NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT
AND
OPPORTUNITY FOR A PUBLIC MEETING – IF REQUESTED
FOR PROPOSED AIRPORT TRAFFIC CONTROL TOWER RELOCATION
AT
GERALD R. FORD INTERNATIONAL AIRPORT
GRAND RAPIDS, MICHIGAN

All interested persons are notified of the availability of the Draft Environmental Assessment (EA) evaluating the potential effects of the proposed relocation of the existing airport traffic control tower at the Gerald R. Ford International Airport in compliance with applicable laws, regulations, Executive Orders, and FAA policies including Order 1050.1F Environmental Impacts: Policies and Procedures.

The EA document is available for review at https://www.grr.org/airport-board#meetings or a hardcopy is available for examination during regular business hours at the Airport Authority office in the terminal building, located at:

- Gerald R. Ford International Airport, 5500 44th St. SE, Grand Rapids, MI 49512

If substantial written requests for a Public Meeting are received, the Airport will schedule and hold a Public Meeting on the Draft EA. The purpose of the Public Meeting (if requested) would be to consider the effects of the proposed action and whether the improvements are in the public interest and consistent with the goals and objectives of the community. Written requests for a Public Meeting must be received by **August 15, 2025,** at the address listed below.

Citizens are also encouraged to submit written comments or concerns regarding the project by mail or email. Comments submitted in this manner must be received by **August 15, 2025,** to be included in the official project record.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Send written or email comments to:

William Ballard, AICP
Mead & Hunt, Inc.
2605 Port Lansing Road
Lansing, MI 48906
william.ballard@meadhunt.com

Environmental Assessment

Draft Report

Gerald R. Ford International Airport

Grand Rapids, Michigan

Report prepared by

Mead & Hunt

Offices Nationwide

www.meadhunt.com

June 2025

This Environmental Assessment becomes a Federal document when evaluated, signed and dated by the responsible FAA official.

Draft

ENVIRONMENTAL ASSESSMENT

for

AIR TRAFFIC CONTROL TOWER RELOCATION

at

GERALD R. FORD INTERNATIONAL AIRPORT
GRAND RAPIDS, MICHIGAN

Prepared for

FEDERAL AVIATION ADMINISTRATION

June 2025

This Environmental Assessment becomes a Federal document when evaluated, signed and dated by the responsible FAA official.

Responsible FAA Official	Date

Preface

The National Environmental Policy Act (NEPA) of 1969 requires that federal agencies or their representatives identify and consider the social, economic, and environmental impacts of proposed actions as part of their decision-making process. NEPA also requires that federal agencies provide information to the public and regulatory agencies and consider their input when reaching decisions. This Environmental Assessment (EA) has been prepared to satisfy these obligations, as well as all applicable state requirements.

The proposed action is to provide the Gerald R. Ford International Airport with a modern Airport Traffic Control Tower (ATCT) with sufficient space to maintain operational efficiency, and to provide a base building of sufficient size to accommodate operational and administrative functions of the ATCT.

The proposed action is needed due to identified safety, security, and technical concerns with the existing ATCT that cannot be resolved at the current site. A relocated ATCT and base building would satisfy these needs.

This EA has been prepared in accordance with the requirements of NEPA (42 U.S.C. §§ 4321 *et seq*.), Title V of the Public Law 97-248 of the Airport and Airway Improvement Act of 1982, FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The intent of the EA is to serve as a decision-making tool to be used by the public and local, state, and federal officials in evaluating the proposed ATCT Relocation project at Gerald R. Ford International Airport.

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Chapter One
Purpose & Need

1.0 Introduction

The Federal Aviation Administration (FAA) proposes to fund, construct, and operate a new Airport Traffic Control Tower (ATCT) at the Gerald R. Ford International Airport (GRR or Airport) in Grand Rapids, Michigan (Proposed Action). The FAA has prepared this Draft Environmental Assessment (EA) to determine the consequences of the Proposed Action on the physical and human environment in the project area. The ATCT project addresses several safety, security, and technical concerns with the existing tower that cannot be resolved at the current site.

Any airport development that involves the expenditure of federal funds and/or Airport Layout Plan (ALP) approval is subject to National Environmental Policy Act (NEPA) to provide officials and decision-makers, as well as members of the public, with an understanding of the potential environmental impacts of the Proposed Action.

This Draft EA has been prepared in compliance with FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* and Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*.

This Draft EA has also been prepared to provide a clear understanding of the Proposed Action at GRR, evaluate reasonable and feasible alternatives, identify potential consequences associated with the Proposed Action, and identify mitigation measures for potential environmental impacts.

1.1 Proposed Action

In addition to relocating and replacing the existing ATCT at GRR, the Proposed Action would include connected projects to accommodate these facilities. The FAA Proposed Actions that are the subject of this Draft EA include:

- Relocate and replace the existing ATCT with a standard ATCT facility at an overall height of 220 feet above ground level (AGL).
- Construct an ATCT with a standard 17,500-square-foot base building to house administrative and operational functions associated with the ATCT.
- Site work, including grading, drainage, utilities, and fencing.
- Decommissioning of the existing ATCT, upon the commissioning of the proposed ATCT.
- Unconditional approval of the revised ALP for the Proposed Actions.
- Federal funding of the project.
- Environmental approval for the project.

Photos of the existing and proposed ATCT site can be found in **Appendix A – ATCT Site Photos**.

1.2 Background

1.2.1 Airport Information

In its original location, the site of the previously named Kent County Airport was able to handle the local and regional demand for nearly 40 years. In 1958, it was determined that the original Airport site did not have the necessary space for the anticipated growth as a result of the "Jet Age," and a site selection study was conducted to determine a new location. The first airplane touched down at the current Airport location in 1963. In 1977, the Airport was designated as Kent County International Airport with the opening of a U.S. Customs Office. In 1999, it was renamed Gerald R. Ford International Airport after the 38th President of the United State.

GRR is a commercial service airport in Cascade Township owned and operated by The Gerald R. Ford International Airport Authority (GFIAA). The Airport is located approximately 13 miles southeast of the City of Grand Rapids, Michigan. GRR is the second largest commercial airport in Michigan, and its property covers approximately 3,100 acres. The Airport is bounded on the east and south by Michigan Route 6 and Kraft Avenue and Patterson Avenue on the west. To the north, the Airport is bordered by the CSX Railroad and Interstate 96. **Figure 1.0 Airport Location** illustrates the location of GRR within the state.

The Airport and offered services have continued to grow over the decades, with over 76,000 aircraft operations in 2023 and nearly 2 million enplanements. The Airport maintains three commercial service, hard surface runways. **Figure 1.1 Airport Diagram** depicts the current runway configuration including:

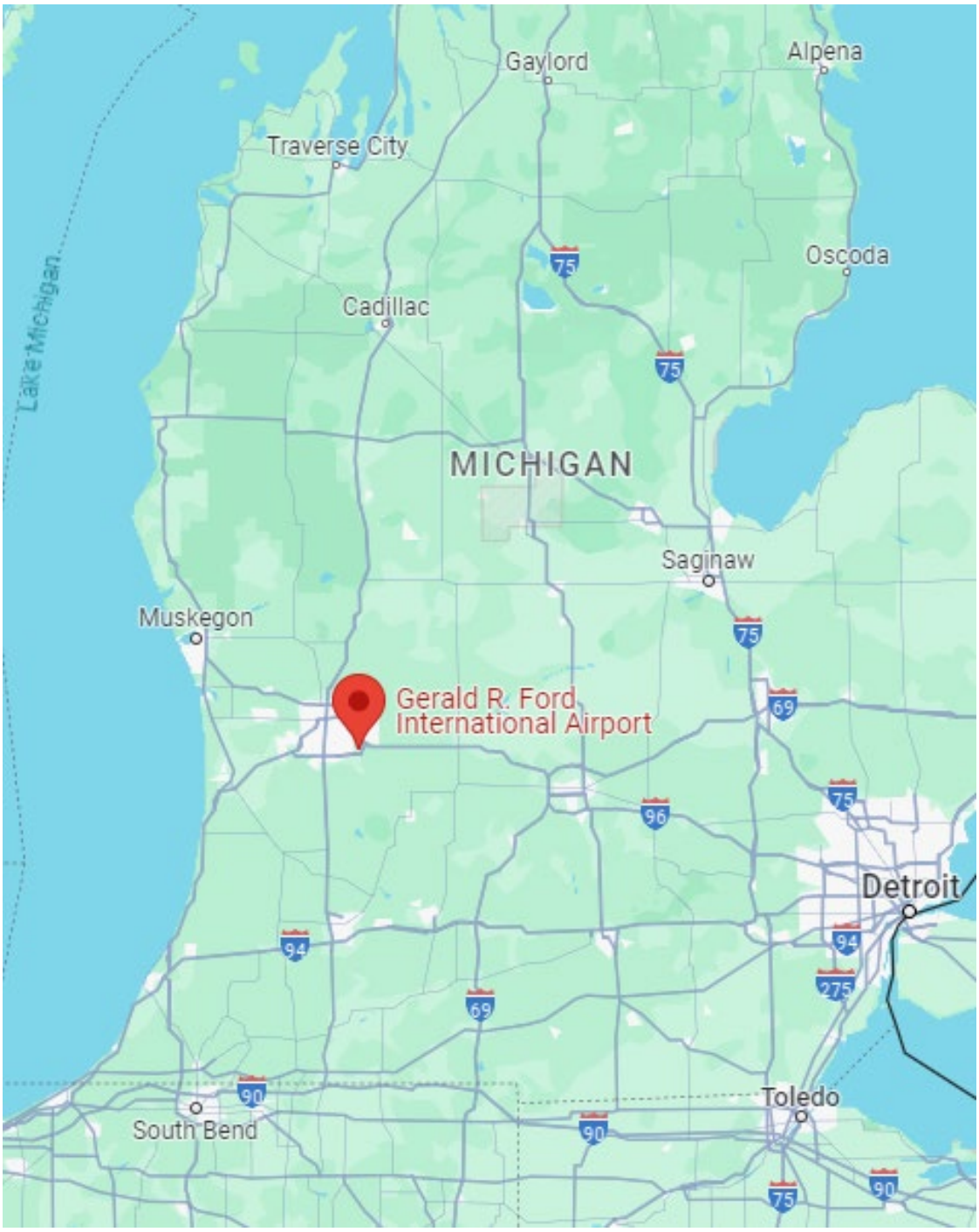
- 8R/26L – 10,001 feet long x 150 feet wide
- 17/35 – 8,501 feet long x 150 feet wide
- 8L/26R – 5,001 feet long x 100 feet wide

In the 2023 calendar year, GRR handled 77,215 control tower operations, averaging 212 aircraft movements per day. Six commercial airlines and seven charter service providers provide air service to the Airport. Two air cargo services also operate out of the Airport.

1.2.2 Existing Airport Traffic Control Tower Information

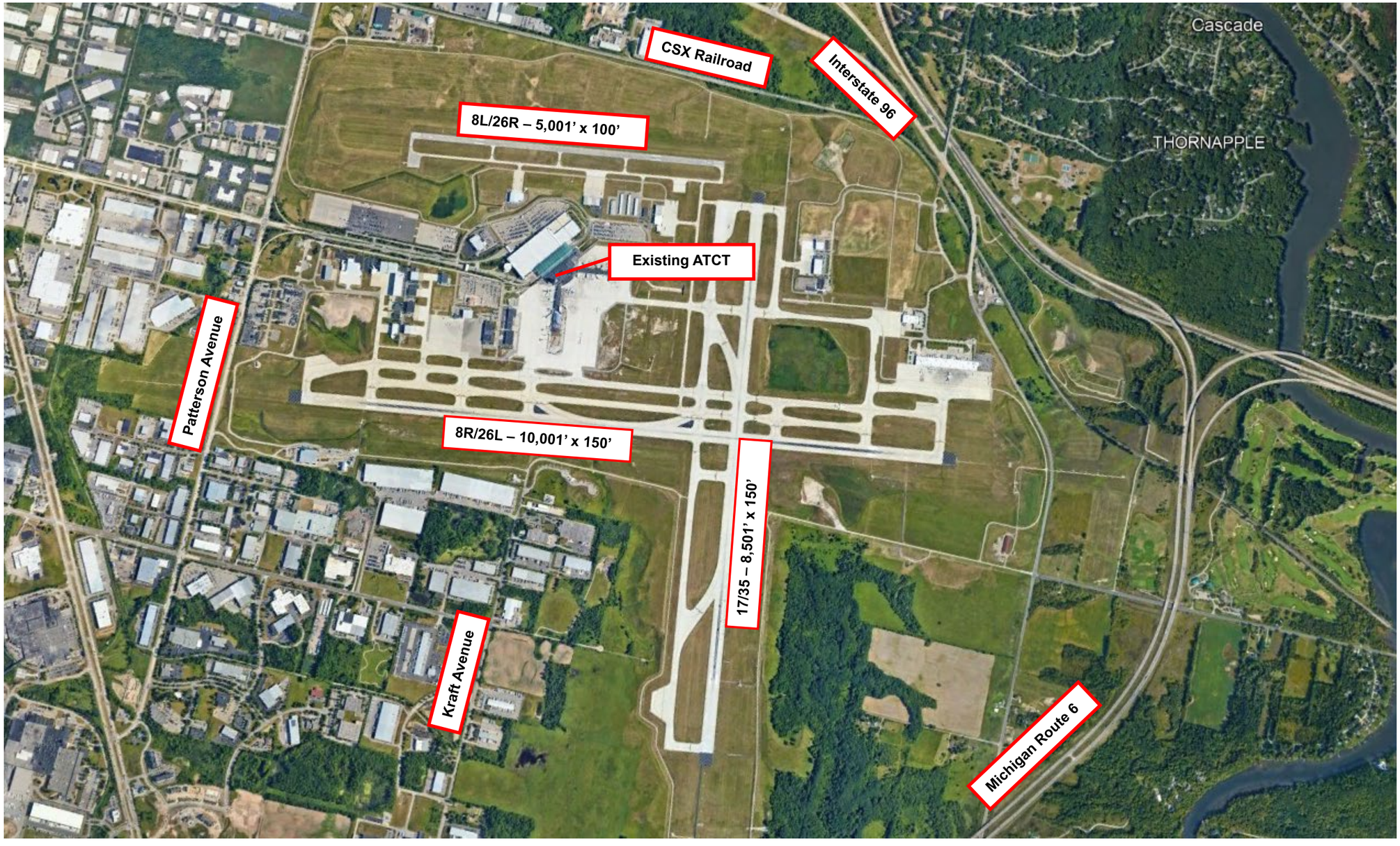
The existing facility is a Level 5 ATCT located within the confines of the Airport passenger terminal (**Figure 1.2 Exterior View of Existing ATCT**). The tower, which is 100 feet high (AGL) at cab floor level, was commissioned on November 23, 1963. The space owned by the FAA includes the third floor and above. The tower cab, which is approximately 450 square feet, occupies the ninth floor. The eighth floor consists of an elevator equipment room, a smoking room, a National Air Traffic Controllers Association office, utility chase and cable chase. The seventh floor contains a men's restroom, mechanical equipment room #2 and a breakroom. The utility chase, cable chase and mechanical equipment room #1 can be accessed through the breakroom. The Contract Weather Observers (CWO) office is located on the sixth floor. The communication equipment room is located on the fifth floor. The fourth floor contains a restroom, breakroom, computer-based instruction (CBI) room and Technical Operations equipment room. The third floor consists of the Air Traffic (AT) manager office and two additional AT offices. The existing ATCT provides air traffic control services to users of the Airport between the hours of 5:30 a.m. and midnight.

Figure 1.0 Airport Location



Source: Google Maps, 2024.

Figure 1.1 Airport Diagram



Source: Mead & Hunt.

Figure 1.2 Exterior View of Existing ATCT

Source: FAA – Air Traffic Organization

The FAA owns the facility (considered the third floor and above as explained in the preceding paragraph) and leases the site without cost from the GFIAA. The FAA also leases approximately 498 square feet for engine generator space within the terminal building.

GRR ATCT formerly had a Terminal Radar Approach Control (TRACON). However, the TRACON was relocated to the Kalamazoo/Battle Creek International Airport in Portage, Michigan, in September 2019.

