 Extension	$10,000.00	$9,000.00	$500.00	$500.00
28	Construct 600-Foot Runway 8-26 and Taxiway A Extension - Phase 1 (Design)	$150,000.00	$135,000.00	$7,500.00	$7,500.00
29	Construct 600-Foot Runway 8-26 and Taxiway A Extension - Phase 2 (Construction)	$1,419,000.00	$1,277,100.00	$70,950.00	$70,950.00
30	Upgrade PAPI-2s to PAPI-4s Serving Runway 8-26 and Install Distance Remaining Signage	$130,000.00	$117,000.00	$6,500.00	$6,500.00
31	Routine Airport Pavement Maintenance	$500,000.00	$450,000.00	$25,000.00	$25,000.00
32	Construct Taxiway D, Taxilane Access, and Site Grading (Southeast Development Area - Including Lighting) - Phase 1 (Design)	$280,000.00	$252,000.00	$14,000.00	$14,000.00
33	Construct Taxiway D, Taxilane Access, and Site Grading (Southeast Development Area - Including Lighting) - Phase 2 (Construction)	$3,500,000.00	$3,150,000.00	$175,000.00	$175,000.00
34	Routine Airport Pavement Maintenance	$500,000.00	$450,000.00	$25,000.00	$25,000.00
35	Construct Taxilane Access and Site Grading for Proposed Hangars in Northeast Development Area - Phase 1 (Design)	$300,000.00	$270,000.00	$15,000.00	$15,000.00
36	Construct Taxilane Access and Site Grading for Proposed Hangars in Northeast Development Area - Phase 2 (Construction)	$3,000,000.00	$2,700,000.00	$150,000.00	$150,000.00
37	Construct Sanitary Sewer and Water Mains to Taxiway B Hangar Development Area (Design and Construction)	$550,000.00	$-	$-	$550,000.00
	Long-Term CIP Subtotal	**$10,339,000.00**	**$8,810,100.00**	**$489,450.00**	**$1,039,450.00**
	CAPITAL IMPROVEMENT PROGRAM TOTAL	**$20,450,000.00**	**$15,609,850.00**	**$877,575.00**	**$3,962,575.00**

*It should be noted that annual entitlement funding can also be used to help offset the local cost of this project.

EAST TROY MUNICIPAL AIRPORT MASTER PLAN



INTERMEDIATE TERM (Years 6-10)	
Project No.	Project Description
18	Remove Aircraft Parking Area Obstructing the Taxiway A TOFA
19	Demolish and Reconstruct Two T-Hangars Near the Airport Terminal Area (Design and Construct)
20	Construct Taxilane Access to the 40' x 40' and 40' x 80' Box Hangars Near the Airport Terminal Area (Design and Construct)
21	Remove and Relocate Taxiway B Connection to Runway 8 to Eliminate Direct Access
22	Routine Airport Pavement Maintenance **NP**
23	Construct Taxiway C, Taxilane Access, and Site Grading (North of Taxiway A to Runway 18 Including Lighting) - Phase 1 (Design) **NP**
24	Construct Taxiway C, Taxilane Access, and Site Grading (North of Taxiway A to Runway 18 Including Lighting) - Phase 2 (Construction)
25	Environmental Assessment (Land Acquisition and Runway 8-26 Extension) **NP**
26	Acquire Approximately 0.6 and 0.5 Acres in Easement for the RPZs Serving Runway 18-36

SHORT TERM (Years 1-5)		
Project No.	Year	Project Description
1	2026	Conduct Airport Master Plan - Phase 2 (Airport Layout Plan) **NP**
2	2026	Acquire Snow Removal Equipment **NP**
3	2026	Rehabilitate Turf Runway - Phase 1 (Design) **NP**
4	2026	Obstruction Clearing - Phase 1 (Design) **NP**
5	2027	Rehabilitate Turf Runway - Phase 2 (Construction)
6	2027	Obstruction Clearing - Phase 2 (Construction)
7	2027	Construct Taxiway C (South of Taxiway B to Runway 36 including lighting) - Phase 1 (Design) **NP**
8	2027	Construct Taxilanes and Site Grading for Southwest Hangar Development Area - Phase 1 (Design) **NP**
9	2027	Construct Service Road for Hangar Access from State Highway 20 - Phase 1 (Design) **NP**
10	2028	Construct Taxiway C (South of Taxiway B to Runway 36 Including Lighting) - Phase 2 (Construction)
11	2028	Construct Taxilanes and Site Grading for Southwest Hangar Development Area - Phase 2 (Construction)
12	2028	Construct Service Road for Hangar Access from State Highway 20 - Phase 2 (Construction)
13	2028	Purchase Mowing Equipment **NP**
14	2029	Construct Snow Removal Equipment Building - Phase 1 (Design) **NP**
15	2029	Construct Snow Removal Equipment Building Ineligible Areas - Phase 1 (Design) **NP**
16	2030	Construct Snow Removal Equipment Building - Phase 2 (Construction)
17	2030	Construct Snow Removal Equipment Building Ineligible Areas - Phase 2 (Construction)

LEGEND	
	Airport Property Line
A	Taxiway Designation
	Short Term Project
	Intermediate Term Project
	Long Term Project
NP	Not Pictured

LONG TERM (Years 11-20)	
Project No.	Project Description
27	Acquire Approximately 0.45 Acres for Runway 8-26 Extension
28	Construct 600-Foot Runway 8-26 and Taxiway A Extension - Phase 1 (Design) **NP**
29	Construct 600-Foot Runway 8-26 and Taxiway A Extension - Phase 2 (Construction)
30	Upgrade PAPI-2s to PAPI-4s Serving Runway 8-26 and Install Distance Remaining Signage
31	Routine Airport Pavement Maintenance **NP**
32	Construct Taxiway D, Taxilane Access, and Site Grading (Southeast Development Area - Including Lighting) - Phase 1 (Design) **NP**
33	Construct Taxiway D, Taxilane Access, and Site Grading (Southeast Development Area - Including Lighting) - Phase 2 (Construction)
34	Routine Airport Pavement Maintenance **NP**
35	Construct Taxilane Access and Site Grading for Proposed Hangars in Northeast Development Area - Phase 1 (Design) **NP**
36	Construct Taxilane Access and Site Grading for Proposed Hangars in Northeast Development Area - Phase 2 (Construction)
37	Construct Sanitary Sewer and Water Mains to Taxiway B Hangar Development Area (Design and Construction)

Project #2: Acquire Snow Removal Equipment

Description: This project is for the acquisition of additional snow removal equipment to ensure safe and efficient airport operation during snow-covered conditions.

Cost Estimate: $215,000.00

Funding Eligibility: FAA/BOA – 95 percent[1] / State Match – 2.5 percent / Airport/Local – 2.5 percent

Project #3: Rehabilitate Turf Runway – Phase 1 (Design)

Description: This project is for routine maintenance and rehabilitation of turf Runway 18-36.

Cost Estimate: $25,000

Funding Eligibility: FAA/BOA – 95 percent[1] / State Match – 2.5 percent / Airport/Local – 2.5 percent

Project #4: Obstruction Clearing – Phase 1 (Design)

Description: This project is for routine maintenance to clear the approach surfaces serving each end of Runway 8-26. An obstruction analysis performed on July 31st, 2024, identified multiple obstructions to the approach surface of Runway 8-26. This analysis is included in **Appendix B** of this document.

Cost Estimate: $15,000

Funding Eligibility: FAA/BOA – 95 percent[1] / State Match – 2.5 percent / Airport/Local – 2.5 percent

FY 2027 PROJECTS

Project #5: Rehabilitate Turf Runway – Phase 2 (Construction)

Description: This project is for routine maintenance and rehabilitation of turf Runway 18-36.

Cost Estimate: $100,000

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #6: Obstruction Clearing – Phase 2 (Construction)

Description: This project is for routine maintenance to clear the approach surfaces serving each end of Runway 8-26 of any obstructing trees. An obstruction analysis performed on July 31st, 2024, identified multiple obstructions to the approach surface of Runway 8-26. This analysis is included in **Appendix B** of this document.

Cost Estimate: $100,000

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #7: Construct Taxiway C (South of Taxiway B to Runway 36, Including Lighting) – Phase 1 (Design)

Description: This project is the design of the southern portion of parallel Taxiway C to extend south to the Runway 36 threshold to provide airside access to planned hangar development.

Cost Estimate: $200,000

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #8: Construct Taxilanes and Site Grading for Southwest Hangar Development Area – Phase 1 (Design)

Description: This project is for the taxilane and site grading design to provide airfield access from the southwest hangar development area to Taxiway C.

Cost Estimate: $150,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #9: Construct Service Road for Hangar Access from State Highway 20 – Phase 1 (Design)

Description: This project is the design phase prior to the construction of an access road and controlled access gate serving the southwest hangar development area and connecting to State Highway 20.

