FINAL ENVIRONMENTAL ASSESSMENT

for

RUNWAY 10-28 SAFETY AREA IMPROVEMENTS

AT

Waukesha County Airport/Crites Field
Waukesha, Wisconsin

prepared by

Mead & Hunt, Inc.

May 2017

under contract with

WISCONSIN DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS

The proposed action includes the following:

1. Re-align Silvernail Road to the west.
2. Shift Runway 10 by 400 feet west with corresponding extensions to Taxiway A.
3. Shift Runway 10 approach lights, glideslope, PAPI and AWOS by 400 feet west.
4. Acquire and transfer property to accommodate a realigned Silvernail Road and shifted approach lights.
5. Relocate the Runway 10 localizer array and shelter outside of runway safety critical areas.
6. Implement declared distances for both directions of operation on Runway 10-28.
7. Construct new access roads to the relocated navigational instruments.
8. Remove the non-standard parallel taxiway along the north side of Runway 10-28.
9. Extend or relocate storm sewer culverts outside the Runway 10-28 safety area.
10. Perform grading operations associated with the proposed improvements.
11. Construct dry storm water management facilities for the proposed improvements.
12. Widen the Taxiway A alignment transition to Design Group 2 standards.

Evidence of compliance with the Wisconsin Environmental Policy Act is indicated by the Wisconsin Department of Transportation signature below.

Steven W. Krebs — 5/23/2017

WisDOT, Director
Bureau of Technical Services — Date

DJM — 05-18-2017

WisDOT, Director
Bureau of Aeronautics — Date

The environmental assessment becomes a federal document when signed by the Responsible FAA Official

[signature] — June 20, 2017

Federal Aviation Administration — Date

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C User Survey, Feedback and FAA Concurrence on Maintaining Existing Runway Length

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E Minutes of Coordination Meetings
- November 25th, 2013
- February 19th, 2014
- March 12th, 2014 – follow up April 7th, 2014

F Build Alternative Exhibits

G RPZ Analysis Exhibits and FAA letter Documenting Support for Alternative 11

H Cost Estimates & Life-Cycle Cost Analyses

I Census Data

J Agency Coordination
- Meeting Minutes – March 16th, 2004
- Correspondence Letter – Feb/Mar 2007
- Meeting Minutes - August 26th, 2015

K Section 106 Documentation

L Noise Analysis

M Public Involvement

N Wetland Functional Impact Analysis – Silvernail Road Relocation

List of Acronyms

AC Advisory Circular

ADID Advanced Identification of Wetland Disposal Areas

ADO Airport District Office (FAA)

ALP Airport Layout Plan

APE Area of Potential Effects

ARC Airport Reference Code

ARFF Aircraft Rescue and Fire Fighting

ASDA Accelerate-Stop Distance Available

BBJ Boeing Business Jet

CAA Clean Air Act

CAT I Category I

CEQ Council on Environmental Quality

CTH County Trunk Highway

DOT Department of Transportation

EA Environmental Assessment

EIS Environmental Impact Statement

EMAS Engineered Material Arresting System

FAA Federal Aviation Administration

FBO Fixed Base Operator

FCC Federal Communications Commission

FONSI Finding of No Significant Impact

GA General Aviation

GPS Global Positioning System

HIRL High Intensity Runway Light

ILS Instrument Landing System

INM Integrated Noise Model

ISA International Standard Atmosphere

LDA Landing Distance Available

LOC Localizer

MALSR Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights

MITL Medium Intensity Taxiway Light

MMSD Milwaukee Metropolitan Sewerage District

MTOW Maximum Takeoff Weight

NAAQS National Ambient Air Quality Standards

NAVAIDS Navigational Aids

NDB Non-Directional Beacon

NEPA National Environmental Policy Act

OFA Object Free Area

PAPI Precision Approach Path Indicator

RAILS Runway Alignment Indicator Light System

REIL Runway End Identifier Lights

ROW Right-of-Way

RPZ Runway Protection Zone

RSA Runway Safety Area

SEWRPC Southeastern Wisconsin Regional Planning Commission

SHPO Wisconsin State Historic Preservation Office

SIP State Implementation Plan

TAF Terminal Area Forecast

TIA Traffic Impact Analysis

UES Airport identifier code for Waukesha County Airport (Crites Field)

USFWS US Fish & Wildlife Services

USEPA United States Environmental Protection Agency

VASI Visual Approach Slope Indicator

VOR Very High Frequency Omni-directional Range

WisDOT Wisconsin Department of Transportation

WDNR Wisconsin Department of Natural Resources

Final Environmental Assessment for Runway 10-28 Safety Area Improvements Waukesha County Airport (Crites Field) Waukesha, Wisconsin

1. Introduction

The Waukesha County Airport (Airport) is located in southeastern Wisconsin and is part of the Milwaukee metropolitan area. With seven cities, eighteen villages and twelve towns, and a population of over 350,000 individuals, Waukesha County provides a large user base for the Airport. Located along the south side of I-94 and just ten miles from downtown Milwaukee, the Airport serves the aviation needs of the western portion of the Milwaukee metropolitan area. A location map is included as **Figure 1-1**.

Waukesha County Airport is categorized as a Large General Aviation (GA) facility by the Wisconsin State Airport System Plan, and is the only National GA Airport in the state. GA Airports of this category are those classified by the Federal Aviation Administration (FAA) as having very high levels of activity with many based jets; providing functions critical to community access, emergency preparedness and response. The Airport was officially dedicated in 1935 and has been an integral part of Waukesha County history. Over the past 77 years, the Airport has evolved into a premiere corporate facility, with 20 based jets and over 4,000 annual business jet operations. The Airport is included in the National Plan of Integrated Airports Systems (NPIAS) as a reliever facility to General Mitchell International Airport in Milwaukee, Wisconsin. The Airport is one of the busiest in the state without scheduled passenger service and provides cargo and freight services to the surrounding areas and hospitals. According to the FAA's Terminal Flow Management System Counts (TFMSC) database, Waukesha County Airport averaged 58,470 annual operations between 2010 and 2014. Over this same period, the Airport conducted an average of 4,402 annual jet operations, the most of any Large General Aviation facility in the state.

The Federal Aviation Administration (FAA) has design standards to ensure the safety, economy, efficiency, and longevity of an airport. Waukesha County Airport (Crites Field) does not meet current FAA design standards related to the Runway Safety Areas (RSAs) for both ends of Runway 10-28. The Waukesha County Airport proposes to correct these safety area deficiencies.

Federal financial participation in the proposed action identified in this document requires environmental approval pursuant to the National Environmental Policy Act (NEPA) and approval of the Airport Layout Plan (ALP) elements associated with the proposed action, including its associated airspace request. By meeting the intent of NEPA, this document also serves as Wisconsin Environmental Policy Act (WEPA) documentation.

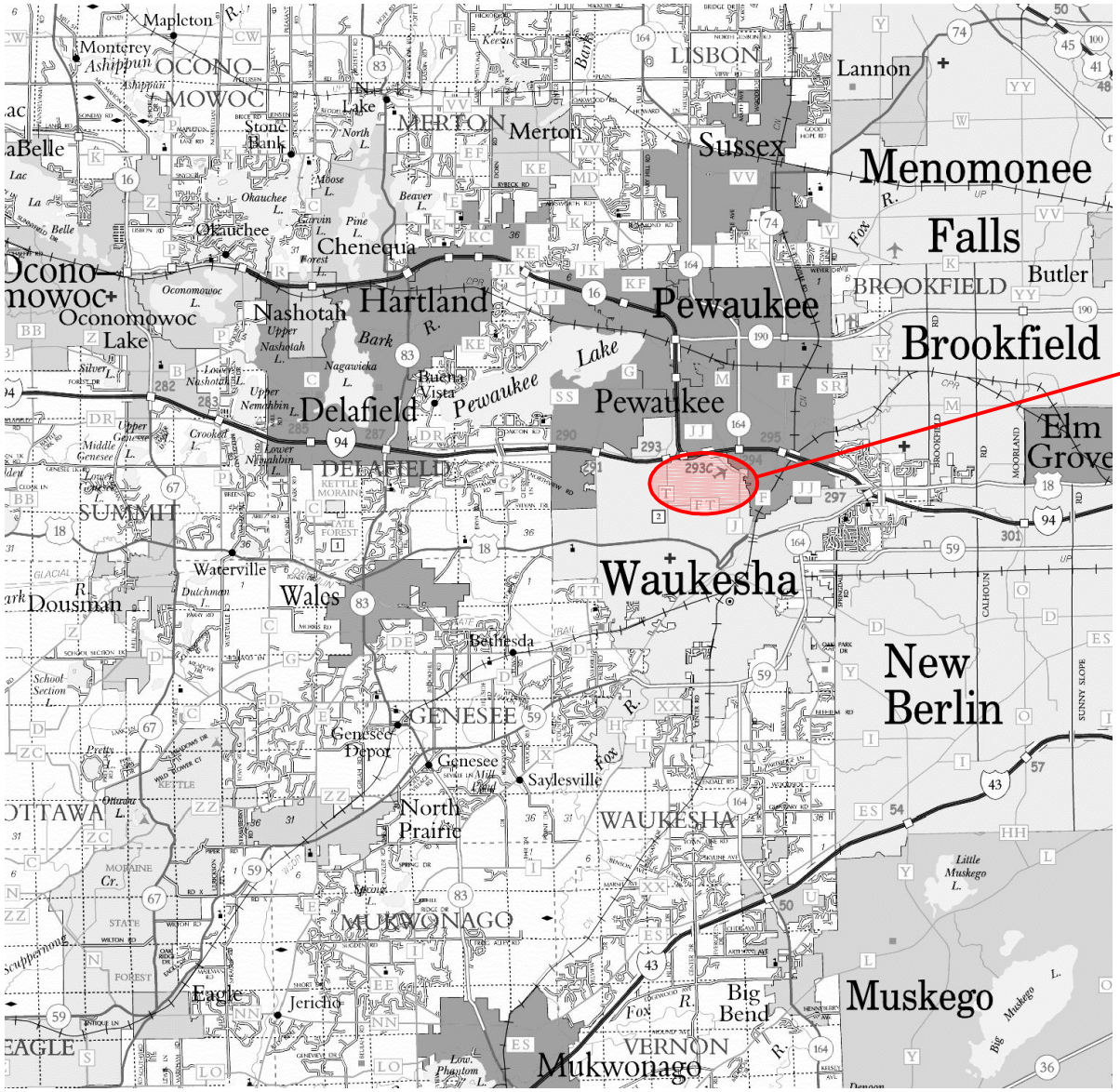
An Environmental Assessment (EA) is a document that assesses and evaluates the effects of a proposed action on the surrounding natural, social, and economic environments. This EA has been prepared in accordance with the requirements of Title V of Public Law 97-248 of the Airport and Airway Improvement

Act of 1982, FAA Order 1050.1E, Environmental Impacts: Policies and Procedures and FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions (April 2006).

An aerial photo of the existing Waukesha County Airport facilities is shown in **Figure 1-2**.

The intent of the EA is to provide the environmental documentation to assist local, state, and federal officials in evaluating the proposed action at the Waukesha County Airport. The proposed action will be evaluated along with a full range of alternatives to identify a preferred alternative which meets the project purpose and need. This analysis will include identification of measures to avoid, minimize and mitigate possible adverse environmental impacts.

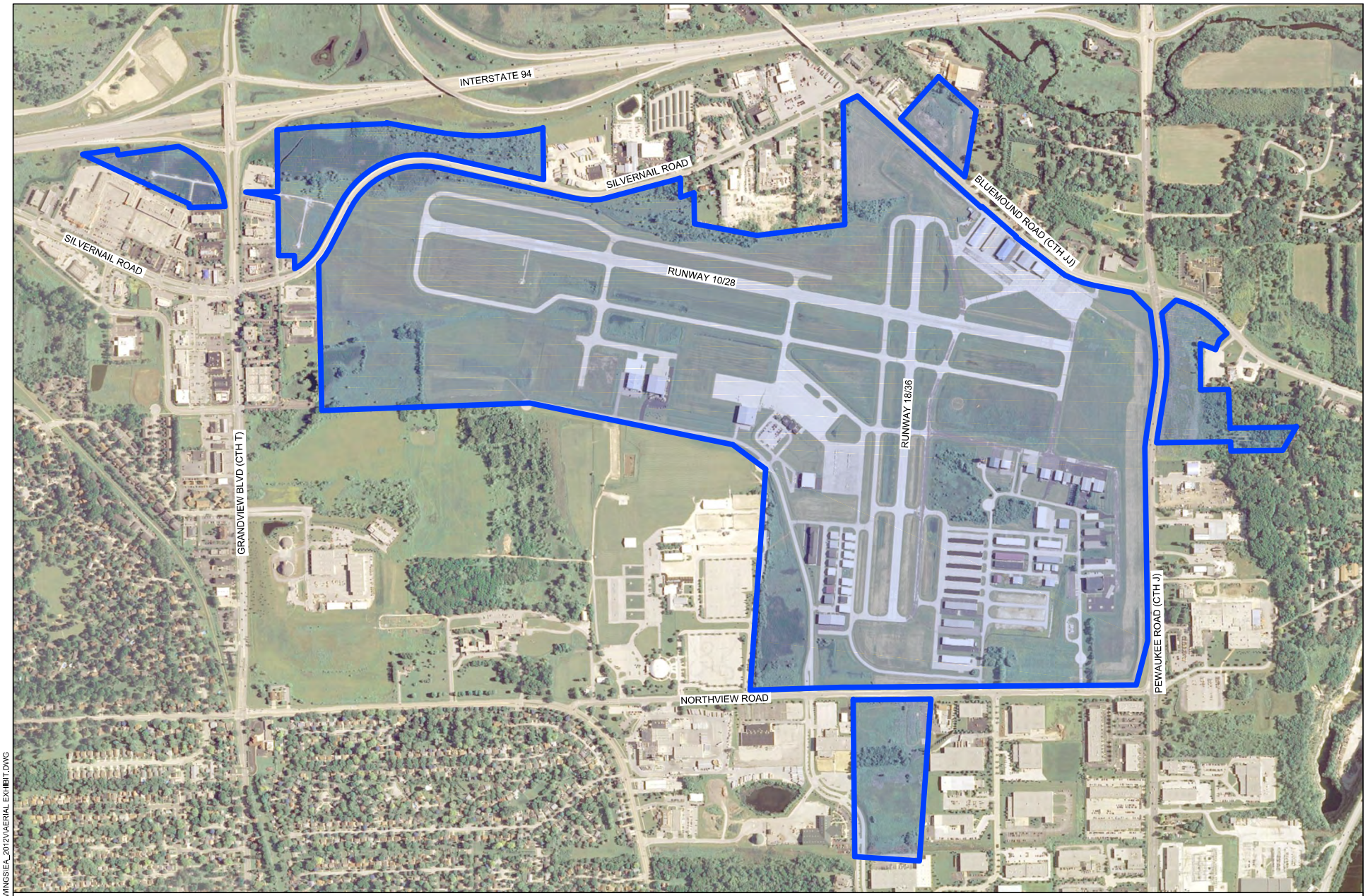
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Map - 2012 WDOT

FIGURE 1-1
LOCATION MAP



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AIRPORT PROPERTY LIMIT

Orthophotograph - 2010 NAIP, Waukesha County

FIGURE 1-2

AERIAL PHOTO &
AIRPORT PROPERTY LIMITS

WAUKESHA COUNTY AIRPORT CRITES FIELD

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2. Purpose and Need

2.1 Project Purpose

The purpose of the project is to bring the safety areas for Runway 10-28 at Waukesha County Airport into compliance with FAA design standards, and to provide related infrastructure improvements.