Several safety, security, and technical concerns have been identified with the existing tower location. These issues include:

- The existing ATCT is atop the Airport terminal building and FAA employees are subject to terminal evacuations due to security events at the Traffic Security Administration (TSA) checkpoints, airline ticket counters, and outbound baggage screening locations.
- Elevator and stair access to the existing ATCT is public facing, in unsecured Airport terminal space allowing FAA employees to be approached and followed by the public.
- Quarterly inspections and reports from the FAA security team note the lack of a video monitoring system at the existing facility.
- FAA staff parking is not a secured lot. The pathway from the parking lot to the existing ATCT is not secure.
- There is no redundant emergency egress pathway from the existing ATCT. Improvements around the existing tower have eliminated the possibility of a fire ladder truck rescue from the existing tower cab.
- The existing ATCT does not meet current Accessibility and Americans with Disabilities Act (ADA) design criteria, including:
    - No restrooms are ADA accessible or meet ADA design standards
    - The cab stair treads are narrow and non-standard, creating a steep and unstable environment for use.
- The existing ATCT fire alarm system is tied to the Airport's terminal sprinkler system and is impacted by Airport construction and false Airport facility flow alarms
- There are several issues due to the age of the existing ATCT, including:

  - Cab window ice build-up, causing impaired visibility
  - Leaking windows
  - Cab and catwalk roof leaks and has rusting components
  - Inoperable heating, ventilation, and air conditioning units cause cab temperature and humidity control challenges as well as non-functioning cooling units to some tower floors
  - Cab console challenges including access door failures
- Line of sight constraints include:
  - Airport terminal infrastructure has been constrained to protect line of sight from the existing ATCT
  - Airfield infrastructure developments have been constrained and limited (airside sites cannot be developed due to line of sight limitations)
  - Airport revenues is limited due to airfield constraints

Because these concerns cannot be resolved at the current location, the GFIAA entered into a reimbursable agreement (RA) with the FAA, signed by all parties on February 24, 2020, to conduct an assessment of alternate ATCT sites.

1.2.3 Historic and Forecast Airport Activity

GRR has experienced an average of approximately 75,000 aircraft operations and over 2.9 million passengers annually over the last five years. **Table 1-0 Historic Airport Operational Activity** presents the historical operational and enplanement activity.

Table 1-0 Historic Airport Operational Activity

	Enplanements			Itinerant Operations					Local Operations			
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops
2018	987,766	586,035	1,573,801	29,331	15,992	24,582	672	70,577	11,833	687	12,520	83,097
2019	1,123,414	624,661	1,748,075	33,870	14,721	23,721	516	72,828	11,936	372	12,308	85,136
2020	714,241	387,063	1,101,304	29,072	7,830	19,624	280	56,806	7,112	85	7,197	64,003
2021	829,636	420,371	1,250,007	29,743	10,249	22,971	324	63,287	8,326	72	8,398	71,685
2022	1,267,029	424,820	1,691,849	32,166	13,821	23,409	413	69,809	5,611	48	5,659	75,468

Source: FAA Terminal Area Forecast, January 2024.

Each year, the FAA publishes projections of aviation activity at individual airports in the National Airspace System, which are to some extent based on the previous year's actual activity. This is referred to as the FAA's Terminal Area Forecast (TAF). The FAA published the most recent update to the Airport's TAF in January 2024. **Table 1-1 Activity Forecasts** presents the forecast for GRR over a 10-year period based on the current TAF.

Table 1-1 Activity Forecasts

	Enplanements			Itinerant Operations					Local Operations			
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops
2023	1,459,754	388,460	1,848,214	32,375	12,676	23,600	364	69,015	5,734	36	5,770	74,785
2024	1,677,254	352,479	2,029,733	37,055	12,034	26,057	364	75,510	12,188	36	12,224	87,734
2025	1,715,717	360,542	2,076,259	38,136	11,725	26,083	364	76,308	12,249	36	12,285	88,593
2026	1,752,754	368,325	2,121,079	39,547	11,012	26,109	364	77,032	12,310	36	12,346	89,378
2027	1,792,002	376,572	2,168,574	40,472	10,897	26,135	364	77,868	12,372	36	12,408	90,276
2028	1,833,076	385,193	2,218,269	41,211	11,017	26,161	364	78,753	12,434	36	12,470	91,223
2029	1,871,911	393,345	2,265,256	41,901	11,138	26,187	364	79,590	12,496	36	12,532	92,122
2030	1,910,878	401,533	2,312,411	42,592	11,261	26,213	364	80,430	12,558	36	12,594	93,024
2031	1,949,974	409,740	2,359,714	43,280	11,385	26,240	364	81,269	12,621	36	12,657	93,926
2032	1,989,880	418,127	2,408,007	43,985	11,510	26,266	364	82,125	12,684	36	12,720	94,845

Source: FAA Terminal Area Forecast, January 2024.

1.3 Purpose And Need

The purpose of the project is to provide the Airport with a modern ATCT with sufficient space to maintain operational efficiency, and to provide a base building of sufficient size to accommodate operational and administrative functions of the ATCT.

The project is needed due to identified safety, security, and technical concerns with the existing ATCT that cannot be resolved at the current site. Refurbishment of the existing ATCT would not address the security concerns previously identified; however, a relocated ATCT and base building would resolve all the issues listed in **1.2.2 Existing Airport Traffic Control Tower Information**.

1.4 Required Environmental Review

Federal financial participation in projects through the *Airport and Airway Improvement Act of 1982* requires environmental review under NEPA. An EA is a document prepared under NEPA that evaluates the effects of a proposed action on the surrounding natural, social, and economic environments.

This EA is prepared under the requirements of Title V of Public Law 97-248 of the *Airport and Airway Improvement Act of 1982*, NEPA, and FAA Order 5050.4B, *National Environmental Policy Act Implementing Instructions for Airport Actions* (April 2006). This EA also meets the requirements of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, dated July 2015.The intent of this EA is to provide the environmental documentation necessary to assist local, state, and federal officials and stakeholders in the evaluation of the Proposed Action at GRR. This EA evaluates the Proposed Action and a range of alternatives that may meet the purpose and need. The analysis also identifies and discusses measures to avoid, minimize, and mitigate possible environmental impacts. The FAA must evaluate this EA under NEPA, and, if the project does not have the potential for significant impacts, a Finding of No Significant Impact (FONSI) may be issued. If the project is expected to have significant impacts, an Environmental Impact Statement (EIS) may be required.

Chapter Two
Alternatives Considered

2.0 Introduction

An environmental review process requires that reasonable alternatives for the proposed action be identified and evaluated, although there is no requirement for the inclusion of any specific number or range of alternatives. FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures,* requires a discussion of alternatives that are reasonable and meet the purpose and need of the Proposed Action. The alternatives discussion should include:

- A list of alternatives considered, including the Proposed Action and the No Action alternatives.
- A concise statement explaining why any initial alternative considered was eliminated from further study because they were not considered reasonable or did not meet the purpose and need.
- A statement identifying a preferred alternative if one has been identified.

This chapter documents different options that may reasonably meet the purpose and need of the Proposed Action. As stated in **Chapter 1.0 Purpose and Need**, the purpose of the Proposed Action is to provide Gerald R. Ford International Airport (Airport or GRR) with a modern Air Traffic Control Tower (ATCT) providing sufficient space to maintain operational efficiency, and to provide a base building of sufficient size to accommodate operational and administrative functions of the ATCT. This is needed due to identified safety, security, and technical concerns with the existing ATCT that cannot be resolved at the current site. It should be noted that preliminary costs for the build alternatives are provided; however, comprehensive costs will be developed during the final design of the preferred alternative.

2.1 Siting Criteria

The FAA, representatives of the Central Service Area (CSA), and Airport staff participated in ATCT siting activities. The team followed FAA Siting Order 6480.4B, *Air Traffic Control Tower Siting Processes* to determine viable/preferred ATCT sites. This coordination process led to the recommended location for the new ATCT site at the Airport.

2.2 Alternative Sites Considered

A series of meetings were completed to identify and evaluate three potential sites for the relocated ATCT. **Figure 2.0 Preferred Sites Location Map** shows the locations of these sites (labeled sites A, A1, and B).

A virtual Airway Facilities Technical Information Laboratory (AFTIL-1) was conducted on January 19, 21, and 27, 2021. During this AFTIL-1 meeting, the team evaluated Line of Site (LOS) considerations for various sites being evaluated and identified Site A, Site A1, and Site B as locations best suited for the relocated ATCT.

A subsequent Virtual Immersive Siting Tower Assessment (VISTA) was conducted on March 23-25, 2021. During this meeting, a recommended site and two additional preferred sites were identified: Site B (recommended), Site A, Site A1.

Finally, an additional virtual AFTIL-2 meeting was conducted on May 5-7, 2021. During this meeting, the team again evaluated the LOS and conducted a safety assessment of the viable sites previously identified. The preferred sites were confirmed as Site B (recommended), Site A, and Site A1, in that order of preference.

In addition to their ability to meet the purpose and need for the proposed action, the FAA also considered the safety, economic, technical, and engineering factors of these alternatives to identify a preferred alternative. See **Table 2-0 Site Comparison Chart** at the end of this chapter for a comparison of the alternatives.

2.2.1 Site A1

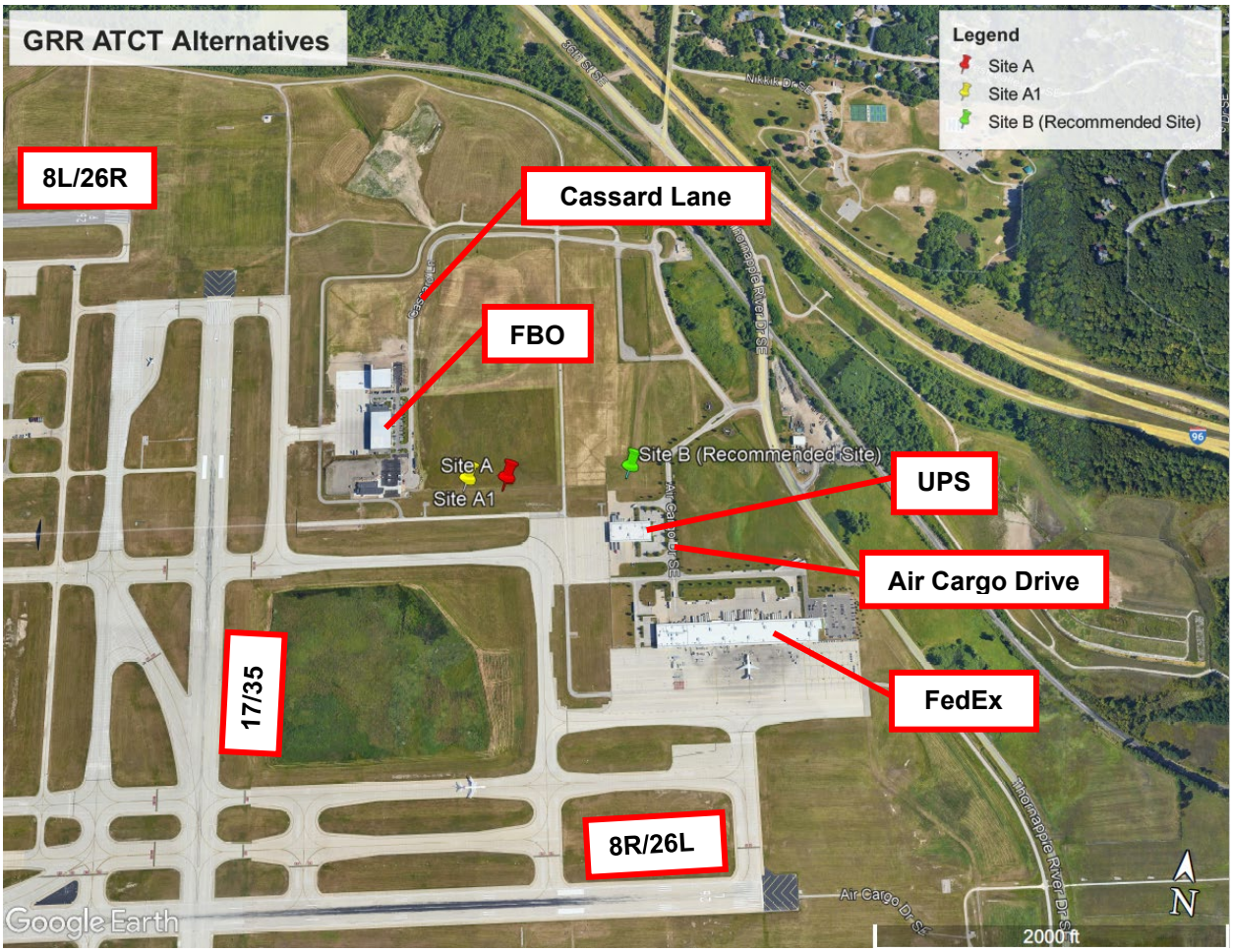
Site A1 is located in the northeast quadrant of GRR (**Figure 2.0 Preferred Sites Location Map**). The site is on Airport property, east of Runway 17/35, north of Runway 8R/26L, and southeast of Runway 8L/26R, just east of the Cassard Lane cul-de-sac. Air traffic controllers will be primarily facing west-southwest, toward the main terminal. The overall height would be 191 feet above ground level (AGL).

Access to Site A1 will not cross any movement areas and is not in the air operations area; therefore, no issues with site access were identified. The Safety Risk Management (SRM) Panel identified one Low Level Hazard for Site A1. Specifically, the ground control position has limited visibility of Taxiway V east of Taxiway K.

No hazardous materials Recognized Environmental Conditions (RECs) were identified at proposed Site A1. However, elevated levels of lead have been previously identified in the groundwater in the local area. All the requirements of FAA Order 6480.4B and FAA Order 1050.19C, *Environmental Due Diligence in the Conduct of FAA Real Property Transactions,* have been completed based on the findings in the Phase I Environmental Site Assessments (ESAs) and the recommendations and review of the FAA. Refer to **Appendix B – ATCT Site Alternatives Phase I ESA** for the complete Phase I ESA.

Estimates indicate a new ATCT at this site will cost approximately $26,500,000.

Figure 2.0 Preferred Sites Location Map



Source: Image-Google Earth, 2024; Labeling-Mead & Hunt.

2.2.2 Site A

Site A is also located in the northeast quadrant of GRR (**Figure 2.0 Preferred Sites Location Map**). The site is on Airport property, east of Runway 17/35, north of Runway 8R/26L, and southeast of Runway 8L/26R between Air Cargo Drive and Cassard Lane. Air traffic controllers will be primarily facing west-southwest, toward the main terminal. The overall height would be 200 feet AGL.

Like Site A1, access to Site A will not cross any movement areas and is not on the air operations area; therefore, no issues with site access were identified. The SRM Panel identified the same Low-Level Hazard in relation to visibility of Taxiway V from the ground control position for Site A.

As with Site A1, no RECs were identified at Site A. However, it should be noted that elevated levels of lead have been previously identified in the groundwater in the local area. All the requirements of FAA Order 6480.4B and FAA Order 1050.19C have been completed based on the findings in the Phase I ESAs and recommendations and review of the FAA. See **Appendix B – ATCT Site Alternatives Phase I ESA** for the complete Phase I ESA.

Estimates indicate a new ATCT at this site will cost approximately $27,500,000.

2.2.3 Site B

Like the other two sites, Site B is also located in the northeast quadrant of the Airport (**Figure 2.0 Preferred Sites Location Map**). This site is on Airport property, east of Runway 17/35, north of Runway 8R/26L, and southeast of Runway 8L/26R, just west of Air Cargo Drive. Air Traffic controllers will be primarily facing west-southwest, toward the main terminal. The overall height would be 220 feet AGL.

Access to Site B will not cross any movement areas and is not on the air operations area; therefore, no issues with site access were identified. The SRM Panel identified no LOS hazards for Site B.

No RECs were identified at Site B. However, elevated levels of lead have been previously identified in the groundwater in the local area. As with the other two sites, all of the requirements of FAA Order 6480.4B and FAA Order 1050.19C have been completed based on the findings in the Phase I ESAs and the recommendations and review of the FAA. Refer to **Appendix B – ATCT Site Alternatives Phase I ESA** for the complete Phase I ESA.

Estimates indicate a new ATCT at this site will cost approximately $29,500,000.