Cost Estimate: $20,000.00

FY 2028 PROJECTS

Project #10: Construct Taxiway C (South of Taxiway B to Runway 36, Including Lighting) – Phase 2 (Construction)

Description: This project is the construction of the southern portion of parallel Taxiway C to extend south to the Runway 36 threshold to provide airside access to planned hangar development.

Cost Estimate: $1,800,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #11: Construct Taxilanes and Site Grading for Southwest Hangar Development Area – Phase 2 (Construction)

Description: This project is for the taxilane construction and site grading to provide airfield access from the southwest hangar development area to Taxiway C.

Cost Estimate: $1,000,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #12: Construct Service Road for Hangar Access from State Highway 20 – Phase 2 (Construction)

Description: This project is for the construction of an access road and controlled access gate serving the southwest hangar development area and connecting to State Highway 20.

Cost Estimate: $150,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #13: Purchase Mowing Equipment

Description: This project is for the purchase of additional or upgraded mowing equipment for ongoing airport maintenance.

Cost Estimate: $25,000.00

Funding Eligibility: FAA/BOA – 0 percent / State Match – 80 percent / Airport/Local – 20 percent

FY 2029 PROJECTS

Project #14: Construct Snow Removal Equipment Building – Phase 1 (Design)

Description: This project is for the design of a dedicated snow removal equipment (SRE) building to more efficiently utilize existing building space owned by the Village of East Troy.

Cost Estimate: $130,00.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #15: Construct Snow Removal Equipment Building Ineligible Areas – Phase 1 (Design)

Description: This project is the continuation of Project #14, as not all areas of the SRE building are eligible for federal funding assistance. As such, this project addresses any portions that are ineligible for the design of the SRE building.

Cost Estimate: $50,000.00

Funding Eligibility: FAA/BOA – 0 percent / State Match – 0 percent / Airport/Local – 100 percent

FY 2030 PROJECTS

Project #16: Construct Snow Removal Equipment Building – Phase 2 (Construction)

Description: This project is for the construction of the dedicated SRE building to more efficiently utilize existing building space owned by the Village of East Troy.

Cost Estimate: $850,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #17: Construct Snow Removal Equipment Building Ineligible Areas – Phase 2 (Construction)

Description: This project is the continuation of Project #16, as not all areas of the SRE building are eligible for federal funding assistance. As such, this project addresses any portions that are ineligible for the construction of the SRE building.

Cost Estimate: $300,000.00

Funding Eligibility: FAA/BOA – 0 percent / State Match – 0 percent / Airport/Local – 100 percent

SHORT-TERM PROGRAM SUMMARY

The short-term CIP is detailed on **Exhibit 6A** and includes projects that enhance the overall safety, efficiency, and maintenance of the airfield while implementing landside improvements. The total investment necessary for the short-term CIP is approximately $5.2 million. Of the total short-term program, approximately $4.4 million is eligible for federal or BOA funding assistance, while the state match program is eligible for approximately $253,700 and the airport (or local) share is approximately $588,700.

INTERMEDIATE-TERM PROGRAM (6-10 YEARS)

The intermediate-term projects are generally anticipated to be necessary between 2031 and 2035. These projects are not tied to specific years of implementation; instead, they have been prioritized so airport management has the flexibility to determine when they need to be pursued based on current conditions.

It is not unusual for certain projects to be delayed or advanced based on changing conditions, such as funding availability or changes in the aviation industry. The intermediate-term planning horizon includes nine projects, as listed on **Exhibit 6A** and depicted on **Exhibit 6B**. This section includes a description of each project.

Project #18: Remove Aircraft Parking Area Obstructing the Taxiway A TOFA

Description: The taxiway object free area (TOFA) serving Taxiway A is currently obstructed by a portion of aircraft parking area under airplane design group (ADG) II standards. This project is for the removal of the obstructing aircraft parking area.

Cost Estimate: $5,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #19: Demolish and Reconstruct Two T-Hangars Near the Airport Terminal Area (Design and Construct)

Description: There is minimal opportunity for infill with additional hangar development within the existing airport terminal area. As such, the two existing T-hangar buildings near the airport entrance are planned to be demolished and redeveloped. It should be noted that non-primary entitlement funding could be banked and utilized for this project in an effort to ease the local funding burden. This project could also be split into two phases for funding purposes.

Cost Estimate: $2,200,000.00

Funding Eligibility: FAA/BOA – 0 percent / State Match – 0 percent / Airport/Local – 100 percent

Project #20: Construct Taxilane Access to the 40- by 40-foot and 40- by 80-foot Box Hangars Near the Airport Terminal Area (Design and Construct)

Description: This project is for the design and construction of a proposed taxilane to provide access to planned hangar development on the north side of the terminal area. It should be noted that hangar development in this area is assumed to be funded through private funding mechanisms and ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $85,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #21: Remove and Relocate Taxiway B Connection to Runway 8 to Eliminate Direct Access

Description: This project is for the elimination of existing direct access through removal and relocation of the Taxiway B connector as it connects to the Runway 8 threshold.

Cost Estimate: $234,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #22: Routine Airport Pavement Maintenance

Description: As part of routine airport maintenance, this project has been included to ensure the airport maintains existing infrastructure and a safe operating environment. At this time, taxiway fillets can be upgraded to current FAA taxiway fillet geometry standards. Additionally, the holding position markings on Taxiway A that are oriented other than 90 degrees to Runway 8-26 should be reoriented to 90 degrees perpendicular to the runway and positioned 200 feet from the runway centerline.

Cost Estimate: $500,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #23: Construct Taxiway C, Taxilane Access, and Site Grading (North of Taxiway A to Runway 18, Including Lighting) – Phase 1 (Design)

Description: This project is the design of the northern portion of parallel Taxiway C to extend north to the Runway 18 threshold to provide airside access to planned hangar development. It should be noted that hangar development and vehicle access roads/parking in this area are assumed to be funded through private or local funding mechanisms and are not included in the cost estimate. Ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $150,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #24: Construct Taxiway C, Taxilane Access, and Site Grading (North of Taxiway A to Runway 18, Including Lighting) – Phase 2 (Construction)

Description: This project is for the taxilane design to provide airfield access from the northwest hangar development area to Taxiway C. It should be noted that hangar development and vehicle access roads/parking in this area are assumed to be funded through private or local funding mechanisms and are not included in the cost estimate. Ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $1,500,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #25: Environmental Assessment (Land Acquisition and Runway 8-26 Extension)

Description: This project is for the environmental documentation required for the runway extension and associated property acquisition prior to extending Runway 8-26.

Cost Estimate: $200,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #26: Acquire Approximately 0.6 and 0.5 Acres in Easement for the RPZs Serving Runway 18-36

Description: This project is for the acquisition of easements for approximately 0.6 and 0.5 acres of property within the existing and ultimate Runway 18-36 RPZs.

Cost Estimate: $15,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

INTERMEDIATE-TERM PROGRAM SUMMARY

The total costs associated with the intermediate-term program are estimated at $4.9 million. Of this total, approximately $2.4 million could be eligible for federal or BOA funding, while the state match program could be eligible for $134,500 and the airport (or local) share is projected at approximately $2.3 million.

LONG-TERM PROGRAM (10-20 YEARS AND BEYOND)

The long-term planning horizon considers 11 projects for the final 10-year period (and beyond) that are mainly demand-driven. These projects and their associated costs are listed on **Exhibit 6A** and presented on **Exhibit 6B**.

Project #27: Acquire Approximately 0.45 Acres for Runway 8-26 Extension

Description: This project is for the land acquisition required to meet the ultimate runway object free area (ROFA) serving the extended Runway 8-26 prior to extending Runway 8-26 to the east. As such, this project is for the acquisition of approximately 0.45 acres of property within the ultimate ROFA.

Cost Estimate: $10,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #28: Construct 600-foot Runway 8-26 and Taxiway A Extension – Phase 1 (Design)

Description: This project is for the engineering and design required before physical construction can take place prior to extending Runway 8-26 and Taxiway A.

Cost Estimate: $150,000

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #29: Construct 600-foot Runway 8-26 and Taxiway A Extension – Phase 2 (Construction)

Description: As discussed in Chapter Five, additional runway length could benefit larger and faster business jet and turboprop operators by making the airport more accessible during hot summer months, providing the opportunity for aircraft to depart with more fuel, and allowing for longer stage lengths and an increase in usable payload. Additional runway length would also improve landing situations for business jets operating under Title 14 Code of Federal Regulations (CFR) Part 91K or Part 135, especially during wet or contaminated runway conditions. As such, this project is for the extension of Taxiway A and Runway 8-26 to an ultimate length of 4,500 feet.