2.2 Project Need

Runway safety is one of the Federal Aviation Administration's (FAA's) top five safety priorities. The FAA has recognized that the safety areas for Runways 10 and 28 at the Waukesha County Airport are not in compliance with the standards outlined in their Airport Design Advisory Circular, 150/5300-13A. Previously, the FAA had granted Waukesha County waivers for the substandard size of the Runway 10 and 28 safety areas, with the latest waiver dated November 29, 1993. The indication of the waivers appears in the Table of Modifications to Federal Standards on Sheet 2 of 11 of the Airport Layout Plan, which is included in **Appendix A**.

In December of 2004, the Waukesha County Executive submitted a written request to the FAA for an indefinite continuation of the runway safety area waivers on both ends of Runway 10-28. In February of 2005, the FAA responded with a letter that indicated that RSA standards cannot be modified or waived like other airport design standards, for reasons discussed in Section 2.2.1. In their letter, the FAA further states that "a continuous evaluation of all practicable alternatives for improving each sub-standard RSA is required until it meets all standards for grade, compaction, and object frangibility." These letters are provided within **Appendix B**.

A separate safety issue also exists on the taxi route to and from the Runway 10 end. To maintain proper separation of aircraft from navigational instruments, Taxiway A transitions from a 400' centerline offset to a 575' offset. The alignment change is abrupt and the wheels of larger business jets often run off the pavement edge when negotiating these curves. Geometry improvements are needed to bring the Taxiway A alignment transition into conformance with current design standards as discussed in Section 2.2.3.

The need for standard runway safety areas off both the ends and sides of Runway 10-28 and related infrastructure improvements are presented in the following subsections:

2.2.1 Runway Safety Areas

In October 1999, the FAA issued Order 5200.8, Runway Safety Area Program. This Order represented a national directive to clean up non-compliant runway safety areas (RSAs), indicating a policy change in which waivers will no longer be acceptable. The intent of the RSA, as described in FAA Order 5200.8, is: *"To provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots, and veer-offs"*

The majority of aviation accidents occur in close proximity to an airport. The National Transportation Safety Board's database, which includes information on civilian accidents and selected accidents since 1962, was queried, along with FAA Accident Investigation records to identify incidents that have involved aircraft landing short, veering off the runway, or aborted take-offs at Waukesha County Airport. A search

of these records found at least five occurrences of such incidents since 1989 due to various reasons, and further demonstrates the need to maintain adequate RSAs.

Runway safety areas (RSAs) must be level, graded areas which, under normal (dry) conditions, must be capable of supporting airplanes without causing structural damage to the airplanes or injury to the occupants. Furthermore, the RSA must provide accessibility for the aircraft firefighting and rescue equipment during emergency conditions.

FAA AC 150/5300-13A states that the RSA shall be:

- Cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface area variations;
- Drained by grading or storm sewers to prevent water accumulation;
- Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and
- Free of objects, except for objects that need to be located in the RSA because of their function.

FAA Advisory Circular (AC) 150/5300-13A defines the RSA dimensions (length and width) for each runway category. At Waukesha County Airport, Runway 10-28 is categorized as a Category C, Group III runway. The "C" represents the aircraft approach category, which is determined by the operational approach speed characteristics of the design/critical aircraft. The "III" represents the airplane design group and is based on the wingspan, which relates to the physical characteristics of the critical or design aircraft. Based on the given runway category of C-III, the RSA for Runway 10 and Runway 28 should be 500 feet wide, centered on the runway centerline for the full length of pavement, and additionally extending 1,000 feet beyond each end of defined useable runway pavement.

Table 2-1 summarizes the design standards for the portion of the Runway 10-28 safety area extending beyond the ends of both runways, and the existing, substandard conditions that this project addresses.

Table 2-1. Design standards for Runway 10-28 Safety Areas beyond the defined useable pavement

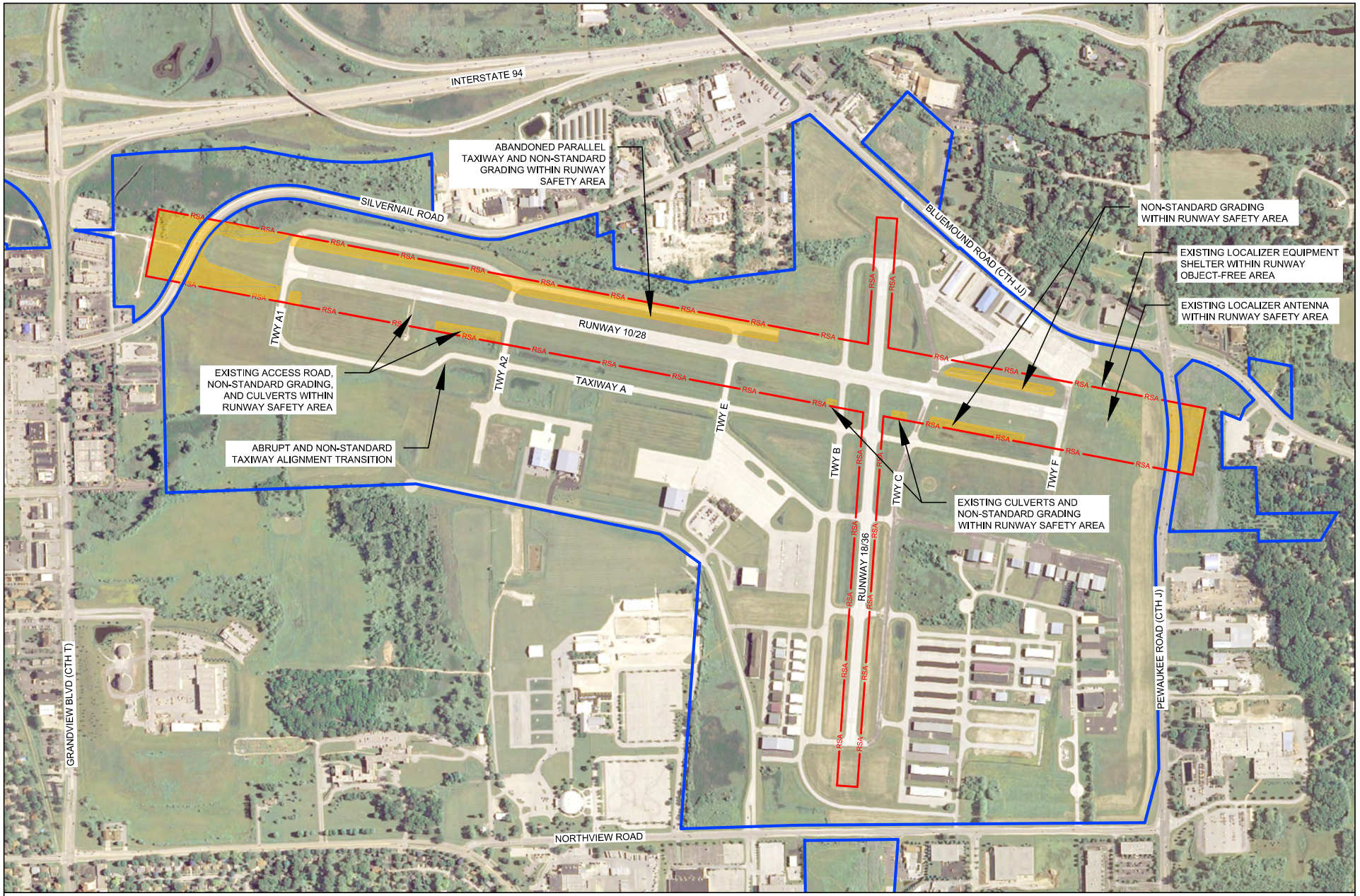
Runway	FAA Requirements Runway Safety Area		Existing Conditions Runway Safety Area	
	Length[1]	Width[1]	Length	Width
Runway 10	1000'	500'	500'*	300' – 430'
Runway 28	1000'	500'	690'*	440' – 500'

[1] This RSA length corresponds to the length beyond the end of defined useable runway pavement. The 500' safety area width is centered on the runway alignment and also extends along the sides of the runway pavement.

** Maximum length of safety area currently available off the end of useable pavement with full 500' required width.*

Figure 2-1 shows the existing Airport facility and the required RSAs for Runway 10 and Runway 28.

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	AIRPORT PROPERTY LIMIT
RSA	RUNWAY SAFETY AREA
	NON STANDARD RSA

Orthophotograph - 2010 NAIP, Waukesha County

FIGURE 2-1
EXISTING FACILITY

WAUKESHA COUNTY AIRPORT CRITES FIELD

As **Figure 2-1** illustrates, Silvernail Road encroaches on the Runway 10 safety area on the west side of the Airport, and Pewaukee Road (CTH J) encroaches on the Runway 28 safety area on the east. The sides of the runway safety area are non-standard mostly due to improper grading and slope, but also include an abandoned east/west taxiway along the north side of the runway, a vehicular access road to Runway 10 navigational instruments, and the presence of storm sewer culverts and ditching. The side areas of the runway are an important component to the overall safety area as they protect aircraft and passengers in the event of a veer off.

2.2.2 Infrastructure Improvement Needs Related to the Runway Safety Area Improvements

If a runway safety area build alternative is selected, other related infrastructure improvements are needed to bring the safety areas for Runway 10-28 into compliance with FAA standards. The related improvements are described in the following subsections.

2.2.2.1 Relocate the Runway 10 Localizer array and shelter outside runway safety critical areas

The Runway 10 localizer array supports low-visibility approach procedures by aligning aircraft horizontally with the runway centerline. This antenna is located off the east end of the runway and is currently located within the Runway 28 safety area. Additionally, the shelter that houses equipment for the localizer antenna is located within the object free area (OFA) for Runway 28. The localizer array needs to be relocated outside the runway safety area, and the localizer equipment shelter needs to be relocated outside the runway OFA to be within FAA siting standards for these facilities.

2.2.2.2 Construct new access roads to relocated navigational instruments

Existing navigational instruments (glideslope, PAPI, AWOS) on the south side of Runway 10 are currently accessed by an asphalt roadway that connects directly to the runway pavement edge. Vehicles needing to reach these navigational aids for maintenance must enter the runway safety area and drive down the runway pavement for a distance of 700 to 1,000 feet. The FAA has identified this as a safety issue as it increases the possibility of an incursion between an aircraft and ground vehicles. This existing access road needs to be removed from the safety area of Runway 10-28 to be in conformance with FAA standards and to reduce the need for ground vehicles to enter the runway environment. A new access roadway needs to be constructed to these existing facilities outside the runway safety area. On the east end, an access road to the relocated localizer antenna and equipment shelter also needs to be constructed outside the safety areas and object free areas for the runway.

2.2.2.3 Remove the non-standard parallel taxiway along the north side of Runway 10-28

Taxiway separation standards for Runway 10-28 are a minimum of 400-feet (centerline-to-centerline). The existing parallel taxiway on the north side of Runway 10-28 is not in conformance with these standards with centerline separations that range from 205-feet to 300-feet. Approximately 2,100’ of this taxiway is within the safety area of Runway 10-28 itself. This taxiway has been abandoned and does not serve a functional purpose. This pavement needs to be removed to eliminate the presence of a taxiway within the runway safety area, and the resulting area needs to be regraded to standard safety area requirements along the north side of the runway.

2.2.2.4 Extend or relocate storm sewer culverts outside the Runway 10-28 safety area.

Storm sewer culverts cross Runway 10-28 in a number of areas. In some of these locations, the culvert pipes do not extend far enough beyond the runway pavement to be outside the safety area. This is the case for a 36" storm sewer culvert located 180-feet west of Taxiway A2 on the south side of Runway 10-28, and for twin-30" storm sewer culverts located between Taxiway C and Runway 18-36 also on the south side of the runway. Existing 18" culvert pipes are also present across Taxiway A1 and Taxiway B and these pipes will need to be relocated further south to be outside the Runway 10-28 safety area.