2.3 Recommended ATCT Site

After analyzing the characteristics of the three alternative sites and comparing them against one another, the Siting Team recommended that the FAA construct the new ATCT and base building at Site B. GRR ATC explained that Site B provides a more effective and wide-open view of the Airport with no LOS issues. Site A and Site A1 presented difficulty in seeing a portion of Taxiway V from the ground control location in the ATCT cab and required a wider scanning of the Airport in order to provide both local and ground control duties.

This proposed ATCT location would provide completely unobstructed views of all controlled airport surface areas. This site has the highest cost; however, this estimate is attributed to the fact that the proposed ATCT for Site B is taller than the structures proposed at Sites A and A1.

Although all three sites could satisfy the purpose and need for the proposed action, Site B is the first choice of the Siting Team members and is the recommended site based on the safety risk management assessments. Site B will be carried forward and evaluated as the Preferred Alternative throughout the rest of this EA document.

2.4 No Action Alternative

The No Action Alternative assumes that no action would be taken to address the needs of the Airport as identified in **Chapter 1.0 Purpose and Need**. Under this alternative, GRR would remain in its current state, and no new ATCT or base building would be constructed. As a result, the No Action Alternative does not meet the purpose and need of the project.

Although the No Action Alternative does not meet the project's purpose and need, it is included as required by 40 CFR § 1502.14(c) to serve as a baseline of comparison to the environmental impacts associated with the other alternatives and is, therefore, retained for analysis and carried forward for review.

Table 2-0 Site Comparison Chart

Item Description	Site A1			Site A			Site B		
Recommended Site	Preferred #2			Preferred #3			Recommended		
Cab Floor Level (ft AGL)	156			165			185		
Cab Floor Level (ft AMSL)	938			947			968		
Top of Tower (ft AGL)	191			200			220		
Top of Tower (ft AMSL)	973			982			1003		
Latitude	42º53'11.85"N			42º53'12.18"N			42º53'13.71"N		
Longitude	85º30'46.30"W			85º30'43.12"W			85º30'33.13"W		
Line of Sight Angle of Incidence	PASS - 1.00			PASS - 1.03			PASS - 1.07		
ATCT Orientation Direction	WSW			WSW			WSW		
Access to ATCT Site (Yes or No)	Yes			Yes			Yes		
14 CFR Part 77 Impacts	will be mitigated			will be mitigated			will be mitigated		
Environmental Issues	None			None			None		
ATCT Potential Impacts to Future & Existing NAVAIDs	No			No			No		
Comparative Cost Estimate* ($100K per vertical foot)	$26,500,000			$27,500,000			$29,500,000		
Safety Assessment Initial Risk Ranking**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**
	1	0	0	1	0	0	0	0	0
Safety Assessment Predicted Residual Risk Ranking	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**
	1	0	0	1	0	0	0	0	0

*The comparative cost estimate is not for budgetary purposes; it is for site comparison purposes only.

****L** – Low, **M** – Medium, **H** – High

Source: FAA

Chapter Three
Affected Environment and Environmental Consequences

3.0 Introduction

This chapter of the Environmental Assessment (EA) describes the resources that may be affected by the Preferred Alternative and the No Action Alternative. This chapter also presents an analysis of the reasonably foreseeable direct, indirect, and reasonably foreseeable effects of the Preferred Alternative when compared with those of the No Action Alternative, as well as mitigation measures to avoid or minimize such impacts. Each resource category listed below includes first a summary of the regulatory setting and then an analysis of the topic relative to the Preferred Alternative and the No Action Alternative, as well as any suggested mitigation plans. **Table 3-3 Mitigation Summary of the Preferred Alternative** at the end of this chapter provides a summary of impacts and mitigation associated with the Preferred Alternative.

To help identify measures to first avoid, then minimize, and lastly mitigate impacts of the Preferred Alternative, the Gerald R. Ford International Airport (Airport or GRR), the Federal Aviation Administration (FAA), and various other regulatory agencies with jurisdiction or permitting authority over a particular resource category in the project area provided assistance and guidance.

As described in previous chapters, the FAA is proposing to fund, construct, and operate a new Airport Traffic Control Tower (ATCT). The Proposed Action will provide GRR with a safe and secure modern ATCT with sufficient space to maintain operational efficiency and accommodate administrative functions. For a detailed discussion of the Preferred Alternative, see **Chapter 2.0 Alternatives Considered**. For additional details and justification of why the project is needed, see **Chapter 1.0 Purpose and Need**.

As described in **Chapter 1.0 Purpose and Need**, the FAA's proposed project includes the following components:

- Relocate and replace the existing ATCT with a standard ATCT facility at an overall height of 220 feet above ground level (AGL).
- Construct an ATCT standard design 17,500-square-foot Base Building to house administrative and operational functions associated with the ATCT.
- Complete site work, including grading, drainage, utilities, and fencing.
- Decommission of the existing ATCT, upon the commissioning of the proposed ATCT.
- Acquire unconditional approval of the revised ALP for the Proposed Actions.
- Gain federal funding of the project.
- Acquire environmental approval for the project.

Figure 3.0 Proposed Project Area shows the proposed location of the replacement ATCT as well as the location of the existing ATCT.

Figure 3.0 Proposed Project Area

Source: 2024 Google Earth, with labeling by Mead & Hunt, Inc.

3.1 Early Agency and Public Coordination

Resource agencies and Native American tribes with potential jurisdiction over or interest in the Proposed Action were contacted at the beginning of the project and given the opportunity to provide comments on the Proposed Action. **Appendix C – Early Agency Coordination** contains a copy of the distribution list, early coordination letters and maps sent to each agency and organization, and their response letters. The appropriate resource sections below address specific information and direction received from responding agencies where applicable.

Upon issuance of the Draft EA, the document will be made available for public and agency review and comment for a minimum of 30 days. An electronic copy will be posted on the Airport's website and hard copies will be available at the Airport and local libraries. Digital copies will be shared with regulatory agencies via flash drive or file transfer. The opportunity to request a public hearing will be advertised in a local paper and held, if requested. Written comments from the regulatory agencies and the public will be considered and incorporated into the Final EA where applicable.

3.2 Air Quality

An air quality analysis is the measure of the air's composition in terms of pollutant concentrations. Air quality is regulated out of concern for human health (especially the health of children, the elderly, and those with certain health conditions). Poor air quality can also affect crops and vegetation, as well as buildings and other facilities. The United States Environmental Protection Agency (EPA) regulates air quality under the Clean Air Act (CAA) described in 42 U.S.C. §§ 7401- 7671q. The EPA regulates six common air pollutants under the CAA, referred to as criteria pollutants, to permissible levels via standards called National Ambient Air Quality Standards (NAAQS). In addition to the EPA, the Michigan Department of Environment, Great Lakes, and Energy (EGLE) and the Grand Valley Metro Council, the Metropolitan Planning Organization for the Greater Grand Rapids area, also address air quality in the project area.

Areas that have ambient concentrations of criteria pollutants below the NAAQS are designated as "attainment areas." Areas with ambient criteria pollutant concentrations above the NAAQS are designated as "nonattainment areas." Nonattainment areas must have an applicable State Implementation Plan (SIP) that establishes mitigation measures and timelines required to lower pollutant levels below the NAAQS. In addition, aviation-related federal projects planned for nonattainment areas must conform to the applicable SIP, known as "General Conformity."

3.2.1 Affected Environment

The Airport is located in Kent County, which is currently in attainment for all criteria pollutants. Kent county was previously classified as being in nonattainment for the 8-Hour Ozone (1997) from 2004-2006 and was redesignated to a maintenance status on May 16, 2007. The 1997 8-Hour Ozone NAAQS was revoked on April 6, 2015, and Kent County has maintained its status as in attainment ever since. Because of this, the General Conformity rules do not apply to the proposed project. See **Section 3.9 Land Use** for a description of the land uses surrounding the project area.

3.2.2 Environmental Consequences

Preferred Alternative: Given that the proposed ATCT would be energy efficient and use less energy, the Proposed Action is considered an improvement over existing conditions and is not anticipated to cause or contribute to any new violations of NAAQS. Temporary air quality impacts, such as the creation of dust from ground disturbing activities may result from construction, but long-term impacts are not expected.

A 900-kilowatt (kW) emergency backup generator will be installed as part of the Proposed Action. The generator falls below the size threshold standard for EGLE air quality permit requirements. Because the generator will only be used for emergency purposes and monthly tests, no impacts to air quality are expected.

Since there are no long-term impacts anticipated, no specific mitigation is proposed. However, to further reduce the potential for temporary air quality impacts for both workers and the surrounding area, the following Best Management Practices (BMPs) should be considered during construction under the Preferred Alternative where feasible:

- Use low-sulfur diesel fuel (less than 0.05 percent sulfur).

- Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site.
- Position the exhaust pipe so that the diesel fumes are directed away from the operator and nearby workers, thereby reducing the fume concentration to which personnel are exposed.
- Use catalytic convertors to reduce carbon monoxide, aldehydes, and hydrocarbons in diesel fumes. These devices must be used with low sulfur fuels.
- Use climate-controlled cabs that are pressurized and equipped with high efficiency particulate air (HEPA) filters to reduce the operator's exposure to diesel fumes. Pressurization ensures that air is moved from the inside to the outside. HEPA filters ensure that any incoming air is filtered first.
- Regularly maintain diesel engines, which is essential to keeping exhaust emissions low, and follow the manufacturer's recommended maintenance schedule. For example, blue/black smoke indicates that an engine requires servicing or tuning.
- Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel operators to perform routine inspections, and maintaining filtration devices.
- Purchase new vehicles equipped with the most advanced emission control systems available.
- With older vehicles, use electric starting aids as block heaters to warm the engine to reduce diesel emissions.

No Action Alternative: No new impacts to air quality would result from the implementation of the No Action Alternative. However, under this alternative the increased efficiency of a new ATCT leading to less energy use and improved air quality would be lost.

3.3 Biological Resources

Biological resources include plants (vegetation), animals (wildlife), and the habitats where they occur. Habitats are the resources and conditions that support the continuous existence of plants or animals in a particular area. Together, biological resources form ecosystems, which are dynamic and respond over time to changes in the environment, whether natural or human induced. Biological resources provide aesthetic, recreational, and socioeconomic values to society, as well as being valuable in their own right. Accordingly, federal and state laws and statutes exist to protect certain species and habitats of special importance.

Early agency coordination with federal and state regulatory agencies with interest or jurisdiction over biological resources in the project area was conducted at the onset of this project. A list of agencies contacted, and their response letters are found in **Appendix C – Early Agency Coordination**. For details on the biological resources in the project area, including U.S. Fish and Wildlife Service (USFWS) consultation, see **Appendix D – Biological Resources**.

3.3.1 Endangered and Threatened Species

The *Endangered Species Act of 1973* (the Act, 16 U.S.C. §1531 et seq.) and subsequent amendments require the conservation of federally listed threatened and endangered plant and animal species, and critical habitats in which they are found. A species is considered endangered if it is in danger of extinction throughout all or a significant amount of its range. Threatened species are defined as those that are likely to become endangered in the foreseeable future. The USFWS administers the Act primarily for land and

freshwater species and designates critical habitat for species protected under the Act. Section 7 of the Act requires all federal agencies to consult with the USFWS, as applicable, before initiating any action that may affect a listed species or designated critical habitat. Candidate species, which may be listed as threatened or endangered in the future, are not provided any statutory protection under the Act but conservation efforts are encouraged.

At the state level, EGLE protects threatened and endangered species from being taken or harmed during project activities under Part 365 of the *Natural Resources and Environmental Protection Act*, 1994 Public Act 451, as amended. An environmental review must be completed for the project area to identify whether project actions may affect any threatened and endangered species. EGLE may require permits if impacts are identified.

3.3.1.1 Affected Environment

The project area is in the northeast quadrant of the Airport and consists of a turfgrass field that is mowed and maintained (**Figure 3.1 Proposed Replacement ATCT Site**). Immediately south of the project area are impervious surfaces that are part of a cargo facility for United Parcel Service (UPS). West of the project area is a segment of the Airport's perimeter road and to the east is Air Cargo Drive. Another area of turfgrass that is mowed and maintained is north of the project area.

Figure 3.1 Proposed Replacement ATCT Site

Source: Google Street View, July 2019 Imagery

3.3.1.2 Environmental Consequences

Preferred Alternative: To determine the presence of federally listed threatened, endangered, proposed, and candidate species and to evaluate the potential impacts from the proposed project, a qualified biologist conducted a review of the project area via the USFWS Information for Planning and Consultation (IPaC) database. This was coupled with the All-Species Michigan Determination Key (DKey), which provided USFWS recommended effect determinations for species within the project area.

A review of threatened and endangered species information provided by the USFWS for the project area identified seven federally endangered, proposed endangered, threatened, experimental population, or candidate species (found in **Table 3-0 USFWS Endangered and Threatened Species List**). Also, according to the USFWS, there are no critical habitats within the project area. See **Appendix D – Biological Resources** for correspondence from the USFWS regarding protected species in the project area.

Table 3-0
USFWS Endangered and Threatened Species List

Species Name	Common Name	Status
Myotis sodalis	Indiana Bat	Endangered
Myotis septentrionalis	Northern Long-eared Bat	Endangered
Perimyotis subflavus	Tricolored Bat	Proposed Endangered
Grus americana	Whooping Crane	Experimental Population, Non-essential
Sistrurus catenatus	Eastern Massasauga Rattlesnake	Threatened
Lycaeides melissa samuelis	Karner Blue Butterfly	Endangered
Danaus plexippus	Monarch Butterfly	Candidate

Source: USFWS

The Monarch Butterfly is a candidate species and is not yet listed or proposed for listing. Consultation with USFWS under Section 7 of the Act is not required for candidate species although project components should be considered or implemented to best support the butterfly.

In Michigan, the USFWS classifies the Whooping Crane as a non-essential experimental population, which is defined as a population that has been established within its historical range under section 10(j) of the Act to aid recovery of the species. The USFWS has determined a non-essential population is not necessary for the continued existence of the species. For the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (and require consultation under 7(a)(2) of the Act) and as a proposed species on private land (no section 7(a)(2) requirements, but Federal agencies must not jeopardize their existence (section 7(a)(4))).

USFWS proposes to list the Tricolored Bat as endangered under the Act and, if finalized, will extend the Act's protections to this species. Therefore, for the purposes of this EA, the Tricolored Bat will be considered as protected under the Act.

Table 3-1 Recommended Effect Determinations from the Michigan Endangered Species Determination Key (DKey) presents the USFWS impact determinations from the construction of the Proposed Action. The USFWS verification letter is found in **Appendix D – Biological Resources**.

Table 3-1
Recommended Effect Determinations from the Michigan Endangered Species Determination Key (DKey)

Common Name / Species Name	Status	USFWS Determination
Indiana Bat (*Myotis sodalis*)	Endangered	No effect
Northern Long-eared Bat *(Myotis septentrionalis)*	Endangered	No effect
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	No effect
Whooping Crane (*Grus americana*)	Experimental Population, Non-essential	No effect
Eastern Massasauga Rattlesnake *(Sistrurus catenatus)*	Threatened	NLAA*
Karner Blue Butterfly (*Lycaeides melissa samuelis*)	Endangered	No effect
Monarch Butterfly *(Danaus plexippus)*	Candidate	No effect

*NLAA=May affect, but not likely to adversely affect
Source: USFWS Michigan Endangered Species Determination Key (DKey)

The potential for impacts to threatened and endangered species within the project area and recommended mitigation (if any) are discussed below.

Indiana Bat, Northern Long-eared Bat, and Tricolored Bat

The project area is regularly mowed. According to a May 2024 review of the project area by a biologist from the Michigan Department of Natural Resources (MDNR), the area is primarily open field type with a mixture of grasses, some legumes (red clover), common forbs, and weeds (dandelion). The ongoing vegetation maintenance operations in the project area cause significant regular vegetative and noise disturbance. Tree cover is absent in the project area, with only a few ornamental landscaping trees found nearby within the Air Cargo Drive right-of-way. These trees do not provide suitable roosting habitat for the Indiana Bat, Northern Long-eared Bat (NLEB), or Tricolored Bat (TCB). In addition, tree removals are not anticipated under the Preferred Alternative. Therefore, the proposed project will have no effect on protected bat species.

Whooping Crane

The project area is within the historical range of the Whooping Crane. However, as a non-essential experimental population species Section 7 consultation with the USFWS is not required. Although the USFWS encourages opportunities to conserve the species if possible. The proposed project will have no effect on the Whooping Crane.