Cost Estimate: $1,419,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #30: Upgrade Two-Light Precision Approach Path Indicators (PAPI-2s) to PAPI-4s Serving Runway 8-26 and Install Distance Remaining Signage

Description: This project is for the implementation of PAPI-4s and runway distance remaining signage to enhance the use of the runway and overall airfield safety.

Cost Estimate: $130,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #31: Routine Airport Pavement Maintenance

Description: As part of routine airport maintenance, this project has been included to ensure the airport maintains existing infrastructure and a safe operating environment. At this time, taxiway fillets can be upgraded to current FAA taxiway fillet geometry standards.

Cost Estimate: $500,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #32: Construct Taxiway D, Taxilane Access, and Site Grading (Southeast Development Area, Including Lighting) – Phase 1 (Design)

Description: This project is for the design of partial parallel Taxiway D to extend south to the Runway 36 threshold to provide airside access to planned hangar development. It should be noted that hangar development and vehicle access roads/parking in this area are assumed to be funded through private or local funding mechanisms and are not included in the cost estimate. Ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $280,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #33: Construct Taxiway D, Taxilane Access, and Site Grading (Southeast Development Area, Including Lighting) – Phase 2 (Construction)

Description: This project is for the construction of partial parallel Taxiway D to extend south to the Runway 36 threshold to provide airside access to planned hangar development. It should be noted that hangar development and vehicle access roads/parking in this area are assumed to be funded through private or local funding mechanisms and are not included in the cost estimate. Ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $3,500,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #34: Routine Airport Pavement Maintenance

Description: As part of routine airport maintenance, this project has been included to ensure the airport maintains existing infrastructure and a safe operating environment. At this time, taxiway fillets can be upgraded to current FAA taxiway fillet geometry standards.

Cost Estimate: $500,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #35: Construct Taxilane Access and Site Grading for Proposed Hangars in Northeast Development Area – Phase 1 (Design)

Description: Should the airport experience continued demand for hangars, this project is for the design of a taxilane network that would provide access to new hangar development areas on the northeast side of the airfield. It should be noted that hangar development and vehicle access roads/parking in this area are assumed to be funded through private or local funding mechanisms and are not included in the cost estimate. Ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $300,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #36: Construct Taxilane Access and Site Grading for Proposed Hangars in Northeast Development Area – Phase 2 (Construction)

Description: Should the airport experience continued demand for hangars, this project is for the construction of a taxilane network that would provide access to new hangar development areas on the northeast side of the airfield. It should be noted that hangar development and vehicle access roads/parking in this area are assumed to be funded through private or local funding mechanisms and are not included in the cost estimate. Ultimate hangar layouts may vary from what is depicted on the development concept.

Cost Estimate: $3,000,000.00

Funding Eligibility: FAA/BOA – 90 percent / State Match – 5 percent / Airport/Local – 5 percent

Project #37: Construct Sanitary Sewer and Water Mains to Taxiway B Hangar Development Area (Design and Construction)

Description: Should the airport experience continued demand for additional amenities in hangar development areas, this project is for the construction of water and sanitary sewer mains along Taxiway B on the south side of Runway 8-26. It should be noted that this project is assumed to be funded through local or private funding mechanisms, or a combination thereof.

Cost Estimate: $550,000.00

Funding Eligibility: FAA/BOA – 0 percent / State Match – 0 percent / Airport/Local – 100 percent

LONG-TERM PROGRAM SUMMARY

The total investment necessary for the long-term CIP is approximately $10.3 million. Roughly $8.8 million is eligible for federal or BOA assistance; approximately $489,500 is eligible for the state match program, and the airport/local share of the long-term projects are estimated at over $1.0 million. As previously noted, eligibility and actual funding of individual projects will be determined year to year and on a case-by-case basis.

CAPITAL IMPROVEMENT PROGRAM SUMMARY

The CIP is intended as a road map of improvements to help guide the Village of East Troy and the BOA. As presented, the plan will help accommodate increased demand at 57C over the next 20 years and beyond. The sequence of projects may change due to availability of funds or changing priorities based on the annual review by airport management, the airport sponsor, and the BOA; nevertheless, the CIP is a comprehensive list of capital projects the airport should consider in the next 20 years and beyond.

The total CIP proposed represents approximately $20.4 million in airport development needs. Of this total, approximately $15.6 million could be eligible for federal or BOA funding assistance. The state match program could be eligible for nearly $877,600. The local funding estimate for the proposed CIP is estimated to be a minimum of $3.9 million, which could increase if individual projects are not offered federal grants.

CAPITAL IMPROVEMENT FUNDING SOURCES

The four different sources of funds generally used to finance airport development include the following:

- Airport cash flow
- Revenue and general obligation bonds
- Federal/state/local grants
- Passenger facility charges (reserved for commercial service airports)

Access to these sources of financing varies widely among airports. Some large airports maintain substantial cash reserves, while smaller commercial service and general aviation airports often require subsidies from local governments to fund operating expenses and finance modest improvements.

Financing for capital improvements at 57C will not rely solely on the financial resources of the airport sponsor. Capital improvement funding is available through various grant-in-aid programs on the federal and state levels. Historically, the airport has received both federal and state grants. While more funds could be available some years, the CIP has been developed with project phasing to remain realistic and within the range of anticipated grant assistance. The following discussion outlines key sources of funding potentially available for capital improvements at the airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain the system of public-use airports across the United States. The purposes of this system and its federally based funding are to maintain national defense and promote interstate commerce. As previously noted, the *FAA Reauthorization Act of 2024* authorized the FAA's AIP at $4.0 billion for fiscal years 2025 through 2028. Section 708 of this law increases the federal share of allowable AIP-funded project costs at nonhub and nonprimary airports to 95 percent for FY 2025 and FY 2026. After FY 2026, the federal share will revert to 90 percent for AIP-funded projects.

The source for AIP funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 and provides funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

Several projects identified in the CIP are eligible for FAA funding through the AIP, which provides entitlement funds to airports based (in part) on annual enplaned passengers and pounds of landed cargo weight. Additional AIP funds that are designated as discretionary may also be used for eligible projects based on the FAA's national priority system. Although the AIP has been reauthorized several times and the funding formulas have been periodically revised to reflect changing national priorities, the program has remained essentially the same. Public-use airports that serve civil aviation, like 57C, may receive AIP funding for eligible projects, as described in the FAA's *Airport Improvement Program Handbook*. The airport must fund the costs of the remaining projects using a combination of other funding sources, which are discussed in the following sections.

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which the FAA/ BOA typically provides up to 90 percent of the cost and the remaining share is split evenly between the BOA and the airport sponsor (five percent each). In exchange for this level of funding, the airport sponsor is required to meet various grant assurances, including maintenance of each improvement for its useful life (usually 20 years).

Another source for federal grants is the *Infrastructure Investment and Jobs Act*, which is also known as the *Bipartisan Infrastructure Law* (BIL). The BIL was signed into law in 2022 and plans for $25 billion to be invested into U.S. airports over a five-year period. BIL funds are sourced from the U.S. Treasury General Fund and are split into three funding buckets:

- Airport Infrastructure Grants (AIG) – $15 billion
- Airport Terminal Program (ATP) – $5 billion
- Air traffic control facilities and equipment – $5 billion

Under the BIL, 57C will receive $137,000 in allocated AIG funding in FY 2025.[2] This money can be used for the repair and maintenance of existing infrastructure or the construction of new facilities (e.g., airfield pavement, navigational aids, lighting, terminal building, etc.). ATP and air traffic control facility grants can be used for multimodal terminal development and the relocation, reconstruction, repair, or improvement of an airport traffic control tower. The federal share for AIG funds is the same as an AIP grant (90 percent with a 10 percent local match), while the federal share for ATP grants is 95 percent for nonprimary airports. The grant assurances that apply to AIP grants also apply to BIL grants. BIL and AIP grants cannot be combined into a single grant.

Apportionment (Entitlement) Funds | The AIP provides funding for eligible projects at airports through an apportionment (entitlement) program. Nonprimary airports that are included in the *National Plan of Integrated Airport Systems* (NPIAS), such as 57C, receive a guaranteed minimum level of up to $150,000 each year in nonprimary entitlement (NPE) funds. These funds can be carried over and combined for up to four years, thereby allowing for the completion of a more expensive project.

The FAA also provides a state apportionment based on a federal formula that considers land area and population. For the State of Wisconsin, the BOA distributes these funds for projects at various airports throughout the state.

Small Airport Fund | If a large-hub or medium-hub commercial service airport chooses to institute a passenger facility charge (PFC), which is a fee of up to $4.50 per airline ticket for funding of capital improvement projects, the airport's apportionment is reduced. A portion of the reduced apportionment goes to the small airport fund, which is reserved for small-hub primary commercial service airports, nonhub commercial service airports, reliever airports, and general aviation airports. As a general aviation airport, 57C is eligible for funds from this source.