2.2.2.5 Construct dry storm water management facilities for the proposal improvements.

Any proposed build alternative for addressing the needed safety area improvements would require some amount of ground disturbance and change in impervious area. Storm water management features need to be sited outside runway safety areas and object-free areas as well as the associated critical areas of navigational instruments. The FAA provides guidance on the construction of storm water management facilities within Advisory Circular AC 150/5200-33B: "Hazardous Wildlife Attractants on or Near Airports." Per this circular, storm water detention facilities need to drain and remain dry within a 48-hour time frame of the design storm to avoid attracting wildlife hazardous to aviation.

2.2.3 Widen Taxiway A Alignment Transition to Design Group 2 Standards

The west end of Taxiway A transitions from a 400' centerline offset to a 575' offset. This shifting of Taxiway A is necessary to maintain aircraft outside the defined critical area for the Runway 10 glideslope antenna. However, this transition is abrupt, and requires aircraft to make a quick series of both left and right turns. The pavement width, taper lengths and size of the turning radii are not consistent with the Airport's Taxiway Design Group (TDG) requirements. The TDG is based on the wheel configuration of the design critical aircraft, which at Waukesha County Airport consist of large business jets. A number of the largest jets fall into the TDG-2 classification, as defined in the FAA's Airport Design Advisory Circular, AC 150/5300-13A. A listing of these aircraft and the 2014 operations at the Airport are provided in **Table 2-2**.

Table 2-2 Summary of 2014 Taxiway Design Group 2 Aircraft Operations
Waukesha County Airport

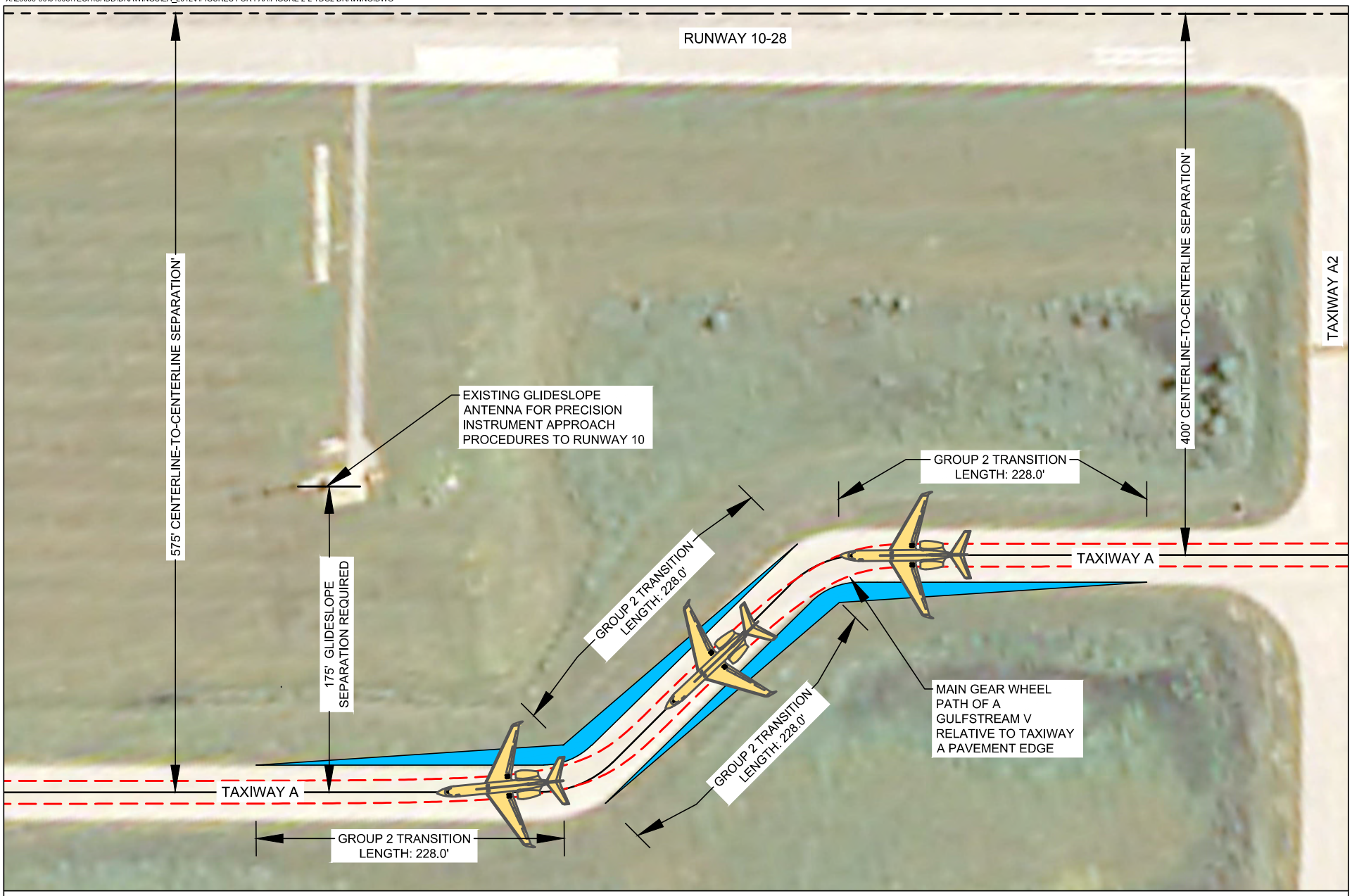
Business Jet Aircraft	2014 Total Operations [1]	Main Gear Width (ft) [2]	Cockpit to Main Gear Distance (ft) [2]
C525 - Cessna CitationJet/CJ1	109	15.88	15.32
C560 - Cessna Citation V/Ultra/Encore	219	18.25	19.88
F2TH - Dassault Falcon 2000	113	16.26	24.25
F900 - Dassault Falcon 900	103	16.56	26.02
GLEX - Bombardier BD-700 Global Express	6	15.98	42.42
GLF3 - Gulfstream III/G300	2	15.99	38.09
GLF4 - Gulfstream IV/G400	169	15.99	38.10
GLF5 - Gulfstream V/G500	72	16.92	45.00
Total 2014 Operations of TDG-2 Aircraft:	**793**		

[1] Source: *FAA's Terminal Flow Management System Counts (Calendar Year 2014)*

[2] *Source: Aircraft Dimensional Data taken from Software Program AeroTurn 5*

Aircraft of the category listed in **Table 2-2** experience difficulty in negotiating this particular turning movement, and their wheels have run off the pavement edges in a number of instances. **Figure 2-2** illustrates the swept wheel paths for the main gear of a Gulfstream V aircraft relative to the pavement edges of the Taxiway A alignment transition. Along the inner radii of the curves, the wheels track very close to the existing pavement edges. FAA guidance on taxiway design is provided in Chapter 4 of Advisory Circular AC 150/5300-13A which states that taxiways should be designed sufficiently wide to allow a certain amount of wander. The allowance for wander is provided by the Taxiway Edge Safety Margin (TESM), which is measured from the outside of the landing gear to the taxiway edge. For TDG-2 aircraft standards, the TESM is 7.5 feet. **Figure 2-2** further illustrates the additional pavement width transitions needed to bring the alignment into conformance with Taxiway Design Group 2 standards, which will also provide the required Taxiway Edge Safety Margin.

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA_2012V\FIGURES FOR FAA\FIGURE 2-2 TDG2 DRAWING.DWG



Orthophotograph - 2010 NAIP, Waukesha County

FIGURE 2-2

MAIN GEAR WHEEL PATH OF A GULFSTREAM V NEGOTIATING THE TAXIWAY A ALIGNMENT TRANSITION

WAUKESHA COUNTY AIRPORT CRITES FIELD

2.3 Requested Federal Action

There are a number of actions necessary for federal approval to allow construction of a build alternative. These include approval of the ALP elements associated with the proposed action and environmental concurrence to support issuance of federal grant-in-aid funds to the Waukesha County Airport for eligible airport development projects.

This EA was prepared for the Waukesha County Airport and the Wisconsin DOT Bureau of Aeronautics (BOA) in accordance with FAA Order 5050.4B, and FAA Order 1050.1E. Wisconsin is one of ten states that receive federal financial aid through the federal block grant program. As a block grant state, the BOA administers the funding for projects at eligible general aviation airports and has the authority to issue a Finding of No Significant Impact (FONSI) on state aid and block grant projects for these airports. The BOA will evaluate the EA and either issue a FONSI, FONSI/Record of Decision or request that an Environmental Impact Statement (EIS) be completed. However, if the project will receive federal discretionary funding, the Federal Aviation Administration (FAA) will issue the FONSI, or request that an EIS be completed. The EA is being submitted in accordance with the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.

2.4 Current and Projected Aircraft Operations

Current and projected operations (an operation is defined as one take-off or one landing) are included to provide a foundation for the current and projected usage at the Airport. **Table 2-3** includes the actual number of operations at Waukesha County Airport as recorded in the FAA's 2014 Terminal Area Forecast ♦(TAF) data. Historical TAF numbers show that operations at Waukesha County Airport had peaked in 2003 at around 95,000 annual operations, and have held consistently between 50,000 to 60,000 annual operations for the past seven years. Additionally, the Airport has consistently seen between 4,000 to 5,000 annual operations of business jets over the past decade, according to data obtained from the FAA's Traffic Flow Management System Counts database. These business jets are the critical aircraft at Waukesha County for determining runway length and other facility requirements. The information shown in **Table 2-3** is represented graphically on **Charts 2-1** and **Chart 2-2**. The actions proposed under this project are intended to correct safety area deficiencies associated with Runway 10-28 and are not driven by capacity or other factors.

Table 2-3 Summary of Historical and Projected Aircraft Operations

Waukesha County Airport (Crites Field)

Year	Air Taxi & Commuter	G.A. (Itinerant)	G.A. (Local)	Military	Total Operations [1]	IFR Jet Operations [2]
Historical:						
2004	2,553	49,093	38,160	158	89,964	4,578
2005	2,196	47,998	38,886	265	89,345	5,141
2006	1,635	37,344	21,167	204	60,350	4,823
2007	1,705	35,474	21,797	609	59,585	5,092
2008	1,699	33,652	23,682	340	59,373	4,591
2009	1,981	33,263	25,800	260	61,304	3,710
2010	2,032	31,781	23,244	194	57,252	4,044
2011	2,295	31,229	23,112	174	56,810	4,018
2012	2,560	35,792	18,172	246	56,784	4,465
2013	2,691	29,746	16,020	286	48,743	4,634
2014	3,118	26,759	11,981	344	42,202	4,850
Compounded Annual Growth Rate (2004 - 2014):						*0.58%*
Projected:						
2018	2,691	28,900	16,277	286	48,154	4,963
2023	2,691	29,293	17,016	286	49,286	5,109
2033	2,691	30,095	18,591	286	51,663	5,412
Compunded Annual Growth Rate (2014 - 2033):						0.58%

[1] Source of Total Operations, Historic: Federal Aviaiton Administration's Terminal Area Forecasts, Feb 2014

[1] Source of Total Operations, Projected: Federal Aviaiton Administration's Terminal Area Forecasts, Feb 2014

[2] Source of IFR Jet Operations, Historic: Traffic Flow Management System Counts (TFMSC) Database

[2] Source of IFR Jet Operations, Projected based on continued 0.58% compounded annual growth rate

♦ In 2015, Waukesha County undertook a major rehabilitation of Runway 10-28 that closed the runway from May – August 2015. As such, the recent 2015 TAF numbers are not reflective of typical operations and the 2014 TAF data was used.