Eastern Massasauga Rattlesnake (EMR)

The project area is within the historic range of the EMR. As such, the USFWS recommended BMPs for projects within the known EMR range are as follows:

- Use of wildlife-safe erosion control materials.
- Viewing of the MDNR “60-Second Snakes: The Eastern Massasauga Rattlesnake” video and/or review of the EMR fact sheet.

- Reporting of any EMR observations (or any other threatened or endangered species) during project implementation.

Quality habitat for the EMR does not exist within the proposed project area. The proposed action may affect, but is not likely to adversely affect, the EMR. No additional mitigation is required.

Karner Blue Butterfly (KBB)

The project area is within the historical range of the KBB. However, suitable habitat is not present within the project area due to the regular vegetation maintenance activities. Therefore, the proposed project will have no effect on the KBB.

Monarch Butterfly

Like the KBB, suitable habitat is not present within the project area due to the regular vegetation maintenance activities. Therefore, the proposed project will have no effect on the Monarch Butterfly.

The Monarch Butterfly is a candidate species and is not yet listed or proposed for listing. Consultation with USFWS under Section 7 of the Act is not required for candidate species. USFWS encourages opportunities to conserve the species if possible.

Potential Presence of Threatened Species

In addition to the species listed above, correspondence received from EGLE in May 2024 noted the potential presence of the state threatened plant species, Virginia Bluebells (*Mertensia virginica*), within the project area. EGLE recommended consultation with the MDNR prior to performing work or applying for permits. Correspondence received from the MDNR in May 2024 explained that an MDNR biologist reviewed the project area and noted that there are no wildlife or habitat concerns due to the area's high degree of development. Communications received from the MDNR can found in **Appendix C – Early Agency Coordination.**

Based on the information presented above, impacts to endangered and threatened species are not expected from the construction or operation of the Preferred Alternative.

No Action Alternative: No impacts to endangered and threatened species would result from the implementation of the No Action Alternative.

3.3.2 Migratory Birds

The *Migratory Bird Treaty Act of 1918* (MBTA) described in 16 U.S.C. § 703 et seq and its amendments are the main driver for the protection of migratory birds in the United States. Executive Order 13186*: Responsibilities of Federal Agencies to Protect Migratory Birds,* also obligates all federal agencies that engage in or authorize activities that might affect migratory birds to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitats.

In a biological sense, a migratory bird is an avian that has a seasonal and somewhat predictable pattern of movement. Generally, migratory birds are defined as all native birds in the United States, except those non-migratory species such as quail and turkey that are managed by individual states.

3.3.2.1 Affected Environment

The affected environment was previously described in **Section 3.3.1.1 Affected Environment**.

3.3.2.2 Environmental Consequences

Preferred Alternative: The USFWS IPaC database search identified 20 bird species protected under the MBTA or birds protected under the *Bald and Golden Eagle Protection Act* (Eagle Act) of 1940. The project area does not contain any trees and consists of turfgrass that is regularly mowed and maintained. As explained in **Section 3.3.1.2 Environmental Consequences**, the only trees near the project area are several ornamental landscaping trees in the Air Cargo Drive right-of-way. There are also no bodies of water within the project area. Therefore, the project area lacks suitable habitat for migratory birds.

Migratory bird impacts are not expected from the construction or operation of the Preferred Alternative. For additional details on the 20 migratory bird species with potential to exist in the project area, including the probability of presence summary, and USFWS correspondence, see **Appendix D – Biological Resources**.

No Action Alternative: No impacts to migratory birds would result from the implementation of the No Action Alternative.

3.4 Coastal Resources

The *Coastal Zone Management Act of 1972* (16 U.S.C. §§ 1451-1466) established the Federal Coastal Zone Management Program to encourage and assist states in preparing and implementing management programs to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." In addition, the *Coastal Barrier Resources Act of 1982* requires that no new federal expenditures or financial assistance may be made available for construction projects within the boundaries of the Coastal Barriers Resource System. Executive Order 13089, *Coral Reef Protection* requires federal agencies to "identify any actions that might affect coral reef ecosystems, protect and enhance the conditions of these ecosystems, and ensure that the actions carried out, authorized, or funded by federal agencies will not negatively impact or degrade coral reef ecosystems."

3.4.1 Affected Environment

GRR is approximately 35 miles east of the shore of Lake Michigan. A review of maps for the Michigan Coastal Management Program (MCMP) shows that GRR is outside the boundaries of the MCMP. In addition, the USFWS Coastal Barrier Resources Mapper online database shows the project area is not located within or near a resource that is part of the Coastal Barrier Resources System.

3.4.2 Environmental Consequences

Preferred Alternative: Due to the Airport's inland location, impacts to coastal resources are not expected from the construction or implementation of the Preferred Alternative. No mitigation is proposed.

No Action Alternative: No impacts to coastal resources are expected with the implementation of the No Action Alternative.

3.5 Department of Transportation Act, Section 4(f)

Section 4(f) of the *Department of Transportation Act* (49 U.S.C. § 303) requires that the Secretary of Transportation not approve any program or project that requires the use of any publicly owned land unless there is no feasible and prudent alternative to the use of such land. Common Section 4(f) resources include:

- Public parks.
- Recreation areas.
- Wildlife and waterfowl refuges of national, state, or local significance.
- Land from a historic site of national, state, or local significance as determined by the officials having jurisdiction.

3.5.1 Affected Environment

Cascade Township Park and a driving range and practice green for the Golf Club at Thornapple Pointe are within a one-mile radius of the project area. The locations of these resources relative to the project area are shown in **Figure 3.2 Section 4(f) Resources**.

3.5.2 Environmental Consequences

Preferred Alternative: The project area is located entirely on Airport property. No construction would occur within or near the boundaries of any Section 4(f) resources. The nearest such resource (Cascade Township Park) is 0.4 miles northeast of the project area. Therefore, it is determined that construction or operation of the Preferred Alternative will not impact any Section 4(f) resources. No mitigation is proposed.

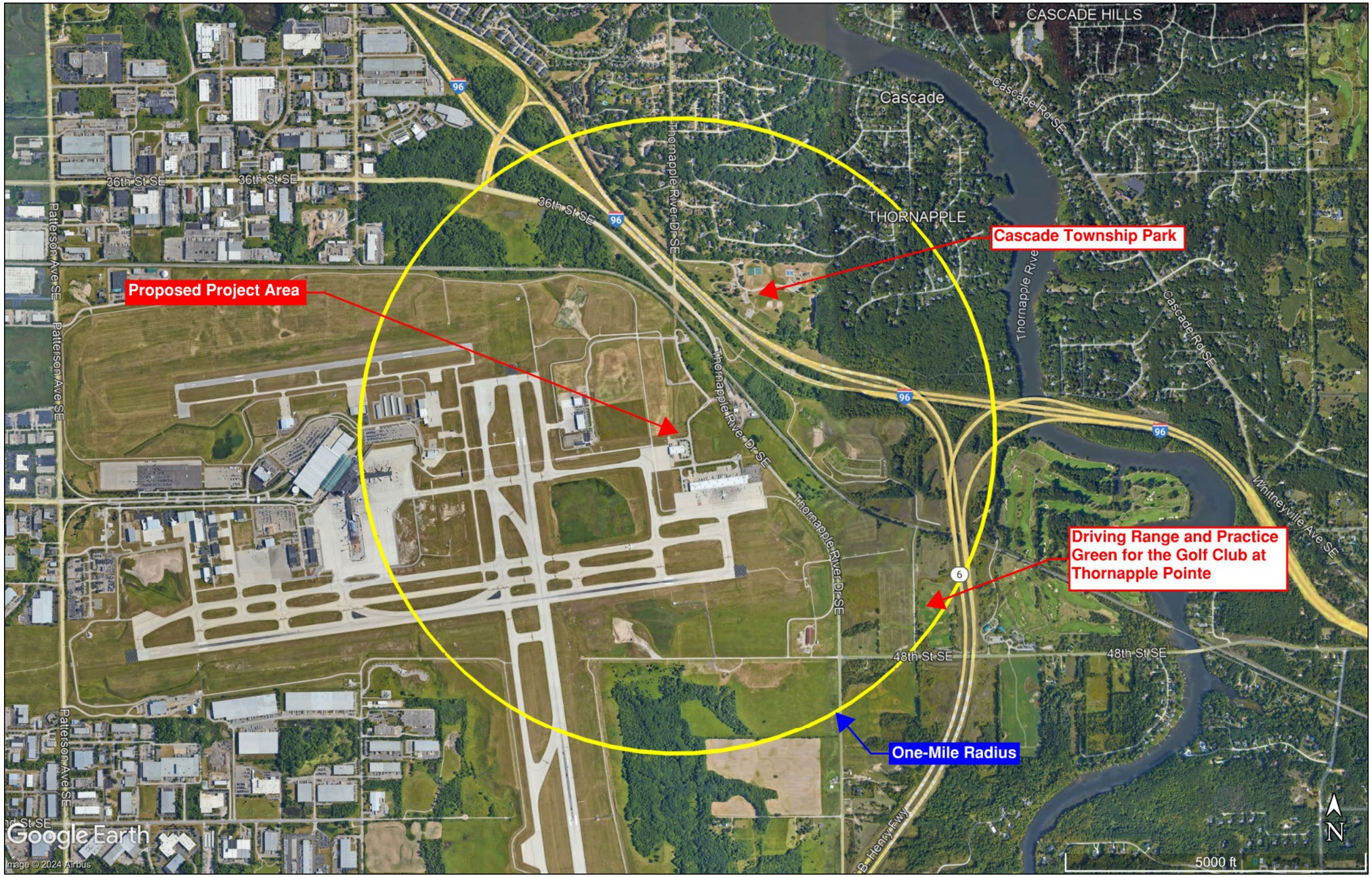
No Action Alternative: No impacts to Section 4(f) resources are expected from the implementation of the No Action Alternative.

3.6 Farmlands

The *Farmland Protection Policy Act of 1981* (FPPA) described in 7 U.S.C. §§ 4201-4209 was enacted to minimize the extent to which federal actions and programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. Per FPPA, “farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.”

Prime farmland has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. Unique farmland is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. Any federal action that may result in conversion of farmland to a non-agricultural use requires coordination with the U.S. Department of Agriculture’s (USDA) Natural Resource Conservation Services (NRCS).

Figure 3.2 Section 4(f) Resources



Source: 2024 Google Earth with labeling by Mead & Hunt, Inc.

3.6.1 Affected Environment

A review of protected farmland classification maps available from the NRCS indicate the project area is classified as “Prime Farmland if Drained”. The U.S. Census Bureau’s Urbanized Area Reference Map for Grand Rapids, Michigan, also shows that the project area is entirely located within the City of Grand Rapids’ “Urbanized Area.” See **Appendix E – Farmland** for the farmland classification map and the Urbanized Area Reference Map.

3.6.2 Environmental Consequences

Preferred Alternative: According to the FPPA, farmland resources located in Urbanized Areas impacted by development projects are exempt from regulatory protection. Specifically, the FPPA exempts farmlands “already in or committed to urban development… [including] lands identified as ‘urbanized area’ on the Census Bureau Map.’” Under Part 523, Subpart B of the FPPA, “Lands identified as ‘urbanized area’ on the Census Bureau maps” are not covered by the act.

Protected farmland within the project area would be impacted by the Proposed Project. However, it is exempt from protection per the FPPA. No mitigation is proposed.

No Action Alternative: The No Action Alternative will not impact protected farmland resources.

3.7 Hazardous Materials, Solid Waste, and Pollution Prevention

Hazardous materials can pose a risk to health, safety, and property. They include hazardous wastes and hazardous substances as well as other materials. Hazardous materials are regulated under several statutes, including the *Comprehensive Environmental Response, Compensation, and Liability Act* (42 U.S.C. §§ 9601-9675), the *Resource Conservation and Recovery Act* (RCRA) described in 42 U.S.C. §§ 6901-6992k, and the *Toxic Substance Control Act* (15 U.S.C. §§ 2601-2697). Solid waste is discarded material that falls into specific regulatory definitions and is regulated under RCRA. Pollution prevention refers to efforts to avoid, prevent, or reduce discharges and emissions of pollutants.

3.7.1 Affected Environment

The EPA’s NEPAssist database was reviewed to determine the potential for hazardous waste contamination in and near the project area. NEPAssist lists numerous “EPA Facilities” on and in the vicinity of the Airport, but none within the project area itself. A map of these facilities is provided in **Appendix F – Hazardous Materials**.

The nearest EPA Facility is a registered RCRA facility approximately 0.1 miles south of the project area at 6450 Air Cargo Drive SE. FedEx operates a cargo facility at this location. Designation as an RCRA facility indicates that the subject organization generates hazardous waste, must manage this waste accordingly, and must report to the EPA. No violations have been associated with this facility.

In addition, a review of EGLE’s Remediation Information Data Exchange (RIDE) Mapper database shows the presence of numerous Part 211 Underground Storage Tanks, Part 213 Leaking Underground Storage Tanks, and Part 201 Environmental Contamination Sites on and in the vicinity of the Airport. None of these storage tanks or contamination sites are within the boundaries of the project area, however.

Appendix F – Hazardous Materials contains a map showing the locations of storage tanks and contamination sites relative to the project area. The nearest storage tanks are 0.2 miles east of the project area at 4190 Thornapple River Road and are associated with Thornapple Enterprises LLC. One tank is a closed Part 211 Underground Storage Tank, and the other is a closed Part 213 Leaking Underground Storage Tank. The nearest contamination site is at 4211 Cassard Lane and is associated with Avflight Grand Rapids, one of GRR's fixed base operators (FBO). Contaminants listed in the database for this location include carcinogenic polycyclic aromatic hydrocarbons (PAHs), chlorinated volatile and semi volatile organic compounds, elements/metals/other inorganics, and lead.

3.7.2 Environmental Consequences

Preferred Alternative: The FAA has not established a significance threshold for hazardous waste, solid waste, or pollution prevention. However, the FAA 1050.1F *Desk Reference* offers guidance to consider whether the proposed project could:

- Violate any laws or regulation regarding hazardous waste.
- Involve a contaminated site, or if actions within a contaminated site are appropriately mitigated.
- Produce an appreciable amount of hazardous waste.
- Generate a different quantity or type of solid waste that could exceed local capacity or use different methods of collection and disposal.

While there is no known hazardous waste contamination within the project area, construction activities associated with the Preferred Alternative have the potential to create solid waste material (e.g., excavated soil and scrap building materials). The contractor will be required to have a Spill Prevention, Control, and Countermeasure (SPCC) plan in place to be implemented if a spill occurs during construction operations. An approved erosion control plan is also required to provide a collection area for non-recyclable waste. Any waste generated through proposed project improvements will be disposed of in compliance with all federal, state, and local regulations.

Hazardous material impacts are not expected from the construction or operation of the Preferred Alternative.

No Action Alternative: Impacts to hazardous materials are not expected with the implementation of the No Action Alternative.

3.8 Historical, Architectural, Archeological, and Cultural Resources

Historical, architectural, archeological, and cultural resources include a variety of sites, properties, and facilities related to activities and societal and cultural institutions. Such resources express past and present elements of human culture and are important to a community. Section 106 of the National Historic Preservation Act (NHPA) (Section 106 of the National Historic Preservation Act, 54 U.S.C. § 300101) requires federal agencies to consider the effects their actions may have on these properties.

According to FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Projects*, two basic laws apply to this impact category; the first law, the *National Historic Preservation Act of 1966*, as amended, "[r]ecommends measures to coordinate Federal historic preservation matters, to recommend measures to

coordinate Federal historic preservation activities and to comment on Federal actions affecting historic properties included in or eligible for inclusion in the National Register of Historic Places."

The second law, the *Archeological and Historic Preservation Act of 1974*, "[p]rovides the survey, recovery, and preservation of significant scientific, prehistorical, historical, archeological, or paleontological data when such data may be destroyed or irreparably lost due to a Federal, Federally licensed, or Federally funded project."

3.8.1 Affected Environment

A Section 106 Report that identified the potential for impacts to historical, archeological, architectural, and cultural resources from the proposed project was submitted to SHPO in October 2024. The full report is provided in **Appendix G – Section 106 Report**.

The built-environment Area of Potential Effect (APE) is approximately 315.2 acres and consists of two discontinuous areas: one of approximately 42.3 acres around the existing ATCT (West APE) that is entirely within Airport property; and one of approximately 272.9 acres at the location of the proposed new ATCT (East APE). Approximately 206.9 acres of the East APE is located on Airport property with the rest being off Airport property.