Discretionary Funds | Airports may face major projects that will require funds that total more than the airport's annual entitlements; thus, additional funds from discretionary apportionments under the AIP become desirable. The primary feature of discretionary funds is that they are distributed on a priority

[2] FAA, Bipartisan Infrastructure Law, Airport Infrastructure Grants (AIG) (https://www.faa.gov/bil/airport-infrastructure)

basis. The priorities are established by the FAA with a code system under which projects are ranked by purpose. Projects that ensure airport safety and security are ranked as the most important priorities, followed by projects that maintain current infrastructure development, mitigate noise and other environmental impacts, meet design standards, and increase system capacity.

It is important to note that competition for discretionary funding is not limited to airports within the State of Wisconsin or those within the FAA Great Lakes Region. The funds are distributed to all airports in the country and, as such, are more difficult to obtain; high-priority projects often fare favorably, while lower-priority projects may not receive discretionary grants.

FAA Facilities and Equipment (F&E) Program | The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program, which provides funding for the installation and maintenance of various navigational aids and equipment of the National Airspace System. Under the F&E Program, funding is provided for FAA airport traffic control towers, en-route navigational aids, on-airport navigational aids, and approach lighting systems.

While the F&E Program still installs and maintains some navigational aids, on-airport facilities at general aviation airports have not been a priority; therefore, airports often request funding assistance for navigational aids through the AIP and maintain the equipment on their own.[3]

STATE FUNDING PROGRAMS

The State of Wisconsin participates in the federal State Block Grant Program. Under this program, the FAA annually distributes general aviation state apportionment and discretionary funds to the WisDOT BOA, which distributes grants to airports within the state. In compliance with the BOA's legislative mandate that it "apply for, receive, and disburse" federal funds for general aviation airports, the BOA acts as the agent of the local airport sponsor. Although these grants are distributed by the BOA, they contain all federal obligations.

All publicly owned airports and federally designated privately owned reliever airports are eligible for state financial aid; however, the state's designation of airport classification in the state aviation system plan (SASP) determines the extent to which an airport can be developed with these funds. Development beyond these guidelines may not be eligible for funding, depending on the justification of need for the specific development. This determination is made on a case-by-case basis. State financial aid is available through the BOA and is provided by the issuance of a finding approved by the governor. Appropriation of funds depends on individual airport needs and BOA priorities. For projects that receive federal financial aid, the airport owner and BOA equally share the non-federal costs.

For projects that do not involve federal financial aid, the state normally pays 80 percent of the cost of eligible airside and landside development and 50 percent of some planning projects. The state's contribution toward the cost of eligible buildings is limited to $1.25 million. The state cannot participate in the cost of hangars. In addition, the State of Wisconsin provides a five percent funding match for airport projects that are federally funded. The five percent state funding match covers a portion of the

[3] Guidance on the eligibility of a project for federal AIP grant funding can be found in FAA Order 5100.38D, Airport Improvement Program Handbook, Change 1, effective February 26, 2019.

10 percent local match, which leaves the airport sponsor responsible for the remaining five percent of the project cost. This state-funded portion of the local match greatly increases the affordability of projects for many airport sponsors throughout the State of Wisconsin.

Advance Land Acquisition Loan Program | The Advance Land Acquisition Loan Program was created to lend state funds to the owners of public-use airports included in the SASP. These funds are used for purchasing land essential for airport development and approach protection.

It is BOA policy that all land needed for airport development projects seeking state or federal aid be purchased prior to funding approval. The program is available to airport owners to assist them in meeting this requirement and also assists airport owners with purchasing properties when they come up for sale and the airport owner has not budgeted for the purchase. The program operates as a revolving fund wherein loan repayments are made available for future loans. Acquisition of land before receipt of federal financial aid allows construction to begin at the earliest possible date and minimizes the need for funding amendments caused by land cost overruns.

In addition to property acquisition costs, other costs associated with the project are eligible for loans through this program, including the following:

- Feasibility studies
- Land surveys
- Airport layout plan updates
- Environmental studies (including agricultural impact statements)
- Project plans and specifications
- Other incidental expenses of acquisition (such as appraisals, relocation plans, hazardous materials surveys, and closing costs)
- Legal services associated with land acquisition

These loans are available for up to 80 percent of eligible costs, for a maximum term of five years, with simple interest payable annually at the rate of four percent on the unpaid balance. The airport owner must provide 20 percent of the estimated eligible project costs up front.

Funding Flow | For land loan projects, the airport owner's share of the project is used to begin the preliminary work. The funds for the preliminary work are then applied to the airport owner's share of the land loan and, ultimately, the state or federal aid project. This procedure allows work to begin on a project before state or federal airport development funds are available. As previously stated, funds for preliminary work are also applied to the airport owner's share. In some cases, a third party (i.e., a private corporation or individual) may donate funds toward the airport owner's share. The airport owner must commit its share of the project funds before state and federal funds can be secured. An airport owner may include one or several listed items in a request for financial aid. Funding consideration is given for each work item listed and work that will enhance safety or keep the airport operational is prioritized.

Five-Year Airport Improvement Program | Although a work item may be eligible for funding, its eligibility does not guarantee funding, or funding on the airport's stated schedule. The BOA always receives more funding requests than it can cover. The state and federal priority systems help the BOA make decisions regarding what work to include in the Five-Year Airport Improvement Program, as well

as the schedule of work included. The Five-Year Airport Improvement Program is the BOA's tool for scheduling individual airport projects that are eligible for federal and state assistance. Projects with the highest priority will be included in the program for early consideration. The first two years of the program's five-year schedule primarily include projects that have been formally petitioned by an airport owner. Many of the projects included in the last three years of the program are tentative; the program is dynamic and changes due to fluctuating funding levels at federal, state, and local levels of government.

LOCAL FUNDING

After consideration has been given to grants, the balance of project costs must be funded through local resources. A goal for any airport is to generate enough revenue to cover all operating and capital expenditures, if possible. Several local financing options are available to consider when funding future development at airports, including airport revenues, issuance of various bond types, leasehold financing, customer facility charge (CFC) implementation, pursuit of non-aviation development potential, and collection of money from special events. These strategies could be used to fund the local matching share or complete a project if grant funding cannot be arranged. This section includes brief descriptions of the most common local funding options.

Airport Revenues | An airport's daily operations are conducted through the collection of various rates and charges. These airport revenues are generated specifically by airport operations and there are restrictions on the use of revenues collected by the airport. All receipts (excluding bond proceeds or related grants and interest) are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or additions or improvements to airport facilities.

All airports should establish standard base rates for various leases. All lease rates should be set to adjust to a standard index, such as the consumer price index (CPI), to ensure fair and equitable rates continue to be charged in the future. Many factors impact what the standard lease rate should be for a particular facility or ground parcel. For example, ground leases for aviation-related facilities should have different lease rates than non-aviation leases. When an airport owns hangars, a separate facility lease rate should be charged. The lease rate for any individual parcel or hangar may vary due to availability of utilities, condition, location, and other factors; nevertheless, standard lease rates should fall within an acceptable range.

Bonding | Bonding is a common method to finance large capital projects at airports. A bond is an instrument of indebtedness of the bond issuer to the bond holders; a bond is a form of loan or "IOU." While bond terms are negotiable, the bond issuer is typically obligated to pay the bond holder interest at regular intervals and/or repay the principal at a later date.

Leasehold/Third-Party Financing | Leasehold or third-party financing refers to a developer or tenant financing improvements under a long-term ground lease. The advantage of this arrangement is that it relieves the airport of the responsibility of raising capital funds for the improvement. For example, a hangar developer might consider constructing hangars and charging fair market lease rates while paying the airport sponsor for a ground lease. A fuel farm can be undertaken in the same manner; under such an arrangement, the developer of the facility would pay the airport a fuel flowage fee.

Many airports use third-party funding when planned improvements will primarily be used by a private business or other organization because such projects are not ordinarily eligible for federal funding. Projects of this kind typically include hangars, fixed base operator facilities, fuel storage, exclusive aircraft parking aprons, industrial aviation-use facilities, non-aviation office/commercial/industrial developments, and other similar projects. Private development proposals are considered on a case-by-case basis. Airport funds for infrastructure, preliminary site work, and site access are often required to facilitate privately developed projects on airport property.

Customer Facility Charge (CFC) | A CFC is the imposition of an additional fee charged to customers for the use of certain facilities. The most common example is when an airport constructs a consolidated rental car facility and imposes a fee for each rental car contract; that fee is then used by the airport to pay down the debt incurred from building the facility. A landing fee is another example, wherein operators of aircraft pay the airport a set amount for use of the airfield; a landing fee can often be waived with the purchase of aviation fuel, which offers another revenue source for the airport.