Chart 2-1 Historic and Projected Operations by Type – Waukesha County Airport

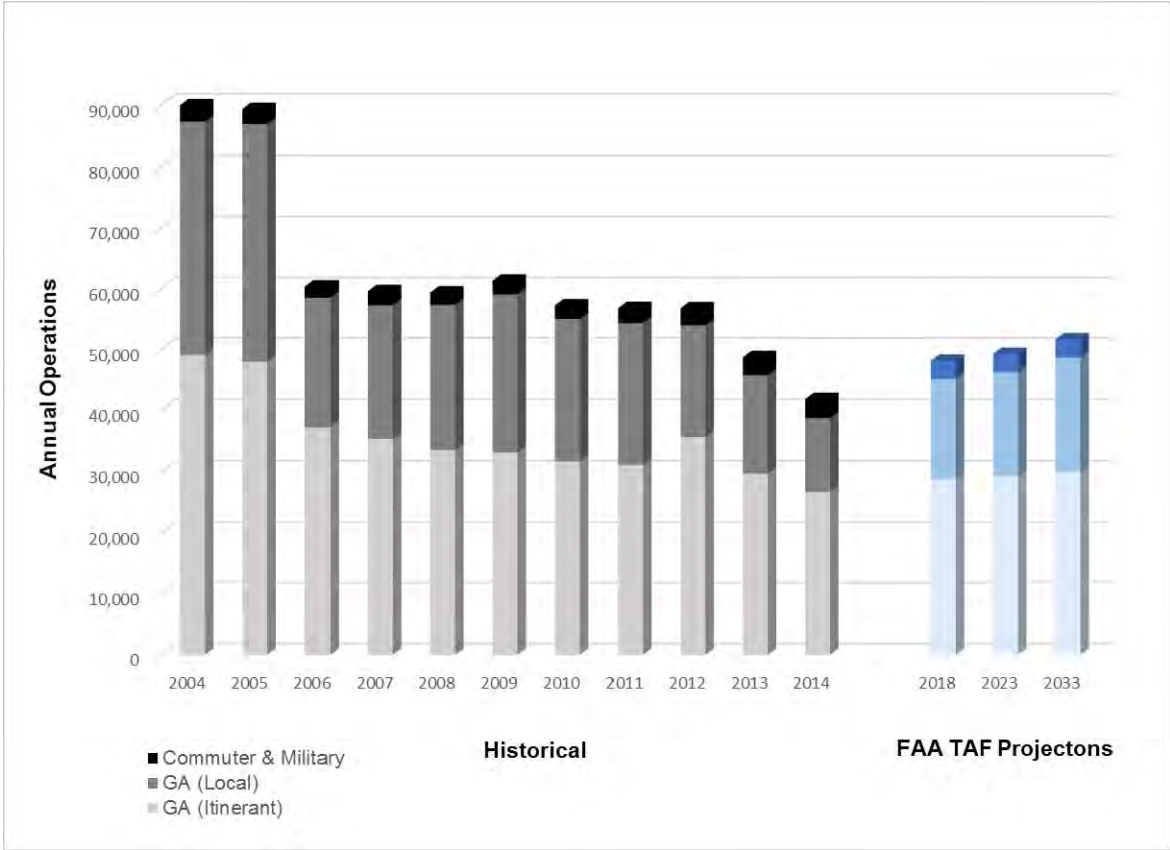
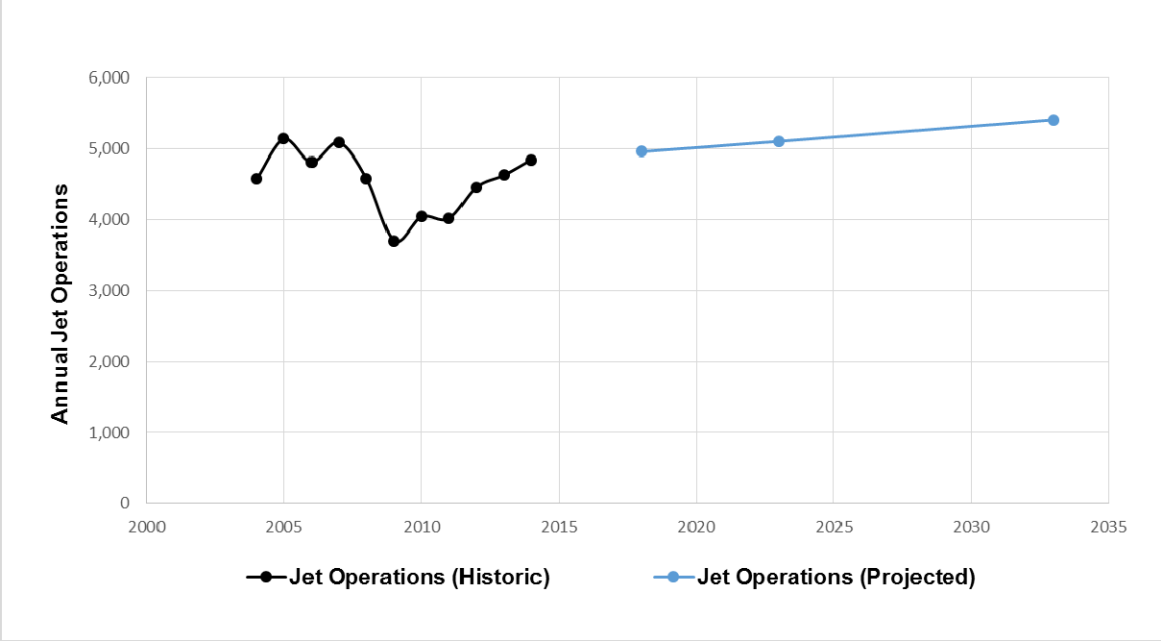


Chart 2-2 Historic and Projected Business Jet Operations – Waukesha County Airport



2.5 Anticipated Time Frame

Assuming a build alternative is selected as the preferred alternative, the following implementation timeframe is proposed.

- 2017: Complete EA
- 2017-2018: Project Design
- 2018-2020: Construction

2.6 Purpose and Need Summary

Waukesha County Airport is one of the busiest general aviation airports in Wisconsin, providing functions critical to community access, emergency preparedness and response. According to the FAA's Traffic Flow Management System Counts database, business jet operations at Waukesha County Airport are the highest of any non-commercial airport in the state. Historical data over the past decade shows a consistent numbers of these business jet operations, and forecasts project continued levels of activity.

Design standards have been set by the FAA for runway safety areas (RSAs) to enhance the safe operation of an airport. Currently, Runway 10-28 at Waukesha County Airport is in non-compliance with FAA standards for these safety areas that extend off both the ends and sides of this runway. The safety areas for Runway 10-28 are required to be 500' wide (centered on the runway centerline) and additionally extend 1,000' beyond the useable end of the runway pavement. The safety areas are to be clear, dry and smoothly graded areas capable of supporting the weight of snow removal equipment, aircraft rescue and firefighting equipment, and the passage of an aircraft without causing structural damage to the plane.

For the west (Runway 10) end, Silvernail Road cuts through a substantial portion of the safety area extending beyond this end of the runway. The presence of this roadway in combination with non-standard grading results in roughly half of the required safety area length (500 feet) being non-standard.

For the east (Runway 28) end, Pewaukee Road also cuts through a significant portion of the safety area. Roughly 310 feet of the required 1,000-foot length of safety area is non-standard as a result.

Along the sides of Runway 10-28, several areas of non-standard safety area exist. These include the presence of an abandoned parallel taxiway on the north, areas of non-standard grading where ground slopes exceed the maximums allowed, and the presence of storm sewer culverts and ditching.

Other related deficiencies associated with the Runway 10-28 safety areas have been identified. These include the need to relocate existing navigational instruments outside the runway safety areas and to construct new or relocated access roads to these facilities that will maintain ground vehicles outside the safety areas and object free areas of Runway 10-28.

A separate safety issue also exists on the primary taxi route to and from the Runway 10 end. The transition of parallel Taxiway A from a 400 to 575-foot offset from Runway 10-28 is abrupt and difficult for large jet aircraft to maneuver safely. Widened pavement transitions associated with these curves need to be brought into conformance with Taxiway Design Group 2 standards to provide the required margins of safety between the wheels and the edge of pavement.

3. Alternatives

The Council on Environmental Quality (CEQ) regulations provides specific direction on the consideration of the alternatives. Alternatives carried forward for detailed evaluation should be feasible and prudent and meet the proposed project objectives presented in Section 2, Purpose and Need. The alternatives developed during the environmental review should go through a test of reasonableness and practicability. The NEPA Implementing Instructions for Airport Projects, FAA Order 5050.4B, suggests that "a concise statement explaining why any initial planning alternatives have been eliminated from the study" also be included in the alternatives description.

To accomplish the CEQ directive, an analysis was performed on select alternatives. The analysis determined if an alternative met the stated purpose and need of the project.

Alternatives that met the stated purpose and need were then further evaluated in a second tier based on project criteria outlined within the following sections. Alternatives meeting both the purpose and need and project criteria were then further evaluated based on practicability and feasibility. The combination of alternatives from both ends of Runway 10-28 which met the stated purpose and need and project criteria most practicably and feasibly were selected for further comparison and analysis.

3.1 Project Criteria

In addition to meeting the purpose and need, for an alternative to be considered further, additional operational design criteria also had to be met as explained below.

3.1.1 Maintain existing runway length

The FAA's Advisory Circular AC 150/5325-4B "Runway Length Requirements for Airport Design" establishes guidelines for determining a runway length suitable for the operations of a particular airport. These include such factors as the aircraft type and payload, stage length, temperature, pavement slope, the frequency of wet and slippery conditions, and the airport elevation. Business jets are the critical aircraft at Waukesha County Airport (UES), and over twenty such aircraft are currently based there.

Table 3-1 provides a summary of the 2014 jet operations conducted at UES by individual aircraft type, ordered by annual operations. The users at UES were also surveyed in early 2014 to determine their operational needs and to determine if any runway length reduction could be part of the safety area solution. Based on the responses, it was determined that the existing 5,848 feet of runway length would need to remain for both takeoffs and landings in both directions. The FAA reviewed the number and type of aircraft operations conducted at UES, along with the user survey responses, and concurred with the need to maintain the existing runway length for Runway 10-28. The user survey, responses and FAA concurrence e-mail are provided in **Appendix C**.

Table 3-1 (2014)

Annual Jet Operations by Aircraft - Waukesha County Airport

Ops Rank	Aircraft Type	Approximate Runway Length Required at MTOW (ft): ISA Conditions (ISA)[1]	Standard Day (UES)[2]	Hot Day (UES-80°F)[3]	2014 Annual Total
1	C56X - Cessna Excel/XLS	3,560	3,907	4,422	632
2	BE40 - Raytheon/Beech Beechjet 400/T-1	4,290	4,684	5,300	473
3	CL30 - Bombardier (Canadair) Challenger 300	4,950	5,386	6,095	350
4	H25B - BAe HS 125/700-800/Hawker 800	5,030	5,471	6,191	295
5	C550 - Cessna Citation II/Bravo	3,600	3,950	4,470	219
6	C560 - Cessna Citation V/Ultra/Encore	3,490	3,833	4,337	219
7	C650 - Cessna III/VI/VII	5,150	5,598	6,336	213
8	C680 - Cessna Citation Sovereign	3,694	4,050	4,583	198
9	CL60 - Bombardier Challenger 600/601/604	5,699	6,182	6,997	198
10	GALX - IAI 1126 Galaxy/Gulfstream G200	6,083	6,591	7,459	178
11	LJ31 - Bombardier Learjet 31/A/B	4,972	5,409	6,121	175
12	GLF4 - Gulfstream IV/G400	5,450	5,918	6,697	169
13	LJ45 - Bombardier Learjet 45	4,350	4,747	5,373	146
14	LJ60 - Bombardier Learjet 60	5,450	5,918	6,697	128
15	F2TH - Dassault Falcon 2000	5,440	5,907	6,685	113
16	C525 - Cessna CitationJet/CJ1	3,280	3,609	4,084	109
17	F900 - Dassault Falcon 900	5,215	5,668	6,414	103
18	LJ35 - Bombardier Learjet 35/36	4,972	5,409	6,121	97
19	E55P - Embraer Phenom 300	3,260	3,588	4,060	82
20	C25B - Cessna Citation CJ3	3,450	3,790	4,289	77
21	C510 - Cessna Citation Mustang	3,260	3,588	4,060	77
22	E135 - Embraer ERJ 135/140/Legacy	5,500	5,971	6,757	73
23	GLF5 - Gulfstream V/G500	5,650	6,130	6,938	72
24	C750 - Cessna Citation X	5,140	5,588	6,324	71
25	C25A - Cessna Citation CJ2	3,420	3,758	4,253	65
	Subtotal:				4,532
26 - 56	All Others: *(Includes: BD-700 Global Express Jet, Learjets 24/25/40/55, Gulfstream G150)*				318
	Total				**4,850**

Source: 2014 Jet Operations downloaded from FAA's TFMSC report database

Notes:
- Existing Runway Length at Waukesha County Airport = 5,848 feet
- MTOW = Maximum Takeoff Weight
- Runway Length Requirements for Maximum Takeoff Weight are based on general aircraft performance data and are approximate. Consult aircraft user for specific operating procedures.

(1) ISA = International Standard Atmosphere (ISA Conditions = 59 deg, 0% gradient, Sea Level)

(2) Runway length requirements at UES adjusted for slope of Runway (0.35%) and elevation of Airport (911 MSL)
FAA **Elevation** Adjustment Factor: (.07 x (EL/1000) + 1) x Runway Length
FAA **Gradient** Adjustment Factor: Runway Length + (10 x (High El - Low EL))

(3) Runway length requirements for Hot Day conditions at UES
FAA **Temperature** Adjustment Factor: ((.005x(80 - (59-(3.566x(El/1000)))))x(Runway Length)) + Runway Length

3.1.2 Maximum Feasible Construction Cost

Within FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*, the FAA has provided guidance for determining the best financially feasible cost for implementing RSA improvements. This order uses a standard EMAS installation as a benchmark in the cost comparison of other alternatives. The term 'EMAS' stands for Engineered Material Arresting System, and consists of a series of cellular concrete blocks that are designed to fail or collapse under the weight of an aircraft, and safely bring the aircraft to a stop. These cellular blocks are laid together on a platform of asphalt off the end of the runway to form an arresting bed.

The EMAS Manufacturer, Zodiac Aerospace, was contacted in March of 2014 and preliminary design was completed to determine appropriate arresting bed lengths and costs for both ends of Runway 10-28. The preliminary EMAS designs were determined by modeling the fleet mix of business jets listed in **Table 3-1** with the slope of the runway and other factors. From the analysis completed by Zodiac Aerospace, the EMAS bed length off the east end of the runway would be 270 feet long. For the west end of the runway, two options were analyzed for both a standard and non-standard EMAS installation, with resulting EMAS bed lengths of 350 feet and 415 feet, respectively. The correspondence and information provide by Zodiac Aerospace is provided in **Appendix D**.

FAA's Order 5200.9 includes a chart which establishes a linear relationship between required standard EMAS bed lengths and the Maximum Feasible Cost (MFC) threshold for bringing a runway's safety areas into conformance. Using the guidance provided within FAA Order 5200.9, and the EMAS bed lengths provided by Zodiac Aerospace, the Maximum Feasible Cost (MFC) for Runway 10-28 comes to approximately $12 million (see graph from FAA Order 5200.9, provided in **Appendix D**). This maximum cost represents the overall construction improvement cost; (i.e. both ends and the sides of the runway safety area). The $12 million MFC will be used as the initial cost screening threshold for alternatives analyzed on practicability and feasibility. In accordance with FAA Order 5200.9, alternatives that meet the project criteria and stated purpose and need additionally need to be evaluated with a life cycle cost comparison to a standard EMAS installation. The life cycle cost comparison is then used in combination with a decision flow chart provided within FAA Order 5200.9 to aid in selecting a preferred alternative that meets the financial feasibility guidelines of the FAA.