The built environment within the West APE includes the entire terminal building, consisting of all the building's components (Primary Terminal Area, Tower, Concourses), and non-historic age parking garage and glass canopy. Other elements of the West APE include the paved ramp and apron areas of the Airport's airside, as well as the main drive leading to the terminal building (Terminal Drive SE) and small grassy areas at the Airport's landside. The existing terminal building (and all its components described above) was the only resource older than 50 years. Although it is a component of the existing terminal building, the ATCT is the only structure that is currently FAA owned and included as part of the Proposed Action.

Within the Airport property, the East APE consists of five buildings associated with airport operations and private leased space, as well as runway and taxiway areas, vehicular access roads, and grassy areas within Airport property. Outside of the Airport property, the East APE includes Thornapple River Dr SE, a railroad, part of the eastbound lanes of I-96, and two industrial properties. None of the built environment within the East APE is over 40 years of age.

Architectural historians also examined current and historic aerial photographs to identify above-ground resources located within the overall APE (east and west built environment). Architectural historians then requested a records search from the Michigan State Historic Preservation Office (SHPO) to confirm whether any built resources within the project area had been previously surveyed. Additionally, the historians searched for any identified locally designated historic resources in Cascade Charter Township and Kent County for potential built environment resources not identified in the SHPO records search results.

One resource identified through the records request from the SHPO was located on Airport property: a Michigan Douglas DC-3 Aircraft (Serial #2144). This resource was identified as having its location at the Airport's physical address, with the latitude/longitude coordinates pointing to the center of Airport property. However, independent research and communications with the Airport's Operations Division suggested the resource likely does not exist on Airport property, and if it does, it is located in a hangar operated by private

tenants leasing Airport land. If the latter is the case, the location of the resource could not be identified, but is confirmed to not be located within the APE.

In addition to a review of above-ground resources, consultants completed a Phase I Archeological Survey of the East APE (area of potential ground disturbance) in August 2024 to identify potential below-ground resources. The methods of investigation used during the survey included visual inspection and subsurface excavation. No archeological resources were identified, and no further archeological investigations were recommended. The complete Phase I Archeological Survey report is provided in **Appendix G – Section 106 Report**.

3.8.2 Environmental Consequences

Preferred Alternative: The Section 106 Report explained that recording the Airport as a historic district was considered. However, most of the buildings from the original 1962 construction of the Airport are no longer extant. Due to these alterations over time, the Airport does not convey a sense of time and place related to Jet Age transportation and architecture from its original construction. Therefore, the terminal building and associated ATCT and concourses are recorded as a singular resource. Hangar buildings constructed c.1990 were also documented during the survey, but ultimately were not included as recorded resources in the Section 106 Report as they are outside of the APE.

The Section 106 Report concluded that the terminal building (and associated existing ATCT and concourses) are not recommended eligible for listing in the National Register and are not considered a historic property. Therefore, no historic properties would be affected as part of the proposed project.

An Application for SHPO Section 106 Consultation summarizing these findings was submitted to the SHPO by the FAA for review and concurrence. The SHPO agreed with the findings and provided a letter of concurrence dated October 22, 2024 (found in **Appendix G – Section 106 Report**). In this letter the SHPO stated that it concurs that no historic properties (architectural, historical, or archeological) will be affected within the APE for the proposed project and issued a “No historic properties affected” determination. SHPO directed that if the scope of work changes in any way or if cultural resources are encountered during construction, work must stop and the SHPO be notified immediately.

Additionally, the federal undertaking (federal action) is limited to the transfer of the existing ATCT from federal ownership. This federal action only includes the transfer of ownership of the existing ATCT from the FAA to the Airport, which is not considered an impact. As previously stated, the terminal building and concourses are not included in the Proposed Action. Correspondence between the Airport and the FAA clarifying the Proposed Action and the understanding that the existing ATCT after decommissioning will be abandoned in place can be found in **Appendix G – Section 106 Report**.

Historical, architectural, archeological, and cultural resources impacts are not expected from the construction or operation of the Preferred Alternative.

No Action Alternative: Impacts to historical, architectural, archeological, and cultural resources are not expected with the implementation of the No Action Alternative.

3.9 Land Use

As described in 1050.1F *Desk Reference*, “regulations require a discussion of possible conflicts between the proposed action and the objectives of federal, state, regional, and local land use plans, policies, and controls for the area concerned. Where an inconsistency exists, the EA document should describe the extent to which the agency would reconcile its proposed action with the existing land use plan.” The FAA also requires airport operators to ensure that actions are taken to establish and maintain compatible land uses around their airports.

Land use regulations near airports typically focus on safety for airport users and the surrounding community. Elements of airport actions can change existing land use patterns and, in some instances, disrupt communities, require residential or business relocations, or degrade surface transportation service. Land use controls and zoning regulations generally discourage or prohibit land use that is incompatible with airport operations. The authority to enact zoning codes usually lies at the local level.

According to FAA Advisory Circular (AC) 150/5200-33C, *Hazardous Wildlife Attractants on or near Airports,* the FAA also requires that consideration be given to the potential increases in wildlife attractants that a project may create and that existing incompatible land uses near airports be assessed, such as solid waste landfills, crops, open water, and wetlands that may act as wildlife attractants.

3.9.1 Affected Environment

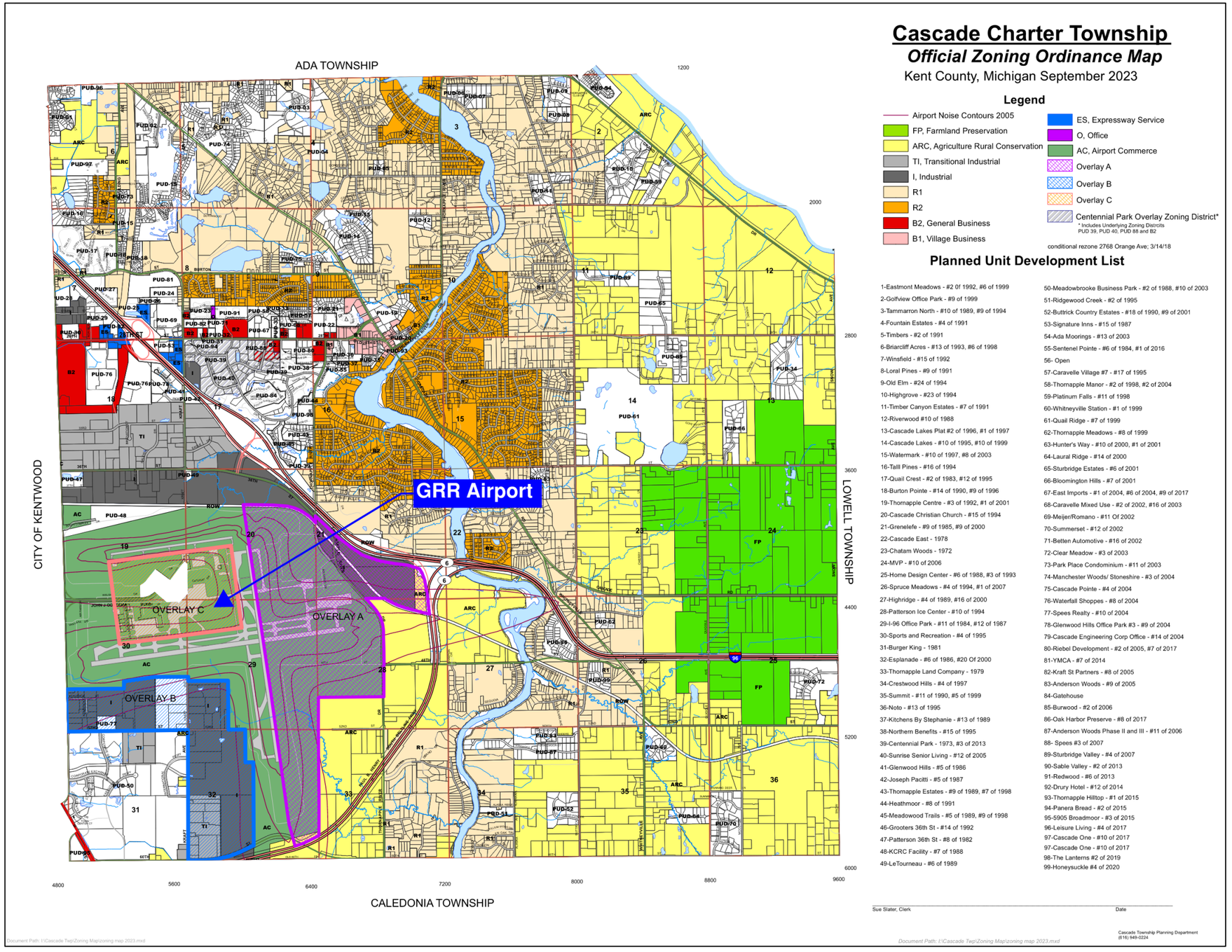
The Airport property lies within Cascade Charter Township and the City of Kentwood, with the majority of the property lying within Cascade Charter Township. According to the current zoning map for Cascade Charter Township, areas of Airport property are zoned as AC – Airport Commerce District (including “Overlay A” and “Overlay C”), ARC – Agriculture Rural Conservation District, PUD – Planned Unit Development District, and I – Industrial District (including “Overlay A” and “Overlay B”). The Cascade Charter Township Zoning Map is provided in **Figure 3.3 Cascade Charter Township Zoning Map**.

Portions of Airport property immediately west of GRR in the City of Kentwood are zoned as I1 – Light Industrial District. The City of Kentwood Zoning Map is provided in **Figure 3.4 City of Kentwood Zoning Map**.

Areas surrounding Airport property are zoned as follows:

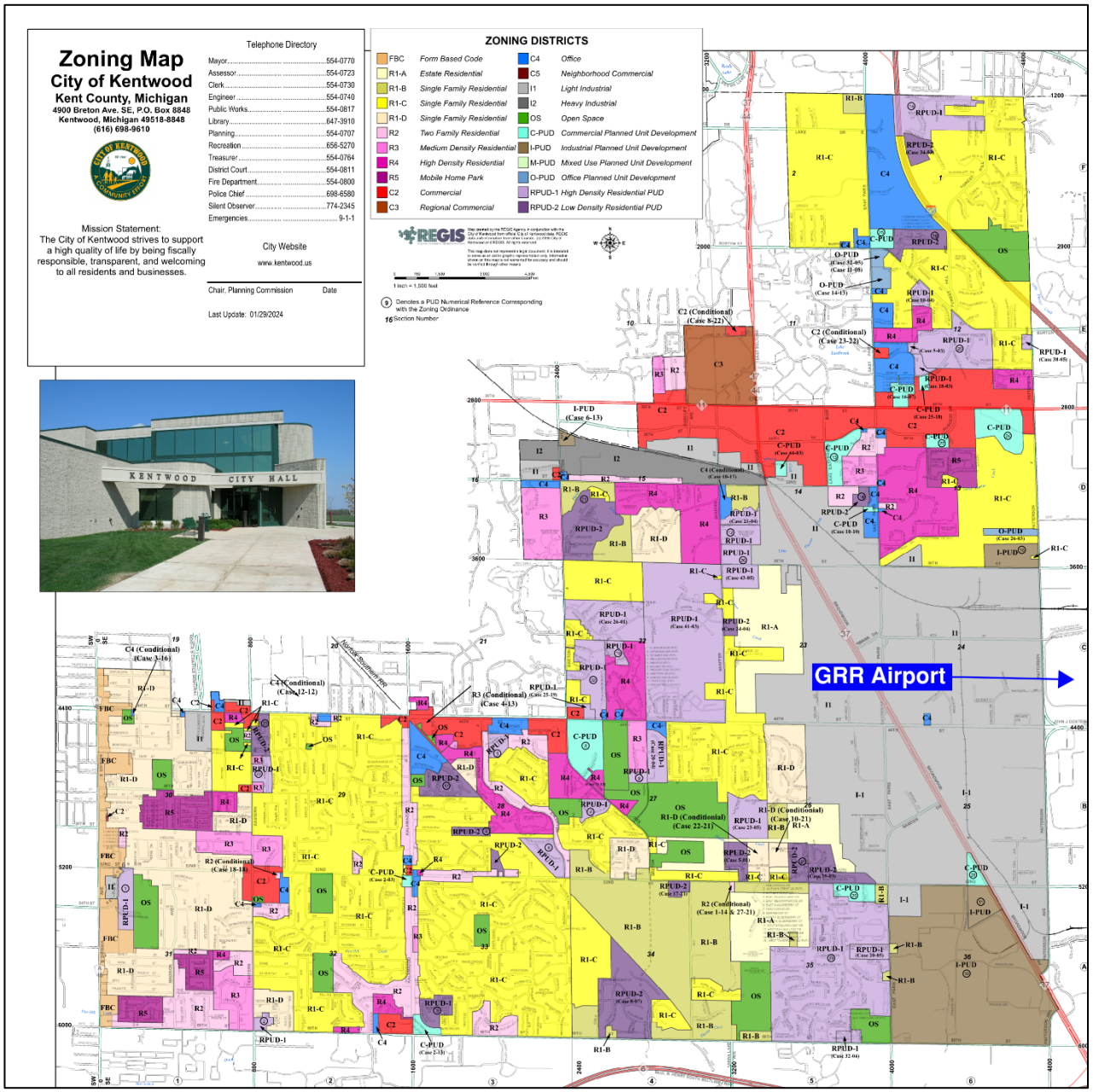
- ARC – Agriculture Rural Conservation District
- PUD – Planned Unit Development District
- R1 – Single Family Residential District
- I – Industrial District (including “Overlay A” and “Overlay B”)
- I1 – Light Industrial District

Figure 3.3 Cascade Charter Township Zoning Map



Source: Cascade Charter Township

Figure 3.4 City of Kentwood Zoning Map



Source: City of Kentwood

3.9.2 Environmental Consequences

Preferred Alternative: The FAA has not established a significance threshold for land use, or factors to consider when determining significance of a project's effect on land use; however, to determine the potential for land use impacts caused by the Preferred Alternative and No Action Alternative, an evaluation of the Proposed Action and its compatibility with local land use controls and plans was completed.

No land use classification changes would occur with the Preferred Alternative or the No Action Alternative. No noise sensitive areas (residential, educational, health, religious, park or recreational, wildlife refuges, or cultural and historical) will be introduced or impacted. In compliance with 49 U.S.C. § 47017 (a)(10), the Airport has been proactive in restricting incompatible land uses adjacent to and within the immediate vicinity of GRR when feasible. Construction of the new ATCT will occur entirely on existing Airport property. Existing land use patterns will remain unchanged. The Preferred Alternative is considered compatible with the existing zoning and land uses of the surrounding area, as shown on the zoning maps for Cascade Charter Township and the City of Kentwood in **Figure 3.3 Cascade Charter Township Zoning Map** and **Figure 3.4 City of Kentwood Zoning Map**.

The proposed action will not increase wildlife attractants or introduce new wildlife that are hazardous to aircraft operations. In addition, neither the Preferred Alternative nor the No Action Alternative are expected to increase congestion, cause degradation of level of service, or permanently close any surface roads within, or adjacent to, the project area. Traffic from construction vehicles would be managed to avoid and minimize any impacts to local roads by defining haul routes and by scheduling the arrival and departure times of construction traffic so that normal traffic patterns are not interrupted. Any potential construction impacts to surface transportation would be temporary in nature.

Based on the above information, it is determined that the Preferred Alternative is compatible with existing and planned land uses and zoning requirements. Land use impacts associated with the proposed action will not be significant based upon the factors described above.

No Action Alternative: No impacts to land use would result from the implementation of the No Action Alternative.

3.10 Natural Resources and Energy Supply

Executive Order 13834, *Efficient Federal Operations* directs airports intending to implement projects to examine the potential changes in the demand for energy or natural resources that would have a significant measurable effect on local supplies due to the implementation of the Preferred Alternative or the No Action Alternative. Energy requirements associated with an airport usually fall into two categories: (1) those which relate to changed demands for stationary facilities and (2) those which involve the movement of air and ground vehicles. Examples of these include airfield lighting, terminal building heating and cooling systems, and aircraft and passenger vehicles.