Non-Aeronautical Development | In addition to generating revenue from traditional aviation sources, airports with excess land can permit compatible non-aeronautical development. Generally, an airport will extend a long-term lease for land that is not anticipated to be needed for aviation purposes in the future. The developer will then pay the monthly lease rate and construct and use the compatible facility. Although the recommended development concept does not include non-aeronautical development, the Village of East Troy should not preclude non-aeronautical development opportunities, if presented. It should be noted that any future non-aviation development must be reviewed and approved by both the FAA and BOA.

Special Events | Another common revenue-generating option is permitted use of airport property for temporary or single events. Pancake "fly-ins" and airshows are two popular examples of special events. Airports can also permit portions of their facilities to be used for non-aviation special events, such as car shows or video production of commercials. This type of revenue generation must be approved by the FAA.

Airport Rates and Fees Information | Each year, the BOA completes a survey of public-use airports in Wisconsin to gauge the rates, charges, and related activities for state airports. Per Wisconsin Administrative Code, Chapter Trans 55, airports are required to submit responses as a condition of receiving state funding. The survey offers a comparative tool to help airports gauge financial practices and needs. Of the 97 SASP airports, 93 airports provided responses to the survey. (Complete rates and charges survey data can be found on the BOA's website at https://wisconsindot.gov/av-pubs.) 57C qualifies as a large general aviation airport; summary averages and/or detailed information for specific rates/fees are included in **Table 6B**.

TABLE 6B | BOA Rates and Charges Survey Results (2023) – Large GA Airports

100LL Fuel – Available at 100% of Responding Large GA Airports	
100LL Price on 12/31/2023	$5.78
Gallons of 100LL Sold	60,000
Jet A Fuel – Available at 100% of Responding Large GA Airports	
Jet A Price on 12/31/2023	$5.66
Gallons of Jet A Sold	434,000
Landing Fees – Charged at 43% of Responding Large GA Airports	
Landing Fee for a Hawker 800	$172
Landing Fee for a CRJ-200	$421

Continues on next page.

TABLE 6B | BOA Rates and Charges Survey Results (2023) – Large GA Airports (continued)	
Tiedown Fees – Charged at 71% of Responding Large GA Airports	
Daily Tiedown Rate for a Cessna 172	$10
Daily Tiedown Rate for a Beechcraft King Air	$53
Daily Tiedown Rate for a Hawker 800	$94
Rented T-Hangars – Available at 72% of Responding Large GA Airports	
Non-Heated, T-Hangar – Monthly Rate for a Cessna 172	$219
Heated, T-Hangar – Monthly Rate for a Cessna 172	$558
Non-Heated, T-Hangar – Daily Rate for a Cessna 172	$81
Heated, T-Hangar – Daily Rate for a Cessna 172	$100
Community Hangars – Available at 93% of Responding Large GA Airports	
Non-Heated, Community Hangar – Daily Rate for a Cessna 172	$81
Non-Heated, Community Hangar – Monthly Rate for a Cessna 172	$223
Heated, Community Hangar – Daily Rate for a Cessna 172	$80
Heated, Community Hangar – Monthly Rate for a Cessna 172	$371
Ground Leases – Available at 100% of Responding Large GA Airports	
Private Hangar Rate	$0.19 per square foot
Corporate Hangar Rate	$0.24 per square foot
Commercial Hangar Rate	$0.28 per square foot
Financial Self-Sustainability – 50% of Responding Large GA Airports Required Local Subsidy	
Local Tax Levy Subsidy	$299,000

MASTER PLAN IMPLEMENTATION

To implement the master plan recommendations, it is key to recognize that planning is a continuous process and does not end with approval of this document. The airport should implement measures that allow it to track various demand indicators, such as based aircraft, hangar demand, and operations. The issues on which this master plan is based will remain valid for a number of years. The primary goal is for 57C to best serve the air transportation needs of the region while achieving economic self-sufficiency. The CIP and phasing program presented will change over time. An effort has been made to identify and prioritize all major capital projects that would require federal or state grant funding; nevertheless, the airport and the BOA should review the five-year CIP on an annual basis.

The primary value of this study is that it keeps the issues and objectives at the forefront of the minds of decision-makers. In addition to adjustments in aviation demand, decisions regarding when to undertake any projects or improvements recommended in this master plan will impact how long the plan remains valid. The format of this plan reduces the need for formal and costly updates by simply adjusting the timing of project implementation. Updates can be performed by airport management, thereby improving the effectiveness of the master plan; nevertheless, airports are typically encouraged to update their master plans every seven to 10 years, or sooner if significant changes occur in the interim.

In summary, the planning process requires the Village of East Troy to constantly monitor the progress of the airport. The information obtained from continually monitoring activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.

Appendices

The Village of East Troy

Appendix A

Glossary of Terms

The Village of East Troy

GLOSSARY OF TERMS

A

Above Ground Level: The elevation of a point or surface above the ground.

Accelerate-Stop Distance Available (ASDA): See declared distances.

Advisory Circular: External publications issued by the FAA consisting of non-regulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

Air Carrier: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

Air Route Traffic Control Center (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

Air Taxi: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

Air Traffic Control: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

Air Traffic Control System Command Center: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

Air Traffic Hub: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

Air Transport Association Of America: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

Aircraft: A transportation vehicle that is used or intended for use for flight.

Aircraft Approach Category: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- **Category A:** Speed less than 91 knots.
- **Category B:** Speed 91 knots or more, but less than 121 knots.
- **Category C:** Speed 121 knots or more, but less than 141 knots.
- **Category D:** Speed 141 knots or more, but less than 166 knots.
- **Category E:** Speed greater than 166 knots

Aircraft Operation: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

Aircraft Operations Area (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

Aircraft Owners And Pilots Association: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

Aircraft Rescue And Fire Fighting: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

Airfield: The portion of an airport which contains the facilities necessary for the operation of aircraft.

Airline Hub: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

Airplane Design Group (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- **Group I:** Up to but not including 49 feet.
- **Group II:** 49 feet up to but not including 79 feet.
- **Group III:** 79 feet up to but not including 118 feet.
- **Group IV:** 118 feet up to but not including 171 feet.
- **Group V:** 171 feet up to but not including 214 feet.
- **Group VI:** 214 feet or greater.

Airport Authority: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

Airport Beacon: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

Airport Beacon

Airport Capital Improvement Plan: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

Airport Elevation: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

Airport Improvement Program: A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for airport planning and development.

Airport Layout Drawing (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

Airport Layout Plan (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

Airport Layout Plan Drawing Set: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

Airport Master Plan: A local planning document that serves as a guide for the long-term development of an airport.

Airport Movement Area Safety System: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

Airport Obstruction Chart: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

Airport Reference Code (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

Airport Reference Point (ARP): The latitude and longitude of the approximate center of the airport.

Airport Sponsor: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

Airport Surface Detection Equipment: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

Airport Surveillance Radar: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

Airport Traffic Control Tower (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

Airside: The portion of an airport that contains the facilities necessary for the operation of aircraft.

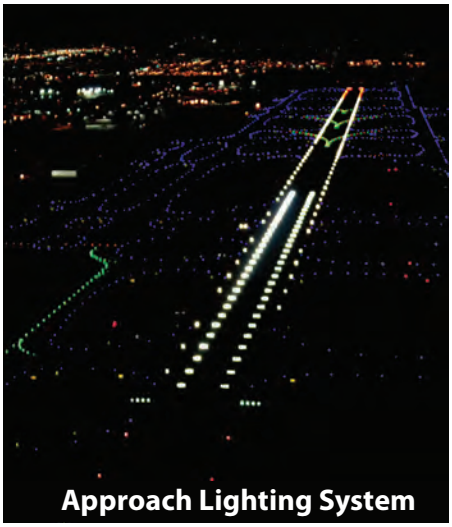
Airspace: The volume of space above the surface of the ground that is provided for the operation of aircraft.

Alert Area: See special-use airspace.

Altitude: The vertical distance measured in feet above mean sea level.

Annual Instrument Approach (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

Approach Lighting System (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on final approach and landing.


Approach Lighting System

Approach Minimums: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

Approach Surface: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

Apron: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

Area Navigation: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

Automated Terminal Information Service (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

Automated Surface Observation System (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

Automated Weather Observation System (AWOS): Equipment used to automatically record weather conditions (i.e., cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

Automatic Direction Finder (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

Avigation Easement: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

Azimuth: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

Base Leg: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

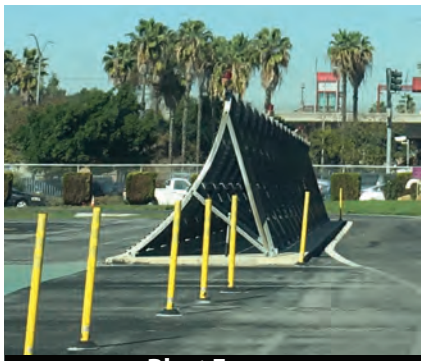
Based Aircraft: The general aviation aircraft that use a specific airport as a home base.