Estimates of cost for the alternatives analyzed were developed by applying consistent unit prices for the various elements of airfield and roadway construction, navigational instrument relocations, property acquisition and wetland mitigation. All costs were developed in Year 2014 dollars for accurate comparison with the 2014 EMAS costs obtained from Zodiac Aerospace. A summary of the costs developed for each alternative and a life cycle analysis per the guidance in FAA Order 5200.9 are provided in **Appendix H**.

3.2 Alternative Formulation

The FAA provides guidance for developing alternatives for achieving RSA compliance in both FAA Order 5200.8 *Runway Safety Area Program* and FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems (EMAS).* Using the guidance provided within these documents, the following alternatives were developed and evaluated for each end of Runway 10-28 at the Waukesha County Airport:

No Build Alternatives

- Alternative 1 No Action for Runway 10 & 28 Safety Areas
- Alternative 2 Request Continuance of FAA Waiver for Runway 10 & 28 Safety Areas

Roadway Modification Alternatives

- Alternative 3 Close Silvernail Road and Pewaukee Road
- Alternative 4 Relocate Silvernail Road and Pewaukee Road
- Alternative 5 Tunnel Silvernail Road and Pewaukee Road

Airfield Modification Alternatives

- Alternative 6 Shift Runway 10-28 (East / West)
- Alternative 7 Shorten Runway 10 & 28
- Alternative 8 Establish Declared Distances for Runways 10 & 28
- Alternative 9 Install Engineered Material Arresting System (EMAS) at Runway 10 & 28
- Alternative 10 Add Pavement to Runways 10 & 28 and Establish Declared Distances

Combination Alternatives

- Alternative 11 Realign Silvernail Road, Extend Runway 10, Establish Declared Distances
- Alternative 12 Realign Silvernail Road, Install EMAS off Runway 28

Alternatives were formulated with an initial focus of bringing the *ends* of the runway safety areas into compliance, as they represent the greatest potential for surrounding impacts and the overall complexity and cost of the project.

The safety area improvements along the *sides* of the runway are straight forward corrections and are consistent for the range of alternatives identified above. The non-compliance of the side safety areas includes non-standard grading, insufficient storm sewer lengths, the presence of an abandoned parallel taxiway on the north side of the runway and a vehicular access road on the south side that fall within the RSA area. For all the side safety area deficiencies, only one practical and feasible build alternative exists for bringing these areas into compliance. The impacts associated with the runway “side” safety area improvements have been quantified and are included with each of the runway safety area alternatives evaluated.

3.3 Alternate Existing Airports and New Airport Construction

Other Build alternatives reviewed were alternate existing airport sites and a new construction site for the Waukesha County Airport. As categorized by the Wisconsin State Airport System Plan, the Waukesha County Airport is a large general aviation airport. The primary market area for the Airport is Waukesha County, and extends into the western portion of the Milwaukee metropolitan Area. The Airport has also served as a reliever airport to General Mitchell International Airport (GMIA) in Milwaukee since 1976.

3.3.1 Alternate Existing Airport Site Alternative

Figure 3-1 shows existing airports in proximity to the Waukesha County Airport. Drive times and distances from the Waukesha County Airport we evaluated. The area representing a thirty minute drive from the airport is highlighted on **Figure 3-1**. The Airport's existing location is within a half-hour drive of almost all of Waukesha County and also covers a portion of western Milwaukee County.

Alternate existing airports within a 30-minute drive of the Waukesha County Airport include the Capitol Drive Airport (02C) in Brookfield, and the Lawrence J. Timmerman Airport (MWC) in Milwaukee. Like Waukesha County, these airports are currently classified as relievers to GMIA. While just outside the 30-minute drive time, the East Troy Municipal Airport (57C) was also evaluated as it is a similar drive to GMIA with potential to also function as a reliever. Other surrounding airports were not evaluated as alternate sites as they were either too far from Waukesha County Airport or too far from GMIA to be able to function as a reliever.

Facilities of the alternate existing airports were compared to those of the Waukesha County Airport. Cost estimates to upgrade the infrastructure to equivalent size and service are summarized in **Table 3-2**.

Table 3-2

Cost Estimates for Replicating Waukesha County Airport Facilities at Alternate Existing Airports

Facility Inventory Evaluated	Capitol (02C)	Timmerman (MWC)	East Troy (57C)
Primary Runway:	$3,888,257	$85,152,630	$3,607,789
Crosswind Runway:	$2,574,707	$280,547	$2,608,577
Primary Taxiway:	$1,599,753	$822,425	$889,753
Crosswind Taxiway:	$1,344,000	$282,335	$1,344,000
Ramp Area:	$2,595,333	$189,500	$959,917
Auto Parking:	$94,600	$0	$47,300
Air Traffic Control Tower:	$2,931,245	$0	$2,931,245
Instrument Landing System (ILS):	$550,000	$350,000	$550,000
Weather Reporting:	$110,000	$0	$110,000
Approach Capability:	$2,465,200	$79,125,000	$4,895,200
Fueling Facilities:	$250,000	$0	$0
Hangars / Aircraft Storage:	$34,653,600	$27,794,700	$24,615,000
Land Management / Zoning:	$102,500	$0	$40,000
Total Infrastructure Costs:	**$53,159,196**	**$193,997,137**	**$42,598,781**

Sources: Facility Inventories and Unit Costs were obtained from the Wisconsin State Airport System Plan 2030

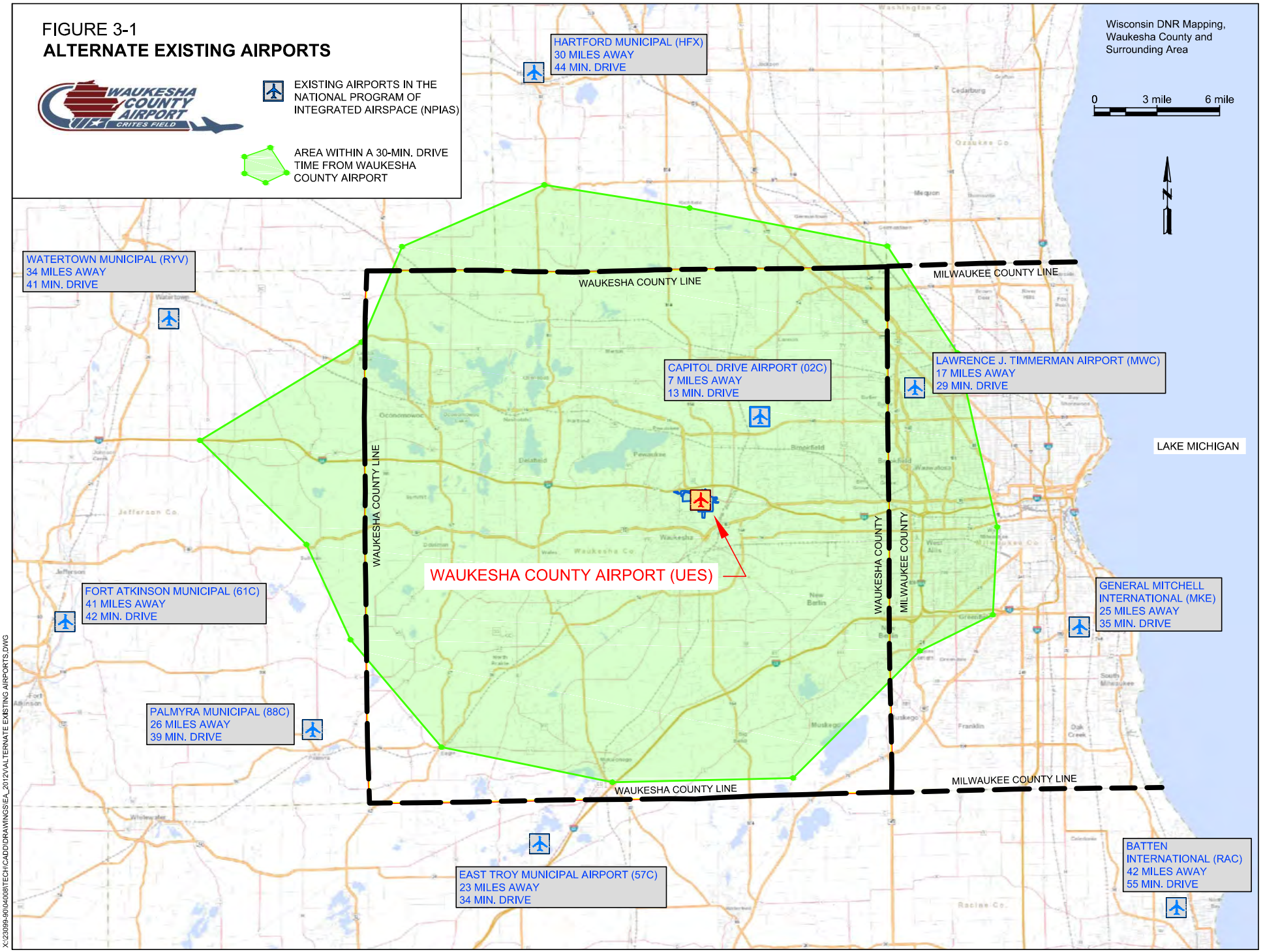
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FIGURE 3-1
ALTERNATE EXISTING AIRPORTS

WAUKESHA COUNTY AIRPORT CRITES FIELD

EXISTING AIRPORTS IN THE NATIONAL PROGRAM OF INTEGRATED AIRSPACE (NPIAS)

AREA WITHIN A 30-MIN. DRIVE TIME FROM WAUKESHA COUNTY AIRPORT



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The facility inventories and unit costs quantified in **Table 3-2** were obtained from the Wisconsin State Airport System Plan 2030[1]. More information on the individual differences and costs for the various infrastructure improvements required of each alternate airport site are detailed within the cost estimates provided in **Appendix H**.

The Waukesha County Airport has existing facilities to meet the demands of the users and is located in good proximity to the various businesses and operators in the region. The improvements needed to replicate these facilities at alternate existing airports is substantial and exceeds the maximum feasible cost. For Capitol Drive and East Troy Municipal Airport, improvements to every major component of these facilities would need to be addressed. The Lawrence J. Timmerman Airport has a greater amount of matching infrastructure, but is surrounded by roadways, numerous residences and parks that would need to be acquired or relocated in order to provide equivalent runway length and approach capability. In considering the extent of these infrastructure needs, and the associated relocations and costs, replicating the facilities of the Waukesha County Airport at the adjacent airports is not a practicable or feasible alternative to meet the purpose and need, and therefore has been removed from further consideration in this EA.

3.3.2 New Airport Construction Site Alternative

The option of a new construction site for the Airport was also reviewed. Waukesha County Airport comprises approximately 600 acres of land that is owned in fee. The Airport controls an additional 100 acres of property for protection of surrounding airspace through avigation easements and clear zone easements. Areas within a 10-mile radius of the Waukesha County Airport and within a 25-mile radius of General Mitchell International Airport were screened for open tracks of land that would be viable for construction of a similar 700-acre airport with equivalent facilities and approach capabilities.

Within these initial boundaries, regional land use mapping and planning data were then reviewed. The Southeast Wisconsin Regional Planning Commission (SEWRPC) has a Regional Land Use Plan for Southeastern Wisconsin[2]. This document provides information on the boundaries of wetlands and woodlands, surface waters, natural areas, critical species habitat, primary and secondary environmental corridors, and areas to be considered for preservation for agricultural and open space uses. The size and number of each of these areas within Waukesha County are extensive and when considered together, little open space remains outside of already urbanized and residential areas.

Based on review of the SEWRPC data, the development of a new site to replace the function of the Waukesha County Airport would require impacts to one or more of the environmental resource areas identified, and require substantial land acquisition and relocation of homes and roadways. Site preparation and construction of new facilities would take years to accomplish. Closing of the existing airport means a loss of public and private investment, putting a potential substantial burden on the existing tenants who would need to relocate to the new airport. The cost of this alternative would far exceed the maximum feasible cost, is not practicable and feasible, and would not meet the stated purpose and need. Therefore, this alternative has been removed from further consideration in this EA.

[1] http://wisconsindot.gov/Pages/projects/multimodal/sasp/default.aspx

[2] http://www.sewrpc.org/SEWRPCFiles/Publications/pr/pr-048_regional_land_use_plan_for_se_wi_2035.pdf

3.4 No Build Alternatives

3.4.1 Alternative 1 - No Action Alternative

This alternative considers taking no action for improving the safety areas on Runway 10-28. **Figure 3-2**, depicts the existing conditions of Runway 10-28 and the associated safety area deficiencies. In this alternative, the Airport would maintain its current airfield layout, including the non-standard runway safety areas off the ends and sides of Runway 10-28.

FAA Order 5200.8, Runway Safety Area Program, requires that "whenever a project for a runway involves construction, reconstruction (includes overlays), or significant expansion, the project shall also provide for improving the RSA". No action at either end of the runway would jeopardize federal funding of future maintenance or improvement projects on Runway 10-28, as safety area issues would eventually have to be addressed in the next project proposed for the runway. While the no action alternatives do not meet the purpose and need for this project, they do serve as a baseline for a comparison of impacts related to the Build Alternatives retained for analysis.