As described in 1050.1f *Desk Reference*, 40 CFR § 1502.16(e)(f) regulations require that federal agencies consider energy requirements, natural depletable resource requirements, and the conservation potential of alternatives and mitigation measures in NEPA documents. Though specific significance thresholds for natural resource consumption and energy supply have not been established by the FAA, the proposed

action should be examined for the potential to cause demand to exceed available or future supplies of these resources.

FAA guidance typically states that airport improvement projects do not generally increase the consumption of energy or natural resources to the point that significant impacts would occur unless it is found that implementation of a proposed project would cause demand to exceed supply.

3.10.1 Affected Environment

The facilities at the Airport require electricity and natural gas for lighting, cooling / heating, and operations. The area around the Airport is considered a suburban area with adequate access to natural resources for aircraft operations and construction projects as well as meeting the needs of the surrounding community.

3.10.2 Environmental Consequences

Preferred Alternative: The proposed project would slightly increase the use of natural resources and energy supplies during construction. Construction of the new ATCT would result in temporary increases in energy demand and would require the use of construction materials (e.g., aggregate, concrete, asphalt, fuel oil, gasoline, wire, glass, and paint). Additionally, trucks and construction equipment such as cranes and excavators would consume fuels as needed for construction purposes. BMPs to reduce energy consumption during construction will be employed, where applicable. To reduce energy consumption associated with the temporary use of cranes, excavators, and vehicles for the Preferred Alternative, construction equipment should be in good working order to ensure the most efficient use of fuel. All vehicles and equipment should be checked for leaks and repaired immediately.

The new ATCT would be designed and constructed to include sustainability features such that energy consumption during operation would likely decrease compared to the existing ATCT. These features may include the use of energy efficient fixtures, point-of-use water heaters, efficient/upgraded insulation and LED lighting, and efficient HVAC systems.

Natural resources and energy supply impacts are not expected from the construction or operation of the Preferred Alternative.

No Action Alternative: No new impacts to natural resources or energy supply would result from the implementation of the No Action Alternative. However, under this alternative the increased efficiency of a new ATCT with sustainability features leading to less energy consumption would be lost.

3.11 Noise and Noise Compatible Land Use

FAA Order 5050.4B*, NEPA Instructions for Implementing Airport Actions,* describes compatible land use as, “the compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the noise impacts related to that airport.” An FAA noise analysis primarily focuses on how proposed airport actions would change the cumulative noise exposure of individuals to aircraft noise in areas surrounding the airport.

Noise is considered unwanted sound that disturbs or interrupts routine activities. Aviation noise includes sounds made by aircraft during departure, arrival, flight, taxiing, and other activities. The compatibility of

land use around an airport is typically determined based on the level of aircraft noise. The degree of annoyance that people suffer from aircraft noise varies depending upon their activities at any given time.

The FAA uses the Day-Night Average Sound Level (DNL) as its primary noise metric. DNL accounts for the levels of aircraft events, the number of times those events take place, and the timeframe in which they occur (day or night). The FAA, USEPA, and U.S. Department of Housing and Urban Development have established the 65-decibel DNL level as the threshold for noise impacts over noise sensitive areas. Noise levels greater than 65 DNL on noise sensitive areas are considered a potential impact.

Noise sensitive areas typically include residential, educational, health, religious structures and sites, parks, recreational areas, wilderness areas, wildlife refuges, and cultural and historical sites. In the context of airport noise, such facilities, or areas within the 65 DNL contour, may be considered a noise sensitive land use.

3.11.1 Affected Environment

No noise-sensitive land uses (e.g., residential neighborhoods, recreational areas, and parks) exist in the project area. Residential and recreational areas north and east of the Airport were considered for noise impacts, but other adjacent land uses (industrial and agricultural/rural conservation uses) are not noise-sensitive and were not considered.

3.11.2 Environmental Consequences

Preferred Alternative: Per FAA Order 1050.1F – *Environmental Impacts: Policies and Procedures*, and Order 1050.1F *Desk Reference*, any airport that exceeds 90,000 annual piston-powered aircraft operations or 700 annual jet-powered aircraft operations, 10 or more daily helicopter operations, or any project that includes the construction of a new airport, a runway relocation, runway strengthening, or a major runway expansion requires a noise analysis. A noise analysis is performed for actions that result in a general overall increase in daily aircraft operations or the use of larger/noisier aircraft. The FAA's noise analysis primarily focuses on how proposed airport actions would change the cumulative noise exposure of individuals to aircraft noise in areas surrounding the airport.

According to the FAA's Traffic Flow Management System Counts (TFMSC) database, Instrument Flight Rules (IFR) jet operations at GRR totaled 50,192 in 2023, which exceeds the threshold of 700 annual jet operations.

According to the FAA 2023 Terminal Area Forecast (TAF), GRR's total operations are forecast to be nearly 102,000 annual operations by 2039. Based on the TAF and TFMSC data, piston-powered aircraft activity levels do not exceed the threshold of 90,000 annual operations.

GRR's FAA Form 5010-1, *Airport Master Record* indicates there are six based helicopters at the Airport, which means it is possible the threshold of 10 daily helicopter operations for a noise analysis will be exceeded.

See **Appendix H – Noise** for TFMSC, TAF, and Airport Master Plan data.

Although the activity levels by jet aircraft and helicopters either exceed or are expected to exceed the stated threshold for a noise analysis, a noise analysis was not completed because the project does not involve

the construction of a new airport, a runway relocation, runway strengthening, or a major runway expansion. Given the nature of the proposed project (construction of a replacement ATCT), it is unlikely the Preferred Alternative will cause an increase in noise levels over existing conditions or change existing air traffic patterns.

Temporary increase in noise may occur due to operations of heavy equipment and construction vehicles during construction activities. Construction staging areas are not allowed near noise sensitive land uses.

Based on the information presented above, noise impacts are not expected from the construction or operation of the Preferred Alternative.

No Action Alternative: Noise impacts are not expected from the implementation of the No Action Alternative.

3.12 Socioeconomics, and Children's Environmental Health and Safety Risks

Statutes related to socioeconomic impacts include the *Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970* (42 U.S.C. § 61 et seq.). Title VI of the *Civil Rights Act of 1964* (42 U.S.C. §§ 2000d2000d-7), Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks***,** and other federal guidance have been issued to address children's environmental health and safety risks.

Airport development projects can impact the socioeconomic conditions of the surrounding community. Such projects have the potential to impact neighboring populations, including children, and may do so disproportionately to the overall area population. The proposed project was evaluated for socioeconomic impacts as well as health and safety risks to children.

3.12.1 Socioeconomic Impacts

The types of socioeconomic impacts that can arise from airport development projects include:

- Relocation of residences, businesses, or farms.
- Alteration of surface transportation patterns that may restrict community access.
- Disruption of established communities.
- Disruption of orderly, planned development.
- Creation of appreciable changes in employment.

3.12.1.1 Affected Environment

Table 3-2 Major Employers in Kent County, Michigan lists important employers in Kent County and the approximate number of people employed. The County's major employers and industry are not expected to be adversely impacted by the Proposed Action and may benefit from access to an improved airport facility. In addition, no appreciable changes in employment in the County are anticipated.

3.12.1.2 Environmental Consequences

Preferred Alternative: No residential, business, or farm relocations will be required as part of this proposed project. All construction will take place on existing Airport property. No impacts to surface transportation patterns, community disruptions, or disruptions of orderly, planned development are expected.

Socioeconomic impacts from the construction or operation of the Preferred Alternative are not expected. No mitigation is proposed.

No Action Alternative: Socioeconomic impacts from the implementation of the No Action Alternative are not expected.

Table 3-2
Major Employers in Kent County, Michigan

Company/Organization	Principal Product or Service	Number of Employees*
Corewell Health	Healthcare	25,000
Trinity Health Grand Rapids	Healthcare	8,500
Meritage Hospitality Group Inc.	Food and Beverage	7,000
Gordon Food Service Inc.	Wholesale/Distribution	5,000
Meijer, Inc.	Retail	5,000
Gentex Corporation	Computer/Electronics Manufacturing	4,500
Perrigo	Chemicals Manufacturing	3,500
Farmers Insurance Group	Insurance	3,500
Steelcase, Inc.	Furniture Manufacturing	3,400
University of Michigan Health - West	Healthcare	3,000

* Employee data gathered between 2020 and 2023
Source: The Right Place, Inc.

3.12.2 Children's Environmental Health and Safety Risks Impacts

FAA Order 1050.1F requires the identification of any potential environmental health risks to children as stated: "Environmental health risks and safety risks include risks to health and safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to."

The FAA has not established a significance threshold for impacts to children's environmental health and safety; however, an analysis should include a determination on a proposed action's potential to cause disproportionate health or safety risks to children.

3.12.2.1 Affected Environment

All construction under the Proposed Action would occur on GRR-owned property.

3.12.2.2 Environmental Consequences

Preferred Alternative: In most cases, the significance of impacts to children's environmental health and safety is dependent on the significance of impacts in other environmental categories. Impacts from the proposed action to other resource categories are not considered significant. Areas affected by the Preferred Alternative do not include schools or other facilities that would otherwise be primarily accessed by children. Under the Preferred Alternative, there are no significant impacts to air quality or noise that may influence the health of the surrounding population, including children. No disproportionate health or safety risks to children are expected.

Children's Environmental Health and Safety Risks impacts from the construction or operation of the Preferred Alternative are not anticipated. No mitigation is proposed.

No Action Alternative: Children's Environmental Health and Safety Risk impacts are not anticipated with the implementation of the No Action Alternative.

3.13 Visual Effects (including Light Emissions)

Airport lighting is required for security, obstruction identification, and navigation. The essential lighting systems required to safely operate an airport, and its components can contribute to light emissions. When projects introduce new or existing relocated airport lighting facilities that may affect residential or other light-sensitive areas in proximity to an airport, an analysis of these impacts is necessary. FAA guidance states that the level of light emissions considered sufficient to warrant a special study is unusual, for example, occurring when a high-intensity strobe would be shining into a residential area or when apron, parking, or streetlights create a visual impact to pilots.

A project can also have impacts on the visual resources and visual character of the surrounding area. Visual resources and visual character impacts are typically related to a decrease in the aesthetic quality of an area resulting from development, construction, or demolition. FAA guidance states that an analysis of visual impacts is necessary when the proposed action would affect, obstruct, substantially alter, or remove visual resources including buildings, historic sites, or other landscape features, such as topography, water bodies, or vegetation, which are visually important or have unique characteristics.

3.13.1 Affected Environment

The project area is located in an open field adjacent to the existing UPS cargo facility in GRR's northeast quadrant. There may be obstruction lights placed on top of the proposed ATCT, but these would not be inconsistent with other obstruction lights located on the Airport. In addition, lighting on the Base Building would be similar to existing building lighting at the Airport.

A residential area located approximately 0.6 miles north and northeast of the project area is the nearest light-sensitive resource.

3.13.2 Environmental Consequences

Preferred Alternative: Although the Proposed Action would construct a new ATCT at an overall height of 220 feet above ground level along with an associated Base Building, the nearest residential area is approximately 0.6 miles from the project area. Located between the project area and this residential area is Interstate 96, a major freeway with an annual average daily traffic volume of approximately 45,000 vehicles, according to data from the Michigan Department of Transportation. In addition, the nearby UPS and FedEx cargo facilities are light sources that already exist in this portion of Airport property.

Land use east and south of the project area is classified as agricultural/rural residential/open space, while the Airport's existing facilities are primarily located to the west.

Due to the location of the project area, construction of the new ATCT and Base Building is not anticipated to affect, obstruct, substantially alter, or remove visual resources that are visually important or have unique characteristics.

Visual effects from the construction or operation of the Preferred Alternative are not anticipated. No mitigation is proposed.

No Action Alternative: Visual effects from the implementation of the No Action Alternative are not anticipated.

3.14 Water Resources

FAA Order 1050.1F references the *Clean Water Act* (CWA) described in 33 U.S.C. §§ 1251-1387, which provides the federal government with the authority to regulate activities related to water quality, including controlling discharges, preventing or minimizing loss of wetlands, and protecting local aquifers or sensitive ecological areas. In essence, the quality of surface water and groundwater should not be degraded by the planned construction or operations associated with a proposed development.

Water resources are surface waters and groundwater that are important to the ecosystem and the human environment. Analysis of water resources includes checking for disruption as well as changes in quality. Because wetlands, floodplains, surface waters, groundwater, and other water resources are all connected within the overall system, this section encompasses an analysis of each.

3.14.1 Wetlands

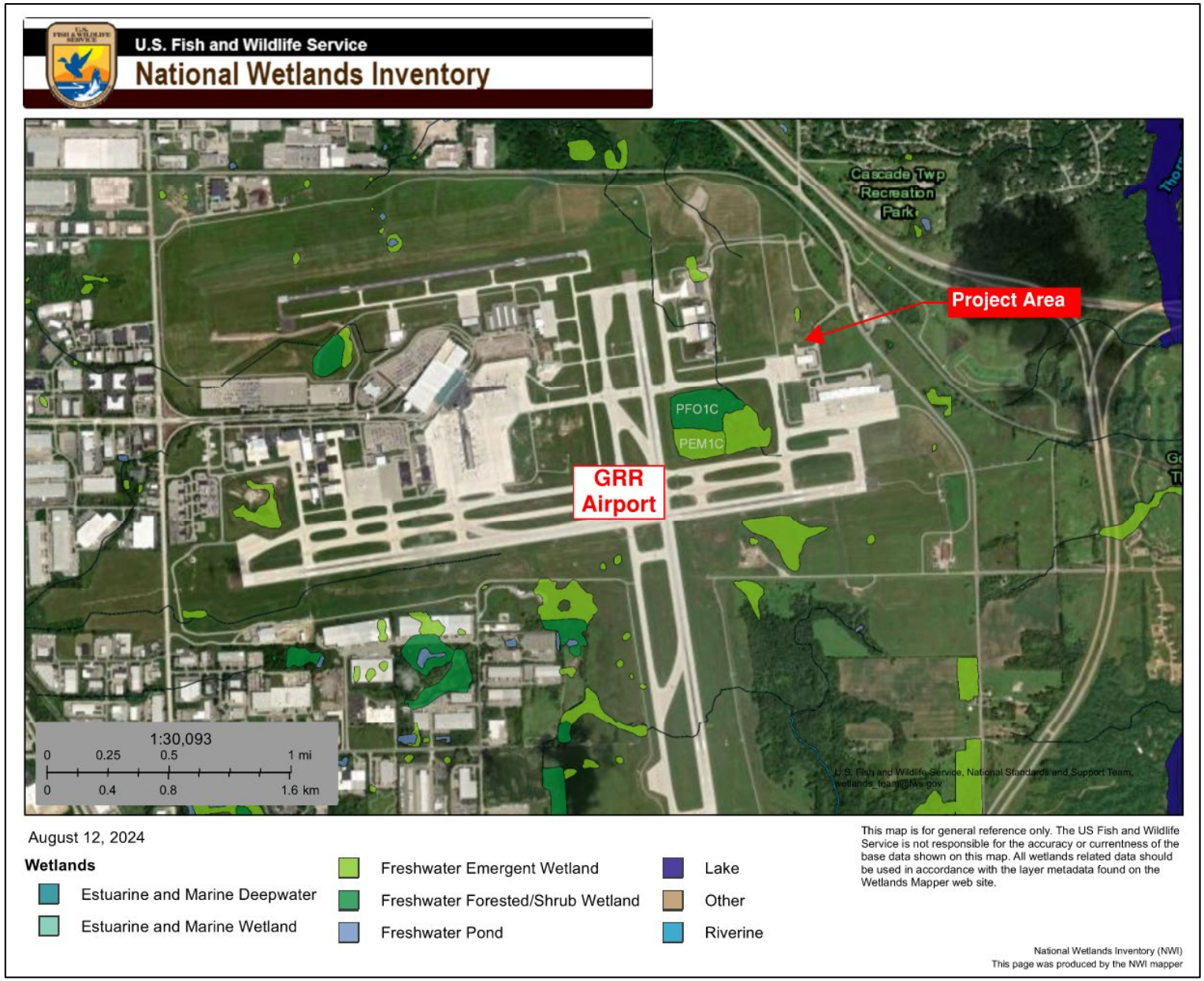
Wetlands are areas that support specific vegetation due to inundation or saturation by groundwater. Sometimes these are called swamps, marshes, or bogs. Wetlands provide benefits to the natural and human environments that include habitat, water filtration, storage, and recreation. There are several statutes, regulations, orders, and other requirements related to wetlands. The CWA regulates the discharge of pollutants into Waters of the U.S. (including wetlands) and establishes a program to regulate discharge of fill material into such waters. The CWA also requires projects not to violate water quality standards.