Bearing: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

Blast Fence: A barrier used to divert or dissipate jet blast or propeller wash.

Blast Pad: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

Building Restriction Line (BRL): A line which identifies suitable building area locations on the airport.



Blast Fence

C

Capital Improvement Plan: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

Cargo Service Airport: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

Ceiling: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

Circling Approach: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.

Class A Airspace: See Controlled Airspace.

Class B Airspace: See Controlled Airspace.

Class C Airspace: See Controlled Airspace.

Class D Airspace: See Controlled Airspace.

Class E Airspace: See Controlled Airspace.

Class G Airspace: See Controlled Airspace.

Clear Zone: See Runway Protection Zone.

Commercial Service Airport: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

Common Traffic Advisory Frequency (CTAF): A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

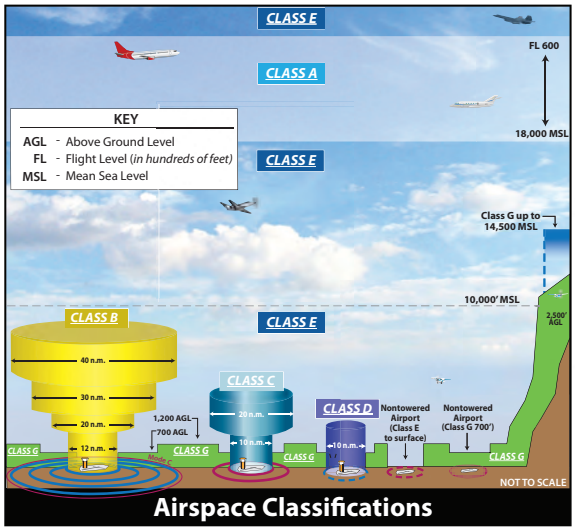
Compass Locator (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

Conical Surface: An imaginary obstruction- limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Controlled Airport: An airport that has an operating airport traffic control tower.

Controlled Airspace: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

CLASS A: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.



CLASS B: Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

CLASS C: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure. Unless otherwise authorized, all persons must establish two-way radio communication.

CLASS E: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

CLASS G: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

Controlled Firing Area: See special-use airspace.

Crosswind: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

Crosswind Component: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

Crosswind Leg: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

Decibel: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

Decision Height/Decision Altitude: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

Declared Distances: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

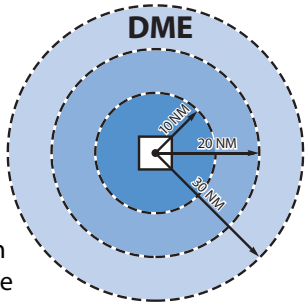
- **Takeoff Run Available (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off.
- **Takeoff Distance Available (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **Accelerate-stop Distance Available (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **Landing Distance Available (LDA):** The runway length declared available and suitable for landing.

Department Of Transportation: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

Discretionary Funds: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

Displaced Threshold: A threshold that is located at a point on the runway other than the designated beginning of the runway.

Distance Measuring Equipment (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

Downwind Leg: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

Easement: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any

specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

Elevation: The vertical distance measured in feet above mean sea level.

Enplaned Passengers: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

Enplanement: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

Entitlement: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

Environmental Assessment (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

Essential Air Service: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

Federal Aviation Regulations: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

Federal Inspection Services: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

Final Approach: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

Final Approach and Takeoff Area (FATO): A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

Final Approach Fix: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

Finding Of No Significant Impact (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

Fixed Base Operator (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

Flight Level: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

Flight Service Station (FSS): An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides preflight and in-flight advisory services to pilots through air and ground based communication facilities.

Frangible Navaid: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

General Aviation: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

General Aviation Airport: An airport that provides air service to only general aviation.

Glideslope (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

- Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or
- Visual ground aids, such as PAPI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

Global Positioning System (GPS): A system of satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

Ground Access: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

Ground Based Augmentation System (GBAS): A program that augments the existing GPS system by providing corrections to aircraft in the vicinity of an airport in order to improve the accuracy of these aircrafts' GPS navigational position

H

Helipad: A designated area for the takeoff, landing, and parking of helicopters.

High Intensity Runway Lights (HIRL): The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

High-speed Exit Taxiway: An acute-angled exit taxiway forming a 30 degree angle with the runway centerline, designed to allow an aircraft to exit a runway without having to decelerate to typical taxi speed.

Horizontal Surface: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are **a** function of the types of approaches existing or planned for the runway.

Hot Spot: A location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

I

Initial Approach Fix: The designated point at which the initial approach segment begins for an instrument approach to a runway.

Instrument Approach Procedure: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions **and the type of flight plan under which an aircraft is operating.**

Instrument Landing System (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer
2. Glide Slope
3. Outer Marker
4. Middle Marker
5. Approach Lights

Instrument Meteorological Conditions: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

Itinerant Operations: Operations by aircraft that are arriving from outside the traffic pattern or departing the airport traffic pattern.

K

Knots: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

Landside: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

Landing Distance Available (LDA): See declared distances.

Large Airplane: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

Local Operations: Aircraft operations performed by aircraft that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport. Typically, this includes touch and-go training operations.

Localizer: The component of an ILS which provides course guidance to the runway.

Localizer Type Directional Aid (LDA): A facility of comparable utility and accuracy to a localizer but is not part of a complete ILS and is not aligned with the runway.

Localizer

Low Intensity Runway Lights: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

Medium Intensity Runway Lights: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

Military Operations: Aircraft operations that are performed in military aircraft.

Military Operations Area (MOA): See special-use airspace

Military Training Route: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

Missed Approach Course (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

- When the aircraft has descended to the decision height and has not established visual contact; or
- When directed by air traffic control to pull up or to go around again.

Movement Area: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

National Airspace System (NAS): The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

National Plan Of Integrated Airport Systems (NPIAS): The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

National Transportation Safety Board: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

Nautical Mile: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

Navaid: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e., PAPI, VASI, ILS, etc.)

Navigational Aid: A facility used as, available for use as, or designed for use as an aid to air navigation.

Noise Contour: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

Non-directional Beacon (NDB): A beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine their bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.


NDB

Non-precision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

Notice To Air Missions (NOTAM): A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

Object Free Area (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

Operation: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

Outer Marker (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

Pilot-controlled Lighting: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

Precision Approach: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I):** A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- **CATEGORY II (CAT II):** A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- **CATEGORY III (CAT III):** A precision approach which provides for approaches with minimal less than Category II.

Precision Approach Path Indicator (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. A PAPI normally consists of four light units but an abbreviated system of two lights is acceptable for some categories of aircraft.


Precision Approach Path Indicator

Precision Approach Radar: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

Precision Object Free Zone (POFZ): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFZ is a clearing standard which requires the POFZ to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA is only in effect when the approach includes vertical guidance, the reported ceiling is below 250 feet, and an aircraft is on final approach within two miles of the runway threshold.

Primary Airport: A commercial service airport that enplanes at least 10,000 annual passengers.

Primary Surface: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

Prohibited Area: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

Radial: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

Regression Analysis: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

Remote Communications Outlet (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

Remote Transmitter/receiver (RTR): See remote communications outlet. RTRs serve ARTCCs.

Reliever Airport: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

Restricted Area: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

Runway: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

Runway Alignment Indicator Light (RAIL): A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

Runway Design Code: A code signifying the FAA design standards to which the runway is to be built.

Runway End Identification Lighting (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.


REIL

Runway Gradient: The average slope, measured in percent, between the two ends of a runway.

Runway Protection Zone (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minimal.

Runway Reference Code: A code signifying the current operational capabilities of a runway and taxiway.

Runway Safety Area (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway Visibility Zone (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of sight from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

Runway Visual Range (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

Scope: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

Segmented Circle: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers, often co-located with a wind cone.

Shoulder: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder Does Not Necessarily Need To Be Paved.

Slant-range Distance: The straight line distance between an aircraft and a point on the ground.

Small Aircraft: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

Special-use Airspace: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA:** Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- **CONTROLLED FIRING AREA:** Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.
- **MILITARY OPERATIONS AREA (MOA):** Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA:** Designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA:** Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** Airspace which may contain hazards to nonparticipating aircraft.

Standard Instrument Departure (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

Standard Instrument Departure Procedures: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or enroute airspace.

Standard Terminal Arrival Route (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

Stop-and-go: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

Stopway: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

Straight-in Landing/approach: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

Tactical Air Navigation (TACAN):
An ultrahigh frequency electronic air navigation system which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN **station.**

Takeoff Runway Available (TORA):
See declared distances.

Takeoff Distance Available (TODA):
See declared distances.

Taxilane: A taxiway designed for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area and provide access to from taxiways to aircraft parking positions and other terminal areas.

Taxiway: A defined path established for the taxiing of aircraft from one part of an airport to another.