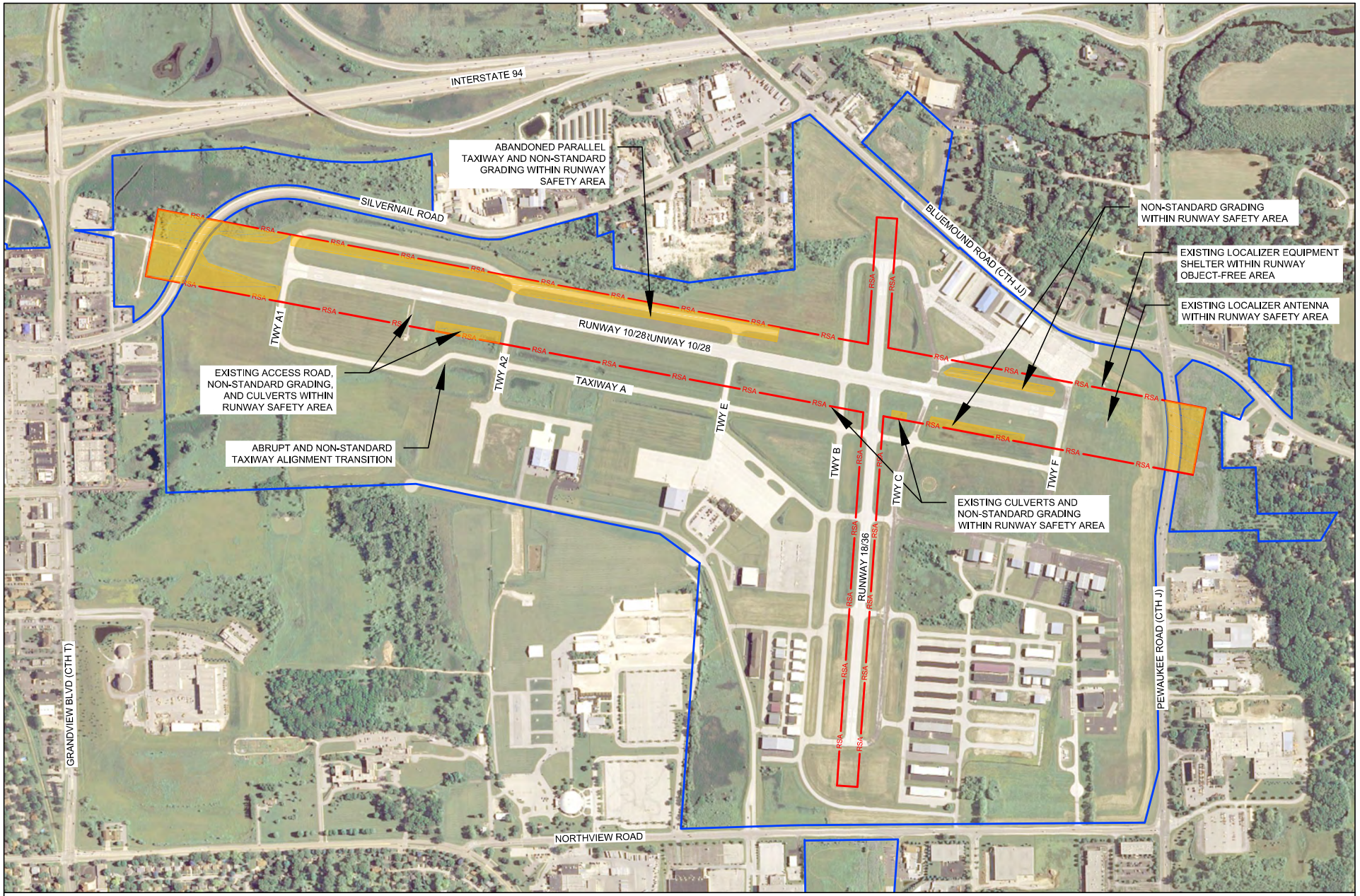
3.4.2 Alternative 2 - Request Continuances of FAA Waivers

This alternative considers requesting a continuance of current waivers for non-standard runway safety areas on Runway 10-28 from the FAA. The current FAA waivers allowing the non-standard runway safety areas on Runway 10-28 have been in place since November 29, 1993, and are noted on the second sheet of the Airport's Airport Layout Plan (ALP) provided in **Appendix A**.

Unlike the No Action Alternative, future projects for maintenance or improvement of Runway 10-28 would not necessarily require improvement of the runway safety areas as long as the waivers were in effect. There would be no construction costs involved in having the FAA grant continuances of the waivers for the non-standard safety areas on Runway 10-28. Likewise, no environmental impacts would occur as no changes to existing conditions would occur and airport operations would be unaffected by these alternatives. Existing conditions are illustrated in **Figure 3-2**.

In December of 2004, the Waukesha County Executive submitted a written request to the FAA for an indefinite continuation of the runway safety area waivers on both ends of Runway 10-28. In February of 2005, the FAA responded with a letter that indicated that RSA standards cannot be modified or waived like other airport design standards. In their letter, the FAA further states that "a continuous evaluation of all practicable alternatives for improving each sub-standard RSA is required until it meets all standards for grade, compaction, and object frangibility." These letters are provided within **Appendix B**. The FAA has indicated that a practicable solution for bringing the safety areas into compliance is feasible at Waukesha County Airport. Therefore, this alternative has been removed from further consideration in this EA.

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AIRPORT PROPERTY LIMIT
RUNWAY SAFETY AREA
NON STANDARD RSA

Orthophotograph - 2010 NAIP, Waukesha County

FIGURE 3-2
NO ACTION

WAUKESHA COUNTY AIRPORT CRITES FIELD

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3.5 Roadway Modification Alternatives

Alternatives for closing, relocating, or tunneling the adjacent roadways were evaluated and discussed in coordination meetings held with the City of Waukesha, County of Waukesha, and representatives of the WisDOT Southeast Region. Minutes from these meetings are provided in **Appendix E**. Exhibits and cost estimates for these road modification alternatives are included with the full range of build alternatives provided in **Appendix F** and **Appendix H**.

The two roads that bound Runway 10-28 are Silvernail Road to the west and Pewaukee Road to the east. These two roads are the only roads that could be modified to bring the Runway 10-28 safety areas into compliance. Silvernail Road is under the jurisdiction of the City of Waukesha and is classified as a minor arterial roadway by the Wisconsin Department of Transportation and the Federal Highway Administration. Silvernail Road is a two-lane east-west roadway with an annual average daily traffic volume of 6,600. Pewaukee Road (County Trunk Highway J) is under the jurisdiction of Waukesha County and is classified as a principal arterial roadway by the Wisconsin Department of Transportation and the Federal Highway Administration. Pewaukee Road is a four-lane north-south roadway with an annual average daily traffic volume over 17,000. In meetings with the City, County and Wisconsin DOT it was discussed that these roadways serve many functions and provide many benefits.

The State DOT noted that Silvernail Road functions as an alternate route for Interstate I-94 traffic in the event of a freeway incident in the area. The County stated that Silvernail Road provides a northerly option for area traffic to negotiate around the Airport that would otherwise be diverted and concentrated to the south and onto other County roadways that are already heavily utilized. Planners at the City noted that Silvernail Road provides valued access to the businesses located along this roadway. The City explained that several of the businesses north of the Airport are involved with the sale and service of semi-trucks and trailers, and Silvernail provides a convenient access to/from the neighboring interstate.

County Trunk Highway J (Pewaukee Road) provides regional connectivity between Interstate I-94 and downtown Waukesha to the south. It also serves as a principal connection between Waukesha and the City of Pewaukee and Village of Sussex to the north.

3.5.1 Alternative 3 - Close Silvernail Road and Pewaukee Road

Based on the feedback received from the meetings with the City, County and Wisconsin DOT (**Appendix E**) alternatives for the closure of these roadways were dismissed from further consideration given their heavy use, the benefits they provide to the overall accessibility and connectivity of the area, and the regional socioeconomic effects associated with their closure.

3.5.2 Alternative 4 - Relocate Silvernail Road and Pewaukee Road

Relocate Silvernail Road

In meetings with the City, County and Wisconsin DOT, a realignment of Silvernail Road was determined to be a feasible alternative and was analyzed in coordination with the City of Waukesha, who has jurisdiction over this portion of the road (see meeting minutes provided in **Appendix E**). Several options were developed for how Silvernail Road could be realigned to maintain access to the existing businesses, both with and without a round-a-bout. Initial concept drawings were presented to the City in February of

2014 and refined in March of 2014. A meeting between the City and County of Waukesha was held on April 7th, 2014 where it was determined that the City preferred a realignment of Silvernail Road that did not include a round-a-bout. Incorporating these and other comments provided by the City, a conceptual realignment for Silvernail Road was developed (**Figure 3-3**).

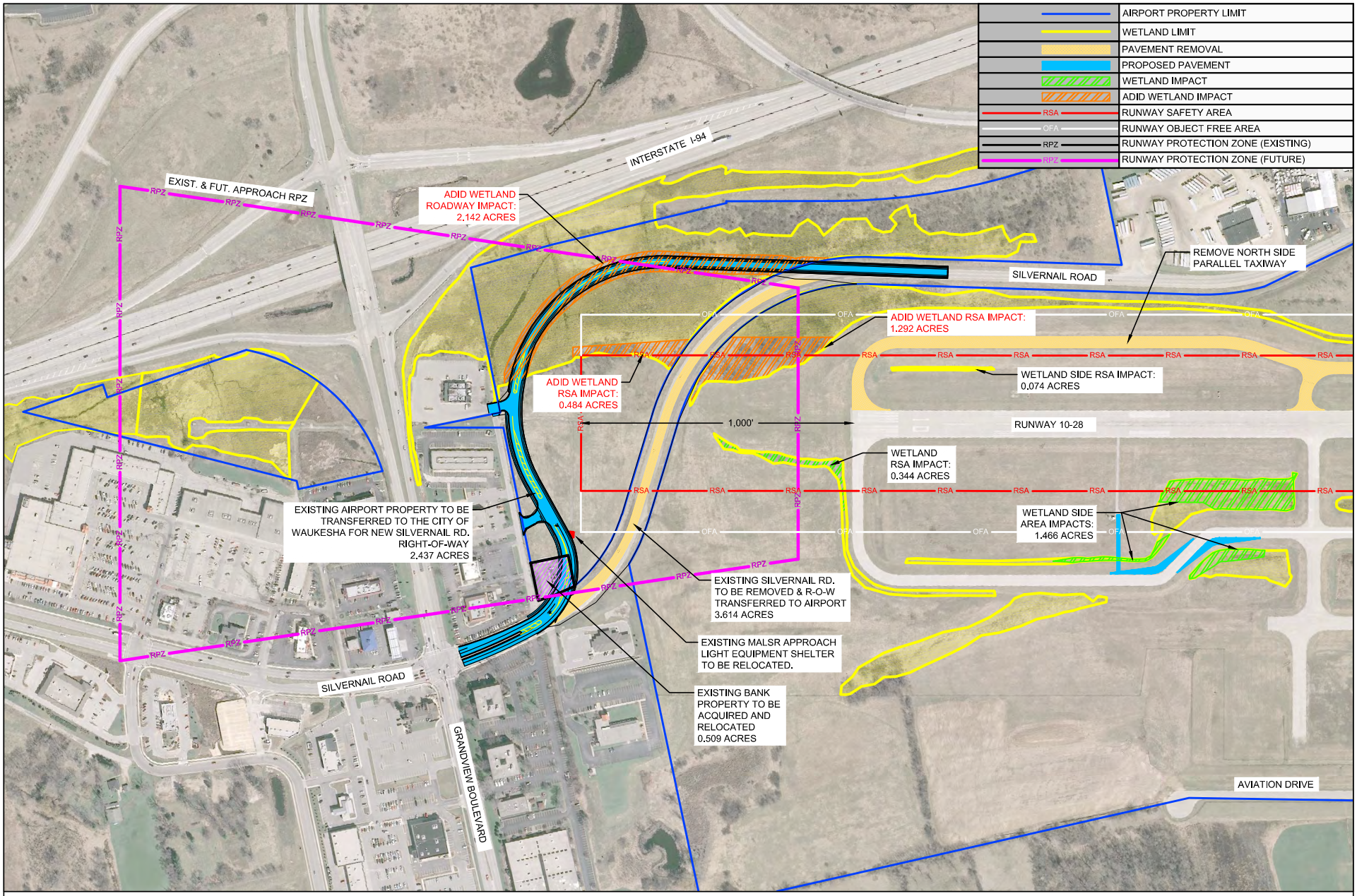
As illustrated on **Figure 3-3**, the realigned Silvernail Road concept will require the acquisition and relocation of one bank business property (0.509 acres), and will additionally require the transfer of ownership between County-owned airport land and City-owned right-of-way to accommodate the new road alignment and the expanded runway safety area off Runway 10. The realigned roadway will require the equipment shelter for the MALSR approach lights to Runway 10 to be relocated and sufficiently setback from the realigned Silvernail Road right-of-way. The design speed of the smaller curve closest to Grandview Boulevard would be 30 mph and that of the larger curve would be 40 mph. The 40 mph curve segment will impact 2.142 acres of wetlands that have been given a higher value designation through a wetland identification project. The Advance Identification of Wetland Disposal Areas (ADID), are wetlands mapped as part of a project initiated by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) to identify high-value wetlands inappropriate for the disposal of fill and dredged materials. It is not likely that the area of the removed roadway could be used to mitigate this impact since the FAA typically does not allow on-site wetland mitigation because of the potential increase in wildlife hazards that are created. The grading of a traditional 1,000 feet long by 500 feet wide safety area off the end of Runway 10 will impact an additional 1.776 acres of ADID wetlands and 0.344 acres of non-ADID ditch wetlands. The side safety area improvements would impact an additional 1.717 acres of non-ADID wetlands. The total wetland impact associated with the realignment of Silvernail Road, the Runway 10 RSA grading and side area improvements is 5.979 acres.