Surface waters or wetlands considered jurisdictional are regulated under the CWA; however, not all surface waters are under the authority of the CWA. The United States Army Corps of Engineers makes jurisdictional determination case by case. Non-jurisdictional wetlands are protected under Presidential Executive Order 11990, *Protection of Wetlands*, commonly known as the “No Net Loss” executive order. This executive order directs any project that uses federal funds or is federally approved to mitigate for all wetland impacts that it causes regardless of size or regulatory status. Therefore, any wetland impacts as a result of the Preferred Alternative will require mitigation.

3.14.1.1 Affected Environment

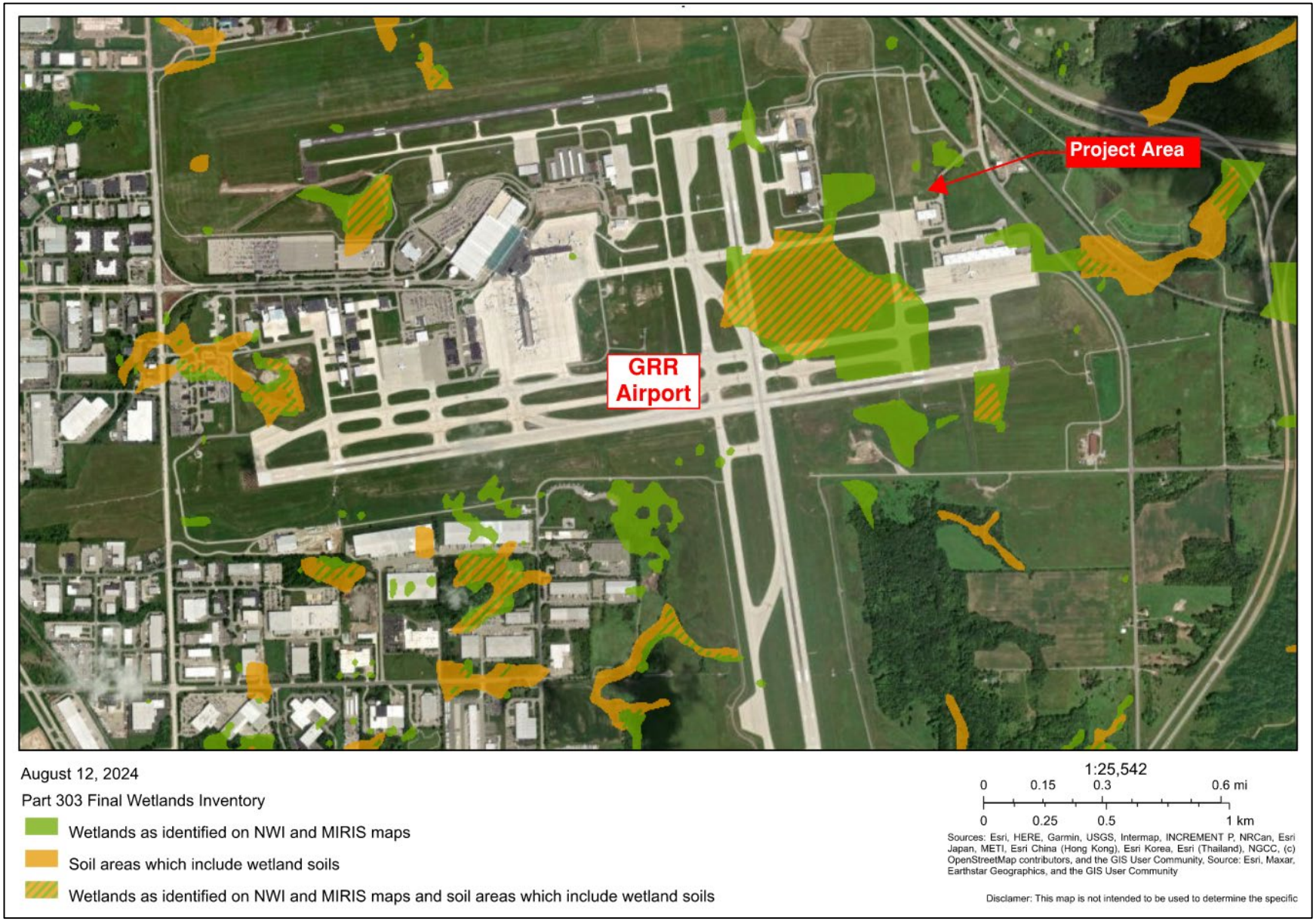
Maps from the USFWS National Wetlands Inventory (NWI) and EGLE Wetlands Map Viewer database indicate the possible presence of wetlands scattered throughout Airport property (see **Figure 3.5 USFWS National Wetlands Inventory Map** and **Figure 3.6 EGLE Wetlands Map Viewer Map**). These maps also indicate potential wetlands immediately north of the project area, near an area where a new chain-link perimeter fence is planned for construction.

Figure 3.5 USFWS National Wetlands Inventory Map



Source: USFWS National Wetlands Inventory

Figure 3.6 EGLE Wetlands Map Viewer Map



Source: EGLE Wetlands Map Viewer

3.14.1.2 Environmental Consequences

Preferred Alternative: Based on the review of USFWS NWI maps and EGLE Wetlands Map Viewer, preliminary analysis indicated that regulated wetlands may exist in the project area. To confirm the presence or absence of regulated wetlands in the project area, EGLE was contacted for additional coordination and wetland verification. EGLE reviewed the site and determined that there was no evidence of regulated wetlands in the project area and the project, as proposed, would not require a Part 303 Wetland Permit.

Additionally, EGLE's review concluded that the presence of an existing drainage ditch in the planned location of a proposed perimeter fence was manmade and would also be exempt under Part 303 permitting requirements.

Based on coordination with EGLE, the project will have no wetland impacts and will not require a permit from EGLE. Correspondence from EGLE confirming their findings can be found in **Appendix C – Early Agency Coordination.**

No Action Alternative: The No Action Alternative will have no impacts on wetlands.

3.14.2 Floodplains

Executive Order 11988, *Floodplain Management*, defines floodplains as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year." Executive Order 11988 discourages federal actions in a floodplain unless no practicable alternative exists and requires measures to minimize unavoidable short-term and long-term impacts if the proposed action occurs in a floodplain.

A floodplain is a flat, low area adjacent to a stream, river, or creek that may be flooded during high water flow conditions. A 100-year floodplain includes the area that has a one percent (1%) chance of flooding in any given year. Projects within a 100-year floodplain are discouraged.

3.14.2.1 Affected Environment

As part of the National Flood Insurance Program, the Federal Emergency Management Agency (FEMA) produces Flood Insurance Rate Maps (FIRM) that serve as official flood maps depicting Special Flood Hazard Areas.

The FEMA FIRMs for GRR show there are no regulated floodplains on Airport property. The FIRMs are presented in **Appendix I – Floodplains**.

3.14.2.2 Environmental Consequences

Preferred Alternative: The FEMA FIRMs were reviewed for the project area to evaluate potential floodplain impacts. FIRMs indicate that no regulated floodplains are found within the project area.

The Preferred Alternative is not expected to have any adverse floodplain impacts. No mitigation is proposed.

No Action Alternative: The No Action Alternative will have no impacts to floodplains.

3.14.3 Surface Water

The CWA, in conjunction with the *Fish and Wildlife Coordination Act* (16 U.S.C. §§ 661-667d), *Rivers and Harbors Act* (33 U.S.C. § 401 and 403), the *Safe Drinking Water Act* (SDWA) found in 42 U.S.C. §§ 300(f)-300j26, and other local statutes, establishes regulations that protect the nation's water resources. Surface waters are typically lakes, rivers, streams, creeks, and wetlands. Surface waters collect the water from precipitation that does not infiltrate the soil and instead flows across the land. Surface waters can be hydrologically connected to groundwater.

3.14.3.1 Affected Environment

The EPA's NEPAssist database was reviewed to determine the presence of surface water resources on and in the vicinity of the Airport. These water resources include several unnamed streams on Airport property and the Thornapple River east of the Airport. A map of these surface water resources is presented in **Figure 3.7 Surface Water Resources**.

3.14.3.2 Environmental Consequences

Preferred Alternative: The NEPAssist database shows there are no surface water resources located within the boundaries of the project area. The nearest resource is an unnamed stream located 0.2 miles west of the project area. The Thornapple River is 1.1 miles east of the project area.

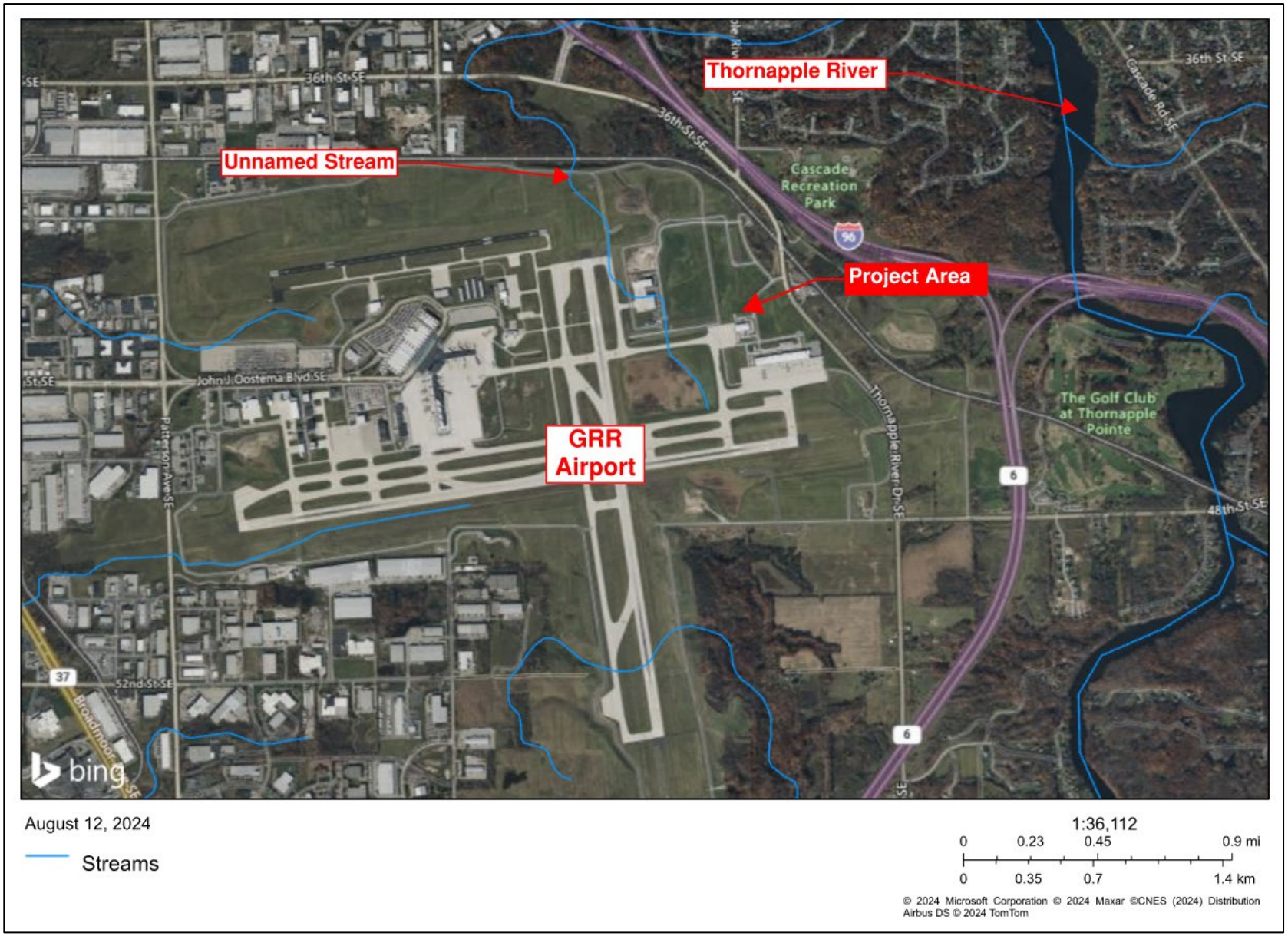
Soil erosion is a source of concern due to possible adverse impacts to surface waters from construction projects. Since the Airport site is generally flat, there is not expected to be a high risk of soil erosion during excavation and other ground disturbing activities. Any erosion that occurs during construction will be minimized using appropriate BMPs. The following list of BMPs represents erosion control measures to protect water resources in the vicinity of the project area. BMPs that should be considered during construction and applied where applicable include:

- Sediment traps.
- Temporary cement ponds.
- Temporary grassing of disturbed areas.
- Vegetation cover replaced as soon as possible.
- Erosion mats and mulch.
- Silt fencing and drainage check dams.
- Settling basins for storm water treatment.

All excavated soils and staging areas for construction equipment will be placed in non-sensitive upland areas with disturbed areas replanted as soon as possible to reduce the likelihood of erosion. Mitigation measures prepared under an erosion control plan, in accordance with FAA AC 150/5370-10H, *Standard Specifications for Construction of Airports*, will help minimize long-term impacts to area water quality and to the existing drainage system.

Part 91, Michigan Soil Erosion and Sedimentation Control of the *Natural Resources and Environmental Protection Act*, 1994 Public Act 451, as amended, requires the Airport to obtain a soil erosion permit from the Kent County Road Commission for any activity within 500 feet of a lake or stream and a storm water runoff control permit from Cascade Charter Township.

Figure 3.7 Surface Water Resources



Source: EPA NEPAssist Database

The Airport is also required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction activity disturbing one acre or more of soil. Permittees are required to control runoff from construction sites and develop a construction Stormwater Pollution Prevention Plan (SWPPP) that includes erosion prevention and sediment control BMPs.

Surface water impacts from the construction or operation of the Preferred Alternative are not anticipated.

No Action Alternative: Surface water impacts from the implementation of the No Action Alternative are not anticipated.

3.14.4 Ground Water

Ground water is water that is below the surface of the ground within the spaces between soil and rock formations. Ground water quality is primarily governed under the SDWA administered by the EPA. The study area for ground water includes all areas where the ground could be disturbed by construction of the Preferred Alternative, where impervious surfaces could change rates of ground water infiltration, where airport operations could increase spills or leaks, and where construction vehicles and other equipment could potentially impact ground water due to staging, machinery, storage, and spills.

3.14.4.1 Affected Environment

In evaluating ground water resources in the project area, the following databases were reviewed:

- EPA Sole Source Aquifer for Drinking Water Database and Mapping Tool
- EGLE Open Data GIS dataset for water wells in Michigan
- EGLE Open Data GIS dataset for wellhead protection areas in Michigan

3.14.4.2 Environmental Consequences

Preferred Alternative: The proposed construction of the Preferred Alternative will increase impervious surface areas and likely increase stormwater runoff. The Proposed Action will decrease groundwater infiltration within the project area due to the additional impervious surfaces; however, this is not expected to tangibly impact ground water recharge rates or impact public water supply.

To protect surface and ground water resources, runoff will be directed into the Airport's existing stormwater management system. Stormwater runoff will drain into the Airport's existing drainage system in accordance with its SWPPP. The SWPPP will also be updated to include BMPs to reduce erosion and discharge of pollutants from construction activities.

The EPA maintains a database of ground water sources that serve as the sole source of drinking water for a population. According to the EPA, the proposed project is not within a Sole Source Aquifer for Drinking Water.

The EGLE maintains several databases for water wells and wellhead protection areas in Michigan. According to EGLE's Open Data GIS dataset for water wells in the west central region of the Lower Peninsula of Michigan, there are several drinking water wells in the vicinity of the project area but not within the limits of proposed construction of the Preferred Alternative (see **Appendix J – Ground Water**).

Wellhead protection areas represent the land surface area that contributes ground water to wells serving public water supply systems throughout Michigan. Wellhead protection areas define a landscape in which management strategies are employed to protect public water supply from ground water contamination. According to EGLE's Open Data GIS dataset for wellhead protection areas in Michigan, there are no wellhead protection areas within or near the limits of proposed construction of the Preferred Alternative (see **Appendix J – Ground Water**).