Taxiway Design Group: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

Taxiway Safety Area (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

Terminal Instrument Procedures: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

Terminal Radar Approach Control:
An element of the air traffic control system responsible for monitoring the enroute and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

Tetrahedron: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.


Tetrahedron

Threshold: The beginning of that portion of the runway available for landing. In some instances, the threshold may be displaced.

Touch-and-go: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

Touchdown: The point at which a landing aircraft makes contact with the runway surface.

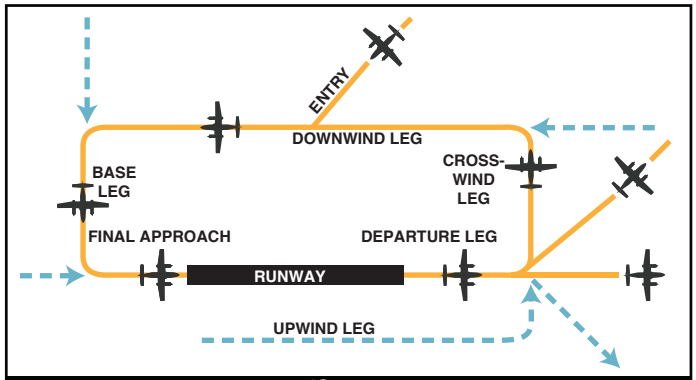
Touchdown and Lift-off Area (TLOF):
A load bearing, generally paved area, normally centered in the FATO, on which a helicopter lands or takes off.

Touchdown Zone (TDZ): The first 3,000 feet of the runway beginning at the threshold.

Touchdown Zone Elevation (TDZE):
The highest elevation in the touchdown zone.

Touchdown Zone Lighting: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Traffic Pattern: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



Traffic Pattern

U

Uncontrolled Airport: An airport without an airport traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

Uncontrolled Airspace: Airspace within which aircraft are not subject to air traffic control.

Universal Communication (UNICOM): A non-government communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

Upwind Leg: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

Very High Frequency Omni-directional Range (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

Very High Frequency Omni-directional Range/Tactical Air Navigation (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

Victor Airway: A system of established routes that run along specified VOR radials, from one VOR station to another.

Visual Approach: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

Visual Approach Slope Indicator (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing. The VASI is now obsolete and is being replaced with the PAPI.

Visual Flight Rules (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Visual Meteorological Conditions: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

Visual Runway: A runway without an existing or planned instrument approach.

VOR: See "Very High Frequency Omni-directional Range."

VORTAC: See "Very High Frequency Omni-directional Range/Tactical Air Navigation."

W

Warning Area: See special-use airspace.

Wide Area Augmentation System: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Windsock/Windcone: A visual aid that indicates the prevailing wind direction and intensity at a particular location.

Windsock/Windcone

Abbreviations

AC: advisory circular

ACIP: airport capital improvement program

ADF: automatic direction finder

ADG: airplane design group

ADS-B: automatic dependent surveillance-broadcast

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APRC: approach reference code

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ASV: annual service volume

ATC: airport traffic control

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DPRC: departure reference code

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GA: general aviation

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LNAV: lateral navigation

LOC: localizer

LOM: compass locator at outer marker

LP: localizer performance

LPV: localizer performance with vertical guidance

MALS: medium intensity approach lighting system

MALSR: MALS with runway alignment indicator lights

MALSF: MALS with sequenced flashers

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

MTOW: maximum takeoff weight

NAVAID: navigational aid

NDB: non-directional radio beacon

NEPA: National Environmental Policy Act

NM: nautical mile (6,076.1 feet)

NPDES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omni-directional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCI: pavement condition index

PCL: pilot-controlled lighting

PIW: public information workshop

POFZ: precision object free zone

PVC: poor visibility and ceiling

RCO: remote communications outlet

RDC: runway design code

REIL: runway end identification lighting

RNAV: area navigation

RPAS: remotely piloted unmanned aircraft system

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: taxiway design group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

UAS: unmanned aircraft system

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: very high frequency omni-directional range/tactical air navigation

WAAS: wide area augmentation system

Appendix B

Runway 8-26 Obstruction Analysis

The Village of East Troy

WisDOT Division of Transportation Investment Management
Wisconsin Bureau of Aeronautics
PO Box 7914
Madison, WI 53707-7914

Governor Tony Evers
Secretary Craig Thompson
wisconsindot.gov
608-266-3351

August 19, 2024

Doug Gauger
2015 Energy Dr
East Troy, WI 53120

Airport Safety Data Program
East Troy Municipal Airport
Site # 27168.1A

Dear Doug:

On Wednesday, July 31st I conducted a site visit to your airport to update the Federal Aviation Administration (FAA) form 5010-1, airport master record. The information gathered from these visits forms the basis for the FAA chart supplement, aeronautical charts and third-party publications such as ForeFlight and AirNav.com.

First of all, I appreciate the Village's efforts to remove several trees along the fence line on the east end of the airport in the runway 26 approach area. Unfortunately, I can now confirm the removed trees were obscuring additional obstructions further east. Fortunately, this was expected. During the inspection our survey drone was utilized to identify obstructions more comprehensively. The obstructions identified on the attached map penetrate both the FAR Part 77 approach surface and FAA Advisory Circular 150/5300-13B approach surface. While it should be the goal of all federally funded airports to keep the FAR Part 77 approach surface clear, obstructions to the AC 150/5300-13B approach surface often result in the loss of flight procedure authorization at night. Therefore, removing these trees should be a top priority. As before, the obstructions appear to be located on airport property or in an existing easement area.

Similarly, several trees were identified as obstructions in the runway 08 approach area between County Road L and I-43. I recall other obstructions had to be removed from this same area a few years ago. While the individual obstructing trees are identified in the attached photo, I recommend clearing the entirety of the tree line under the approach and to keep it mowed to eliminate the need to conduct future clearing. Many of the other trees will likely grow to be obstructions in the next few years.

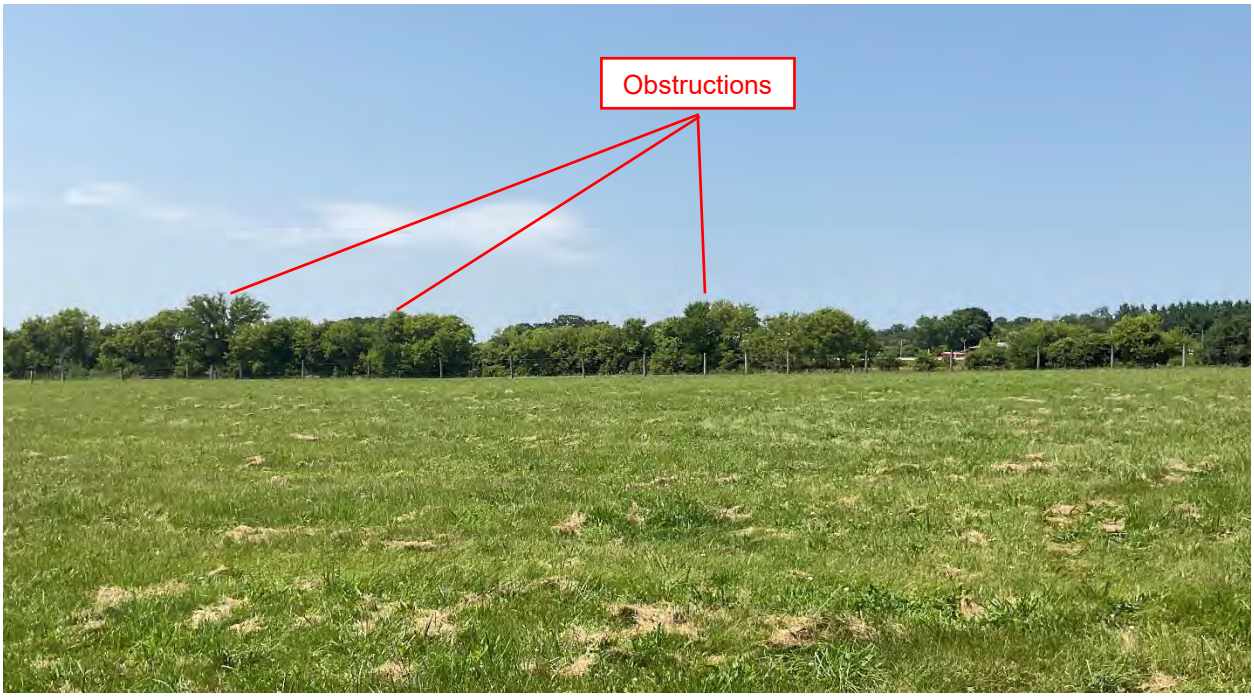
Please let me know if you have any questions.