The estimated cost for a relocated Silvernail Road alternative is $5.15 million, and includes property acquisition, relocation costs and the grading for a traditional RSA off the end of Runway 10. Relocating Silvernail Road would not be a standalone alternative that meets the purpose and need as it does not address the non-standard safety area off the east (Runway 28) end for takeoff and landings to the east. However, the relocation of Silvernail Road was determined to be a practicable and feasible alternative and was carried forward for further evaluation in combination with other improvements as presented in Section 3.7.

Relocate Pewaukee Road

The extent to which Pewaukee Road would need to be realigned in order to provide a full 500’ wide by 1,000’ long safety area off the end of Runway 28 is substantial. This alternative would also require the realignment of nearby Bluemound Road and the relocation and reconfiguration of the intersection between these two roadways. These changes would require relocation of at least one business and four residences as well modifications to access points of several other businesses and land acquisition for the highway right-of-way (ROW). The costs associated with realigning Pewaukee Road are estimated at $16.35 million, which by itself exceeds the Maximum Feasible Cost for the overall solution without addressing the remaining deficient safety areas on the west end and sides of the runway. Given the cost and the expanse of impact to surrounding property and infrastructure, a realignment of Pewaukee Road was dismissed from further consideration.

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-3 SILVERNAIL ROAD REALIGNMENT.DWG



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Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**5.979 ACRES**

FIGURE 3-3
SILVERNAIL ROAD RELOCATION (ALTERNATIVE 4)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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3.5.3 Alternative 5 - Tunnel Silvernail Road and Pewaukee Road

These alternatives involve constructing tunnel structures for Silvernail Road and Pewaukee Road off each end of Runway 10-28, and grading the areas above to provide standard safety areas. High ground water elevations in the area raised constructability concerns and would require these structures to have substantial de-watering infrastructure. The estimated cost of the westerly tunnel of Silvernail Road is $12.44 million, and the estimated cost of the easterly tunnel of Pewaukee Road is $25.45 million. Neither the east or west tunnel would provide a standalone alternative that would meet the purpose and need as each would only address the safety area off each respective end. The tunnel alternatives were dismissed as they both individually exceeded the MFC, and more constructible / traditional alternatives for meeting the stated purpose and need were feasible.

3.6 Airfield Modification Alternatives

Alternatives for modifying the airfield environment to provide standard runway safety areas off both ends of Runway 10-28 were evaluated. Surrounding land uses make relocation or realignment of Runway 10-28 ineffective methods for improving the safety areas as they would only displace the problem and result in greater impacts than other alternative solutions. The airfield modifications developed for analysis include alternatives for shifting the runway, shortening the runway, incorporating declared distances and the installation of engineered material arresting systems (EMAS). These alternatives are presented and described in greater detail within the following sections. Exhibits and cost estimates for these alternatives are included with the full range of build alternatives provided in **Appendix F** and **Appendix H**.

3.6.1 Alternative 6 - Shift Runway 10-28 (East / West)

These alternatives considered maintaining the current 5,848-foot runway length while shifting the runway east or west by a distance long enough to provide standard safety areas at both ends of the runway. Given the existing configuration of the roadways, Runway 10-28 would need to shift by 490-feet to the east, or by 375-feet to the west. This degree of shift could only be accomplished by constructing a tunnel for either road, as the required extent of realignment would be infeasible and closure of either road was dismissed based on conversations with the City and County of Waukesha and the Wisconsin DOT. Both the Pewaukee Road and Silvernail Road tunnel alternatives were dismissed for cost and constructability reasons outlined in Section 3.5.3, and alternatives for shifting Runway 10-28 were likewise dismissed. While a full shift of Runway 10-28 to the east or west is not a practicable or feasible alternative, the possibility of lesser shifts in the runway were carried forward for evaluation as part of combination alternatives analyzed in Section 3.7.

3.6.2 Alternative 7 - Shorten Runway 10 & 28

These alternatives require the removal of existing runway pavement and changes to the existing taxiway to reduce the length of Runway 10-28 as a means to address the safety area issues at either end. As described in Section 3.1, this alternative does not meet the project criteria for maintaining existing runway length. The users at UES were surveyed in early 2014 to determine their operational needs and to determine if any runway length reduction could be part of the safety areas solution. Based on the responses, it was determined that the existing 5,848 feet of runway length would need to remain for both takeoffs and landings in both directions. The FAA reviewed the number and type of aircraft operations conducted at UES, along with the user survey responses, and concurred with the need to maintain the

existing runway length for Runway 10-28. (See **Appendix C** for User Survey and FAA correspondence, **Table 3-1** provides a summary of critical business jet operations conducted at the Airport in 2014).

Waukesha County Airport serves as a reliever airport for General Mitchell International Airport and reducing the length of Runway 10-28 would have an effect on the Airport's ability to serve this role. A reduction in runway length does not meet the project criteria as stated in Section 3.1, and this alternative was dismissed from further evaluation.

3.6.3 Alternative 8 - Establish Declared Distances for Runways 10 & 28

Establishing declared distances on a runway involves the displacement of a runway landing threshold or the defined ending of the runway; effectively reducing the usable length of pavement by an amount necessary to provide the required safety area length. While no pavement removal is required, pavement markings have to be adjusted as well as airfield lighting and navigational aids to match the new configuration.

As with shortening the runway, the use of declared distances on Runway 10-28 would also have impacts to airport users. Declared distances affect the length of runway available for aircraft departing from either end of the runway, and for aircraft landing to displaced threshold locations. The loss of useable runway length is less than that of the runway shortening alternatives as aircraft taking off from the end of the runway with the displaced threshold may use the remaining pavement in advance of the threshold in their computations for takeoff. The Airport users were surveyed in early 2014 to determine if any reduction in runway takeoff or landing length could be accommodated to bring the safety areas into compliance. The survey and responses from the users, and FAA concurrence on maintaining existing runway length are provided in **Appendix C**. The users identified that reduced runway lengths will result in a greater number of weight-restricted takeoff operations during hot days in the summer and weight-restricted landing operations for adequate braking distance when the pavement is wet or icy in the winter. Reduced runway length and restricted fuel loads result in the need for diversions to other airports and intermediate fuel stops which create a financial and operational burden to the users.

Paragraph 322 of the FAA's Airport Design Advisor Circular, 150/5300-13A defines the declared distances for each runway end into four distinct categories:

1. Takeoff Run Available (TORA): The length of the runway declared available for satisfying takeoff run requirements.

2. Takeoff Distance Available (TODA): The TORA plus the length of any remaining runway or clearway beyond the departure end of the TORA available for satisfying takeoff distance requirements. Obstacles in the departure area control the TODA length.

3. Accelerate-Stop Distance Available (ASDA): The length of runway declared available and suitable for the accelerate-stop distance requirements for a rejected takeoff.

4. Landing Distance Available (LDA): The length of runway declared available and suitable for satisfying landing distance requirements.

Of the four distances, only the ASDA and LDA consider the required 1,000' long by 500' wide safety area requirement. The TORA and TODA are determined by the individual aircraft operator based on the presence of existing obstructions within the departure airspace and the performance of their particular aircraft. For the purposes of this EA, this section will be focused on the resulting ASDA and LDA declared distances as they represent the controlling lengths of defined usable pavement based on providing a standard RSA length.

It should be noted that the required dimensions for safety areas ahead of, or prior to, landing thresholds is only 600' long by 500' wide as opposed to the safety areas required off the ends of runways for landing overruns or aborted takeoffs, which is the standard 1,000' long by 500' feet wide dimension as previously described. This is an important distinction to note when establishing the stopping and starting points of useable runway length, i.e. the resulting "declared distances".

Runway 10 Declared Distances

For operations to and from Runway 10, establishing declared distances would involve displacing the threshold of Runway 10 by 150 feet to the east in order to provide a standard 600-foot long by 500-foot wide safety area ahead of the Runway 10 landing threshold. Additionally, 400 feet of useable runway would be subtracted from the east (Runway 28) end of the runway in order to provide the required 1,000-foot safety area length beyond the useable pavement for takeoffs and landings to the east. For takeoff operations to the east, (from the Runway 10 end), the resulting useable runway length would be 5,448 feet. For landing operations to the east, (starting from the proposed 150' displaced threshold for Runway 10), the resulting useable runway length would be 5,298 feet. The establishment of these declared distances would not require any modifications to Silvernail Road, but would require relocation of the approach lights to Runway 10 as well as adjustments in pavement marking. The resulting useable runway lengths (declared distances) for aircraft operating to/from Runway 10 is shown in **Table 3-3**.

Table 3-3. Declared Distances – Runway 10 (Alternative 8)

Takeoff – Accelerate-stop distance available (ASDA) – feet	5,448
Landing – Landing distance available (LDA) – feet	5,298

Runway 28 Declared Distances

The Runway 28 end currently has sufficient safety area length in advance of the threshold for landings (600' long by 500 feet wide), and no displacement of the Runway 28 threshold is required. Establishing declared distances would involve subtracting 550 feet of useable pavement from the west (Runway 10) end of the runway in order to provide the required 1,000-foot safety area length beyond the useable runway pavement for takeoffs and landings to the west. These modifications would not require closure, realignment, or tunneling of Pewaukee Road and would not require any modifications to runway pavement or lighting. The existing localizer antenna is currently within the Runway 28 safety area, and would need to be relocated. The resulting useable runway lengths (declared distances) for aircraft operation to/from Runway 28 is shown in **Table 3-4**.

Table 3-4. Declared Distances – Runway 28 (Alternative 8)

Takeoff – Accelerate-stop distance available (ASDA) – feet	5,298
Landing – Landing distance available (LDA) – feet	5,298

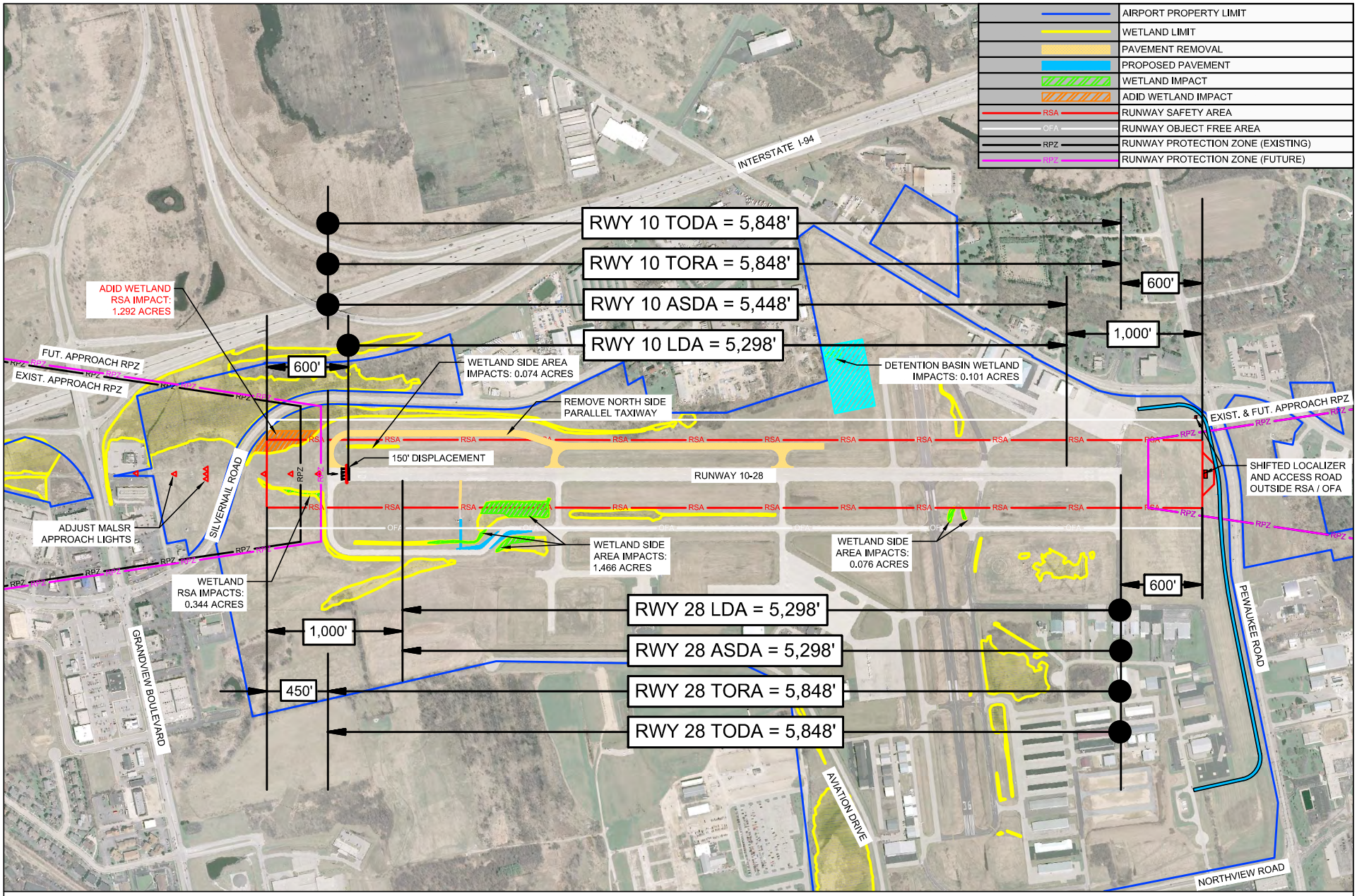
An exhibit illustrating the resulting useable pavement lengths (declared distances) for both directions of operation on Runway 10-28 is provided in **Figure 3-4**.