Based on the information presented above, no significant ground water impacts are anticipated from the construction or operation of the Preferred Alternative.

No Action Alternative: Implementation of the No Action Alternative would have no impacts on ground water resources.

3.14.5 Wild and Scenic Rivers

Wild and Scenic Rivers are those resources that have extraordinary scenic, recreational, geologic, ecosystem, historic, or cultural value as defined in the *Wild and Scenic Rivers Act*. The *Wild and Scenic Rivers Act* (16 U.S.C. §§ 1271-1287) creates a national system intended to preserve certain rivers in a free-flowing condition for current and future enjoyment. The national system is administered by the Bureau of Land Management (BLM), the National Park Service (NPS), the USFWS, and the United States Forest Service (USFS). The land surrounding a protected river or river segment determines the agency that administers the national system.

The Nationwide Rivers Inventory (NRI) is a list maintained by the NPS, that identifies river segments that possess remarkable natural or cultural values and are of more than local or regional importance. All federal agencies are required to avoid or mitigate impacts to NRI segments.

3.14.5.1 Affected Environment

According to the National Wild and Scenic Rivers System website, there are no rivers in the National Wild and Scenic Rivers System in Kent County. The closest protected river is the Pere Marquette River, which is approximately 70 miles northwest of GRR.

According to the NPS, the Thornapple River, which flows east of the Airport, is listed on the NRI. The Thornapple River is approximately 1.1 miles east of the project area.

3.14.5.2 Environmental Consequences

Preferred Alternative: There are no rivers listed in the National Wild and Scenic Rivers System located in or within proximity of the project area. The closest NRI river (Thornapple River) is located 1.1 miles from the project area. Impacts to Wild and Scenic Rivers and NRI resources are not anticipated with the construction or operation of the Preferred Alternative. No mitigation is proposed.

No Action Alternative: Impacts to Wild and Scenic Rivers and NRI resources are not anticipated with the implementation of the No Action Alternative.

3.15 Reasonably Foreseeable Effects in the Context of Past, Present, and Reasonably Foreseeable Future Actions

Reasonably foreseeable effects on the environment commonly result from the incremental change of an action when added to past, present, and reasonably foreseeable development in the area that is not directly associated with the Preferred Alternative, regardless of what agency or person undertakes such actions. According to FAA Order 5050.4B, reasonably foreseeable actions include those "on or off-airport that a proponent would likely complete and that has been developed with enough specificity to provide meaningful information to decision makers and the interested public." In some cases, the individually minor impact of separate projects can have substantial effects when considered together over time.

3.15.1 Affected Environment

Several projects have been completed at the Airport over the past several years. Recent past projects at GRR include the following construction projects:

- 2019 – Construction of Central Utility Plant
- 2019 – Terminal Ticketing Area / Baggage Claim Area Improvements
- 2019 – Terminal Apron Expansion
- 2020 – Federal Inspection Station Baggage Claim
- 2020 – North Side FBO
- 2021 – Corporate Hangars
- 2022 – Corporate Hangars
- 2022 – Operations / Dispatch Center Improvements
- 2023 – Corporate Hangars
- 2024 – Concourse A Expansion
- 2024 – Corporate Hangars
- 2024 – Construction of Long-Term Parking Lot

GRR is planning various improvement projects in the coming years. According to the FY 2022-2026 Federal Airport Capital Improvement Program (see **Appendix K – Reasonably Foreseeable Effects in the Context of Past, Present and Reasonably Foreseeable Future Actions**), the following projects are planned at the Airport over the next several years:

- 2024 – Runway 8R/26L Approach End Taxiway Improvements (8R End)
- 2024 – Runway 8R/26L Approach End Taxiway Improvements (26L End)
- 2024 – Checked Baggage Inspection System – Construction, Year 2
- 2024 – Federal Inspection Station, Phase 2 – Year 2
- 2024 – East Perimeter Road Reconstruction
- 2025 – Runway 8R Wildlife Habitat Mitigation
- 2025 – Taxiway D Rehabilitation (Taxiway R to F)
- 2025 – Taxiway Z1 Rehabilitation
- 2025 – Airfield Electrical Improvements – Runway 8L/26R
- 2025 – GA Apron Rehabilitation

- 2026 – Taxiway T Construction
- 2027 – Runway 17/35 Approach End Taxiway Improvements (17 End)
- 2027 – Runway 17/35 Approach End Taxiway Improvements (35 End)

The City of Kentwood's Schedule of Capital Improvements (SCI) outlines a schedule of public service expenditures during the 2024-2030 period (see **Appendix K – Reasonably Foreseeable Effects in the Context of Past, Present and Reasonably Foreseeable Future Actions**). Examples of the projects planned in the City of Kentwood during this period are listed below:

- 2024-2025 – Bowen Station Restroom and Parking Lot Replacement
- 2025-2026 – Fire Station 2 – Roof Replacement
- 2025-2026 – Breton Crossing of the Paul Henry Trail
- 2026-2027 – Potter Pumping Station – Flow Meter Replacements
- 2027-2028 – 48th Street Widening and Rehabilitation (Division Avenue to Eastern Avenue)
- 2027-2030 – City Campus (Outdoor Gathering Space)

No data was available from Cascade Charter Township regarding capital improvements planned for the Township.

The Michigan Department of Transportation (MDOT) conducts other federal or federally assisted transportation improvement activities throughout the state of Michigan. According to MDOT's 2025-2029 Five-Year Transportation Program the proposed projects nearest the Preferred Alternative are as follows:

- M-37 from 92nd Street north to 76th Street – Reconstruction and Widening (Construction in 2026)
- 32nd Street over M-37 – Bridge Replacement (Construction in 2027)
- Forest Hill Avenue Over Interstate 96 – Deep Overlay (Construction in 2029)

These MDOT projects will all occur more than three miles from the Airport.

3.15.2 Environmental Consequences

Preferred Alternative: A review of potential future Airport projects and projects listed in the City of Kentwood SCI and MDOT 2025-2029 Five-Year Transportation Program suggests that all planned projects will be constructed in existing built and developed environments. When viewed in context with the Preferred Alternative, it is unlikely they will cause a permanent adverse cumulative impact. However, coordination between the Airport and the City of Kentwood, Cascade Charter Township, and MDOT is recommended as part of any future project. No single impact, even when considered with past, present, or future actions, represents a significant impact that cannot be avoided, minimized, or mitigated. All future actions on or off Airport property will be subject to avoidance and minimization studies and will undergo agency review and permitting, as required.

Reasonably foreseeable effects are not anticipated with the construction or operation of the Preferred Alternative. No mitigation is proposed.

No Action Alternative: Reasonably foreseeable effects are not anticipated with the implementation of the No Action Alternative.

3.16 Other Project Considerations

This section discusses other items that, while not specifically covered in previous sections, are important to the understanding of the project's potential impacts on the social, environmental, and economic surroundings.

Conformance with Plans, Policies, and Controls: An airport development project plays an important role in the local and regional economy. Often, a project influences the type and location of specific land uses, the ground transportation network, and the general direction of community growth. When evaluating an action's conformance with plans and policies, there are usually two levels of planning involved. The first level addresses policy plans, which are goals and objectives for the area or jurisdiction. The second addresses specific physical plans that direct development of the physical infrastructure.

Coordination with the Airport does not indicate any conflicts with local, county, or state planning efforts. The City of Grand Rapids, the City of Kentwood, Cascade Charter Township, and Kent County are in full support of the proposed project. The project is also shown on the East Side Building Area Plan sheet in the Airport Layout Plan.

GRR is included in the FAA's National Plan of Integrated Airport Systems (NPIAS). This designation is indicative of its significance in the national air transportation system. At the state level, the MDOT Office of Aeronautics classifies the Airport as a Tier-I, commercial service airport. Tier-I airports support essential and critical state airport system goals and should be developed to their full and appropriate extent.

The proposed project aligns with local and regional plans, and no impacts are expected.

Conformance with Laws and Administrative Rules: In preparing this EA, various federal, state, regional, and local agencies were contacted to solicit their comments on the proposed project as it related to their specific area of expertise or regulatory jurisdiction including permitting and mitigation requirements (**Appendix C – Early Agency Coordination**). Based on this coordination, inconsistency with known federal, state, or local laws or administrative rules is not expected. All phases of the proposed action will adhere to appropriate regulations and permitting requirements including any necessary mitigation measures.

Means to Avoid, Minimize, and Mitigate Adverse Environmental Impacts: Projects should take care to avoid permanent adverse impacts on the environment. It is important that all adverse environmental impacts be minimized or mitigated if avoidance is not possible. The various impacts of the Preferred Alternative and the potential means to avoid, minimize, and mitigate them to the greatest extent possible are summarized in **Table 3-3 Mitigation Summary of the Preferred Alternative**.

Degree of Controversy on Environmental Grounds: The Preferred Alternative is consistent with all federal, state, regional, and local plans and laws. According to conversations and correspondence with various federal and state agencies and the Airport, there have been no negative public comments or controversy concerning the proposed action.

Table 3-3
Mitigation Summary of the Preferred Alternative

Environmental Factor	Proposed Mitigation and Permits
Air Quality	To minimize air emissions from construction equipment the following recommendations may be implemented and incorporated by the Airport during construction, where feasible: • Use low-sulfur diesel fuel (less than 0.05 percent sulfur). • Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site. • Position the exhaust pipe so that the diesel fumes are directed away from the operator and nearby workers, thereby reducing the fume concentration to which personnel are exposed. • Use catalytic convertors to reduce carbon monoxide, aldehydes, and hydrocarbons in diesel fumes. These devices must be used with low sulfur fuels. • Use climate-controlled cabs that are pressurized and equipped with high efficiency particulate air (HEPA) filters to reduce the operator's exposure to diesel fumes. • Regularly maintain diesel engines, which is essential to keeping exhaust emissions low, and follow the manufacturer's recommended maintenance schedule. • Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel operators to perform routine inspections, and maintaining filtration devices. • Purchase new vehicles that are equipped with the most advanced emission control systems available. • With older vehicles, use electric starting aids as block heaters to warm the engine to reduce diesel emissions.
Biological Resources	Recommended best management practices (BMPs) for the Eastern Massasauga Rattlesnake (EMR) will be implemented as follows: • Use of wildlife-safe erosion control materials. • Viewing of the Michigan Department of Natural Resources' "60-Second Snakes: The Eastern Massasauga Rattlesnake" video and/or review of the EMR factsheet. • Reporting of any EMR observations (or any other threatened or endangered species) during project implementation.

Table 3-3
Mitigation Summary of the Preferred Alternative

Environmental Factor	Proposed Mitigation and Permits
Coastal Resources	None Required.
Dept. of Transportation Act, Section 4(f)	None Required.
Farmlands	None Required.
Hazardous Materials	• The contractor is required to have a Spill Prevention, Control, and Countermeasure (SPCC) plan in place to be implemented if a spill occurs during construction operations. • An approved erosion control plan is required. • Any waste generated through proposed project improvements will be disposed of in compliance with all federal, state, and local regulations.
Historical, Architectural, Archeological, and Cultural Resources	If historical, architectural, archeological, or cultural resources are encountered during construction, work must stop, and the State Historic Preservation Office (SHPO) must be notified immediately.
Land Use	Traffic from construction vehicles will be managed to avoid and minimize any impacts to local roads by defining haul routes and by scheduling the arrival and departure times of construction traffic so that normal traffic patterns are not interrupted.
Natural Resources and Energy Supply	• BMPs to reduce energy consumption during construction will be employed, where applicable. • Sustainability features will be incorporated during design and construction to reduce energy consumption. These features could include use of energy efficient fixtures, point-of-use water heaters, efficient/upgraded insulation and windows, light-emitting diode (LED) lighting, and efficient HVAC systems. • To reduce energy consumption associated with the temporary use of excavators and construction vehicles, equipment should be in good working order to ensure the most efficient use of fuel. All vehicles and equipment should be checked for leaks and repaired immediately.
Noise and Noise Compatible Land Use	Construction staging areas are not allowed near noise-sensitive land uses.

Table 3-3
Mitigation Summary of the Preferred Alternative

Environmental Factor	Proposed Mitigation and Permits
Socioeconomics or Children's Environmental Health and Safety Risks	None Required.
Visual Effects & Light Emissions	None Required.

Water Resources	<u>Wetlands:</u>
	None Required
	
	<u>Floodplains:</u>
	None Required.
	
	<u>Surface Water:</u>
	• Soil erosion is a source of concern as a possible adverse impact to surface waters from construction projects. The following list of BMPs represents common erosion control measures that should be considered during construction and applied where applicable:
	  ○ Sediment traps
	  ○ Temporary cement ponds
	  ○ Temporary grassing of disturbed areas
	  ○ Vegetation cover replaced as soon as possible
	  ○ Erosion mats and mulch
	  ○ Silt fencing and drainage check dams
	  ○ Settling basins for storm water treatment
	• All excavated soils and staging areas for construction equipment will be placed in non-sensitive upland areas with disturbed areas replanted as soon as possible to reduce the likelihood of erosion.
	• Mitigation measures prepared under an erosion control plan in accordance with FAA AC 150/5370-10H, *Standard Specifications for Construction of Airports*, will help minimize long-term impacts to area water quality and to the existing drainage system.
	• In accordance with Part 91, Michigan Soil Erosion and Sedimentation Control of the *Natural Resources and Environmental Protection Act*, 1994 Public Act 451, as amended, a soil erosion and sedimentation control permit is required from the Kent County Road Commission for any activity within 500 feet of a lake or stream and a storm water runoff control permit is required from Cascade Charter Township.

Table 3-3
Mitigation Summary of the Preferred Alternative

Environmental Factor	Proposed Mitigation and Permits
	• Obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction activity disturbing one acre or more of soil. • Permittees are required to control runoff from construction sites and develop a construction Stormwater Pollution Prevention Plan (SWPPP) that includes erosion prevention and sediment control BMPs. <u>Ground Water:</u> • To protect surface and ground water resources, runoff will be directed into the Airport's existing stormwater management system. Stormwater runoff will drain into the Airport's existing drainage system in accordance with its SWPPP. The SWPPP will also be updated to include BMPs to reduce erosion and discharge of pollutants from construction activities. <u>Wild and Scenic Rivers</u>: None Required.
Reasonably Foreseeable Effects in the Context of Past, Present and Reasonably Foreseeable Future Actions	None Required.

Chapter Four
List of Preparers

The chapter lists the names and qualifications of the principal Mead & Hunt participants that assisted in the preparation of the Environmental Assessment, as well as representatives from the Airport, and the Federal Aviation Administration.

Mead & Hunt, Inc.

Stephanie Ward, AICP, Project Principal / Quality Control - Has more than 20 years of experience in preparing airport master plans, ALPs, environmental overviews, airport site selection studies, airport feasibility studies, and developing community support and understanding of airports and their importance to a community. Has prepared more than 60 planning studies for air carrier and general aviation facilities.

William Ballard, AICP, Project Manager - More than 18 years of experience evaluating environmental impacts associated with transportation projects and preparing National Environmental Policy Act (NEPA) documents. Has served as project manager for various environmental assessments and environmental impact statements.

Brauna Hartzell, Wetlands and Biological Resources Scientist - More than 20 years of experience in the execution of National Environmental Policy Act (NEPA) environmental compliance documents including state and federal wetland delineations, biological surveys, and regulatory permitting. Has served as project manager for wetland and biological analysis, permitting and mitigation design.

David Clawson, Airport Planner - Serves as an airport planner for Mead & Hunt and is responsible for developing planning and environmental documents. Has assisted with several environmental assessments and has a strong understanding of the National Environmental Policy Act (NEPA), environmental management systems, system plans, and economic analysis.

Courtney Beard, Airport Planner - Serves as an airport planner for Mead & Hunt and is responsible for developing planning and environmental documents. Has assisted with several environmental assessments and has a strong understanding of the National Environmental Policy Act (NEPA), environmental management systems, system plans, and economic analysis.

Brian Matuk, Historian - National resource for Section 106 and Section 4(f) regulatory coordination, historic resource requirements for NEPA documentation, as well as environmental document review. Conducts architectural surveys and preservation planning across the country and serves as project manager for historic preservation projects.

Gerald R. Ford International Airport

Michelle Baker, C.M., ACE, Airport Environmental Manager

Federal Aviation Administration

Alec Martino, Environmental Engineer

Chapter Five
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