Sincerely,

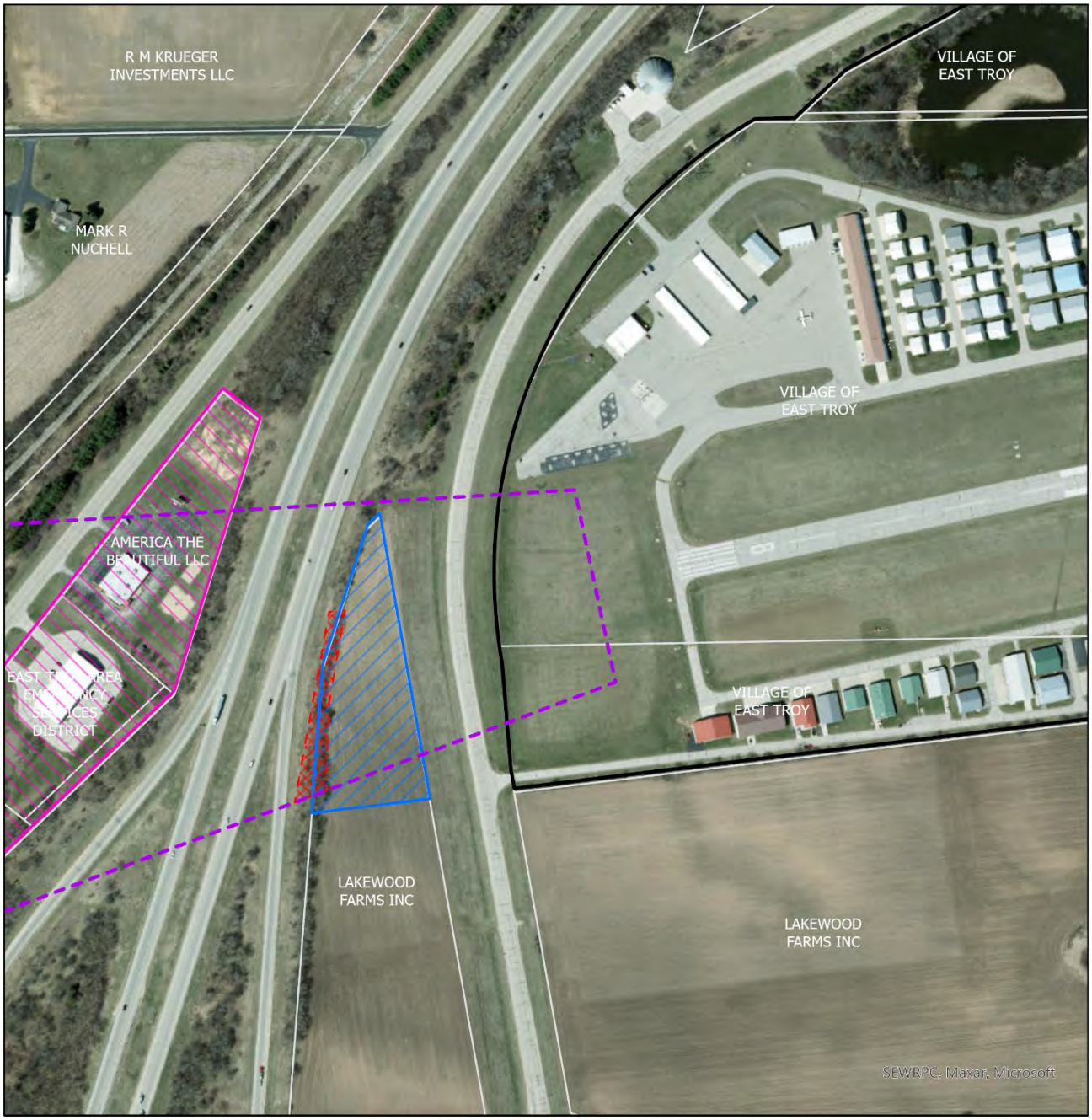
Hal Davis, C.M. | Airport Compliance Manager
Wisconsin Department of Transportation | Bureau of Aeronautics
howard.davis@dot.wi.gov| 608-267-2142

Cc: Andy Trimble - WisDOT Bureau of Aeronautics

Runway 08



Runway 12



Legend

- FAR Part 77 Approach Surface
- Recommended Clearing
- Fee Simple Airport Property
- Airport Avigation Easement
- Airport Clear Zone Easement
- Statewide Parcels V10 - 2024

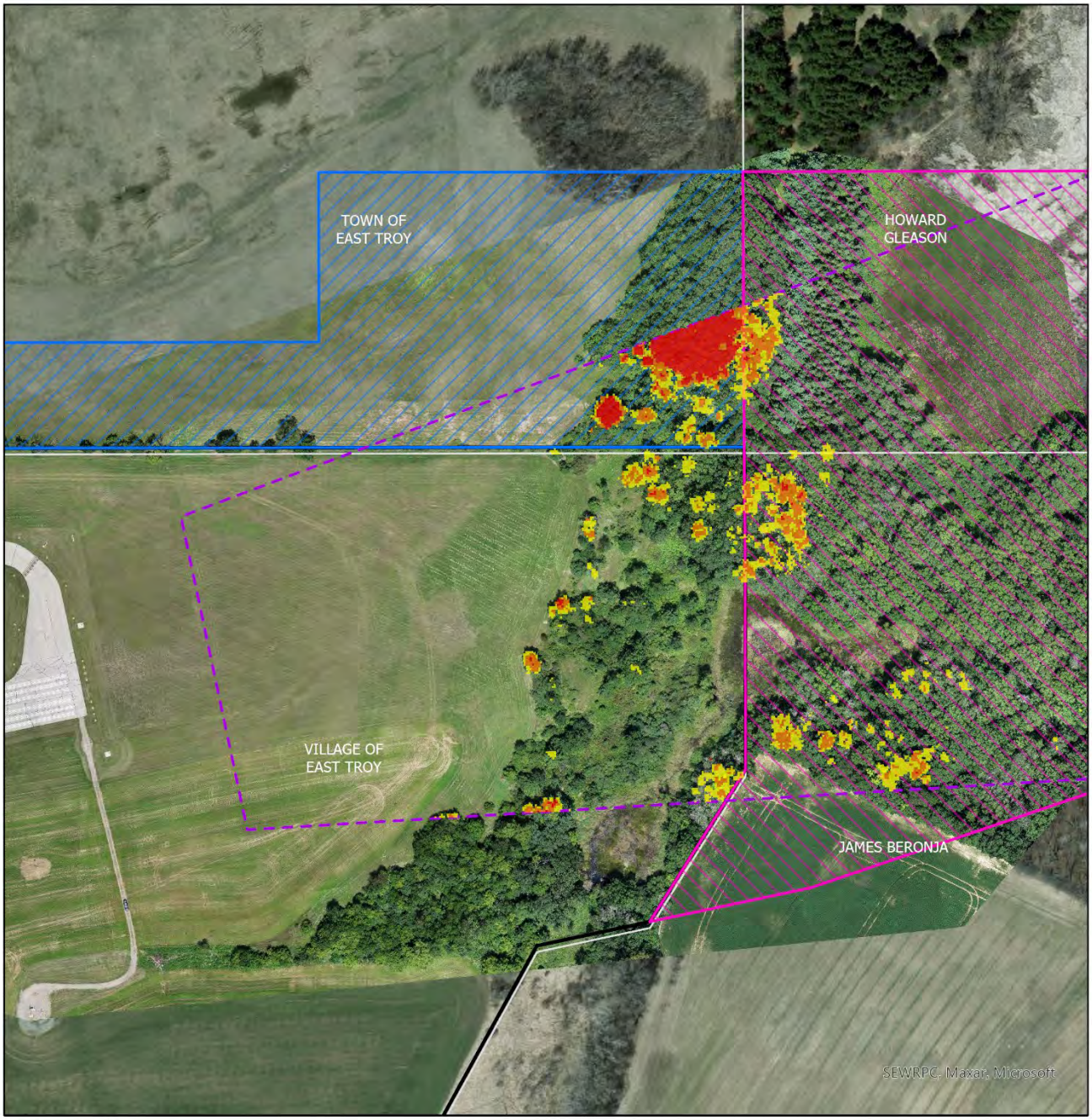
East Troy Municipal Airport

Runway 08 Obstructions

N

Bureau of Aeronautics
Wisconsin Department of Transportation

Prepared By: HD Date: 8/19/2024



Legend

- FAR Part 77 Approach Surface
- Surface Obstructions
- Less than 5' below Surface
- 10' - 5' below Surface
- Fee Simple Airport Property
- Airport Avigation Easement
- Airport Clear Zone Easement
- Statewide Parcels V10 - 2024

East Troy Municipal Airport

Runway 26 Obstructions

N

Bureau of Aeronautics
Wisconsin Department of Transportation

Prepared By: HD Date: 8/19/2024

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