Declared distances reduce the loss in useable runway length when compared to runway shortening alternatives, however these losses would still adversely affect the users.

The users at UES were surveyed in early 2014 to determine their operational needs and to determine if any runway length reduction could be part of the safety areas solution. Based on the responses, it was determined that the existing 5,848 feet of runway length would need to remain for both takeoffs and landings in both directions. The FAA reviewed the number and type of aircraft operations conducted at UES, along with the user survey responses, and concurred with the need to maintain the existing runway length for Runway 10-28. (See **Appendix C** for User Survey and FAA correspondence, **Table 3-1** provides a summary of critical business jet operations conducted at the Airport in 2014).

As the resulting declared distances alternative by itself results in reductions to the existing 5,484 feet of useable runway length, it does not meet the project criteria and was dismissed. However, the declared distance concept was carried forward for evaluation in combination with other improvements as part of alternatives analyzed in Section 3.7.

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-4 DECLARED DISTANCES EXHIBIT.DWG



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Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
SIDE RSA WETLAND IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**3.353 ACRES**

FIGURE 3-4
DECLARED DISTANCES (ALTERNATIVE 8)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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3.6.4 Alternative 9 - Install Engineered Material Arresting System (EMAS) off Runway 10 & 28

These alternatives look at the use of installing an FAA-approved arresting system at either end of Runway 10-28. The term 'EMAS' stands for Engineered Material Arresting System, and consists of a series of cellular concrete blocks that are designed to fail or collapse under the weight of an aircraft, and safely bring the aircraft to a stop. These cellular blocks are laid together on a platform of asphalt off the end of the runway to form an arresting bed. EMAS provides a means of protecting an aircraft in the event of an overrun in a shorter distance than a typical turf runway safety area. As a result, the size of the runway safety area required can be smaller (600 feet in length, versus the standard 1,000 feet of turf area) and have less impact. A standard EMAS installation is designed to arrest the design critical fleet of aircraft at speeds as high as 70 knots.

While EMAS can be a relatively low cost alternative to implement with fewer environmental concerns for improving runway safety areas, an EMAS installation requires frequent inspection and regular maintenance to ensure that it performs properly, especially in cold winter climates where the purchase and use of low-impact snow removal equipment is required. Per FAA Order 5200.9, EMAS requires replacement every ten years, hence the consideration of life cycle cost in its evaluation. EMAS maintenance additionally needs to be accounted for in its evaluation as a feasible alternative.

Runway 10 EMAS

An illustration of a Runway 10 EMAS is provided on **Figure 3-5**. Through preliminary design and coordination with the EMAS manufacturer, Zodiac Aerospace, the EMAS arresting bed for this runway end would be 350 feet long by 110 feet wide, and setback from the runway threshold by 250 feet. The area between the threshold and the EMAS bed would be paved with an asphalt lead-in ramp. Given the proximity of Silvernail Road, the Runway 10 threshold would need to shift by 150 feet east in order to provide a full 600-foot long safety area in front of the landing threshold. This 150-foot shift would result in the same distance being reduced from the length available for landings on Runway 10 and these approach procedures would need to be adjusted accordingly. The existing threshold crossing height is sufficiently high so that existing navigational instruments (glideslope antenna and PAPI) can remain in their current location and maintain a crossing height within standards for the aircraft at Waukesha. The approach lights would need to be re-spaced in a manner consistent with FAA tolerances, with the threshold portion of the approach lights to be replaced and installed as in-pavement fixtures. The area east of Silvernail Road would still need to be graded to standard safety area requirements, with an overall wetland impact of 3.35 acres, of which 1.292 acres are advanced identification of disposal area (ADID) wetlands. The estimated cost for a Runway 10 EMAS installation is $7.21 million and includes the EMAS bed as well as site preparation and supporting pavements. This cost also includes the approach light modifications, re-marking of the runway, and half the side safety area improvements.

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AIRPORT PROPERTY LIMIT
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT
ADID WETLAND IMPACT
RSA — RUNWAY SAFETY AREA
OFA — RUNWAY OBJECT FREE AREA
RPZ — RUNWAY PROTECTION ZONE (EXISTING)
RPZ — RUNWAY PROTECTION ZONE (FUTURE)

RWY 10 TODA = 5,698'
RWY 10 TORA = 5,698'
RWY 10 ASDA = 5,698'
RWY 10 LDA = 5,698'
600'
150'
INTERSTATE I-94
FUTURE APPROACH RPZ
EXISTING APPROACH RPZ
NON-STANDARD OFA INTO SILVERNAIL ROAD.
ADID WETLAND RSA IMPACT: 1.292 ACRES
250' ASPHALT LEAD-IN TO EMAS
REMOVE EXIST. PARALLEL TAXIWAY
WETLAND SIDE AREA IMPACTS: 0.074 ACRES
EMAS
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 5,698' (PROPOSED)
150' THRESHOLD & TAXIWAY DISPLACEMENT
350'x110' EMAS BED
RELOCATED MALSR APPROACH LIGHTS
EXISTING SILVERNAIL ROAD
CTH T - GRANDVIEW BLVD
TAXIWAY A
WETLAND RSA IMPACTS: 0.344 ACRES
WETLAND SIDE AREA IMPACTS: 1.466 ACRES
150'
RWY 28 LDA = 5,698'
RWY 28 ASDA = 5,698'
RWY 28 TORA = 5,698'
RWY 28 TODA = 5,698'
450'
600'

BLUEMOUND ROAD
330' ASPHALT LEAD-IN TO EMAS
EMAS
EXIST. & FUTURE APPROACH RPZ
SHIFTED LOCALIZER, AND ACCESS ROAD OUTSIDE RSA / OFA
270' X 110' EMAS BED
TAXIWAY A
600'
CTH J - PEWAUKEE ROAD
FUEL FARM

0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
SIDE RSA WETLAND IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**3.353 ACRES**

FIGURE 3-5
EMAS INSTALLATIONS (ALTERNATIVE 9)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04068\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-5 EMAS ALTERNATIVE 9.DWG

A standard EMAS installation for Runway 10 requires a loss in runway length that does not meet the project criteria. While a standard runway safety area would be provided, Silvernail Road would remain within a portion of the Object Free Area (OFA) for Runway 10-28. The OFA is an 800' wide area centered on the runway and would also extend 600' beyond the useable pavement. Objects non-essential for air navigation or aircraft ground maneuvering purposes must not be located in the Runway OFA. Greater shifts in the Runway 10 threshold could be implemented to accommodate the full OFA, but this would result in greater runway length reductions. For these reasons, a Runway 10 EMAS alternative was dismissed from further consideration.

Runway 28 EMAS

An illustration of a Runway 28 EMAS is provided on **Figure 3-5**. Through preliminary design and coordination with the EMAS manufacturer, Zodiac Aerospace, the EMAS arresting bed for this runway end would be 270 feet long by 110 feet wide, and setback from the runway threshold by 330 feet. The area between the threshold and the EMAS bed would be paved with an asphalt lead-in ramp. The installation of the EMAS in this configuration would result in a sufficiently developed safety area without requiring the full 1,000-foot length. This installation would fit within the existing site conditions and would not require any reduction of the runway length or modifications to Pewaukee Road. The grade of the safety area would be relatively flat, with little or no change from existing conditions. The Runway 10 localizer would need to be moved east and outside the footprint of the EMAS bed and lead-in ramp.

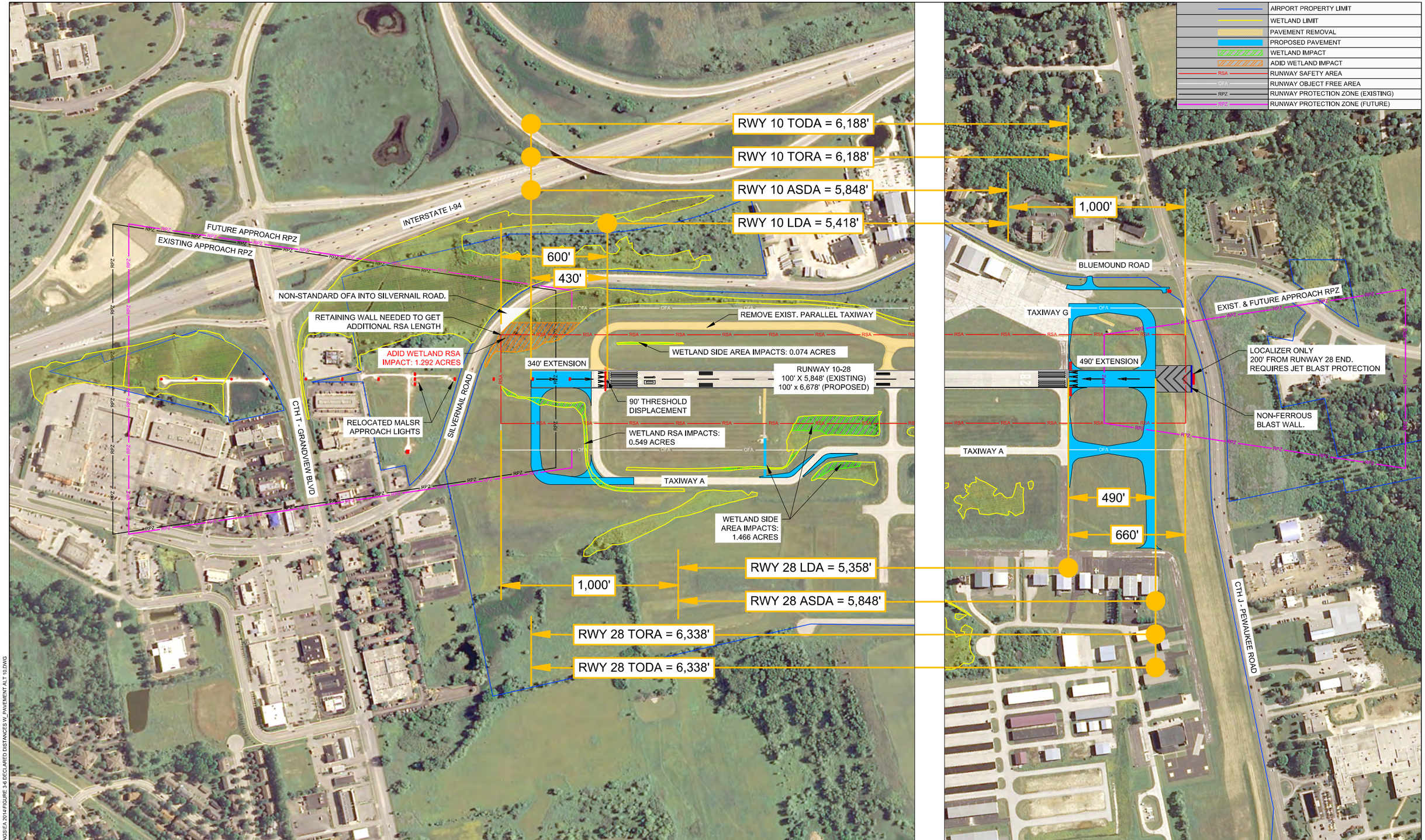
The estimated cost for this alternative is $7.51 million and includes the EMAS bed as well as site preparation such as grading, drainage, the asphalt supporting pavements, relocation of the Runway 10 localizer, and half the side safety area improvements. Wetland impacts are 0.18 acres for the side safety area improvements on the east which include culvert extensions and north side detention basin. The wetlands impacted are not advanced identification of disposal area (ADID) wetlands.

A Runway 28 EMAS installation was determined to be a practicable and feasible alternative and was carried forward for further evaluation as part of combination alternatives evaluated in Section 3.7.

3.6.5 Alternative 10 - Add Pavement to Runways 10 & 28 and Establish Declared Distances

A concept for incorporating declared distances with added pavement on either end of Runway 10-28 was suggested by the FAA in 2005. It was during this time that the FAA was reducing the standards for the RSA length required prior to a landing threshold from 1,000 feet to 600 feet, which made this alternative possible. This alternative maintains takeoff length in both directions, but would require substantial reductions to landing length, as detailed on **Figure 3-6**. The Airport users have been surveyed and have responded that a 430 to 490-foot loss in landing length would represent a serious impact to their operations as detailed in **Appendix C**. While this alternative does not meet the project criteria for maintaining the existing runway length, the use of declared distances was carried forward for further evaluation with other combination alternatives analyzed in Section 3.7.

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Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.549 ACRES
SIDE RSA WETLAND IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**3.558 ACRES**

FIGURE 3-6

DECLARED DISTANCES WITH PAVEMENT (ALTERNATIVE 10)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-6 DECLARED DISTANCES W_PAVEMENT ALT 10.DWG

3.7 Combination Alternatives

From the initial alternatives developed and analyzed within Section 3.6, it was determined that a realignment of Silvernail Road was a feasible and practicable alternative for providing a standard safety area off the west (Runway 10) end, and that a standard EMAS installation was a practicable and feasible alternative for providing a standard safety area off the east (Runway 28) end.

Of the alternatives analyzed in the previous sections, the Silvernail Road realignment was the only practicable and feasible alternative that would provide the minimum distance required for fully compliant runway safety areas (RSAs), while maintaining the existing runway length. This length is 7,448 feet and is based on the existing runway length (5,848 feet) plus 600 feet of RSA needed prior to a landing threshold, and 1,000 feet of safety area needed beyond takeoffs and landings as illustrated below:

1,000' (Beyond Runway End)	+	5,848' (Along Existing Runway)	+	600' (Prior to Threshold)	=	7,448' (Overall RSA Length)

Figure 3-7 illustrates how the 7,448 feet of safety area is provided with a realigned Silvernail Road.

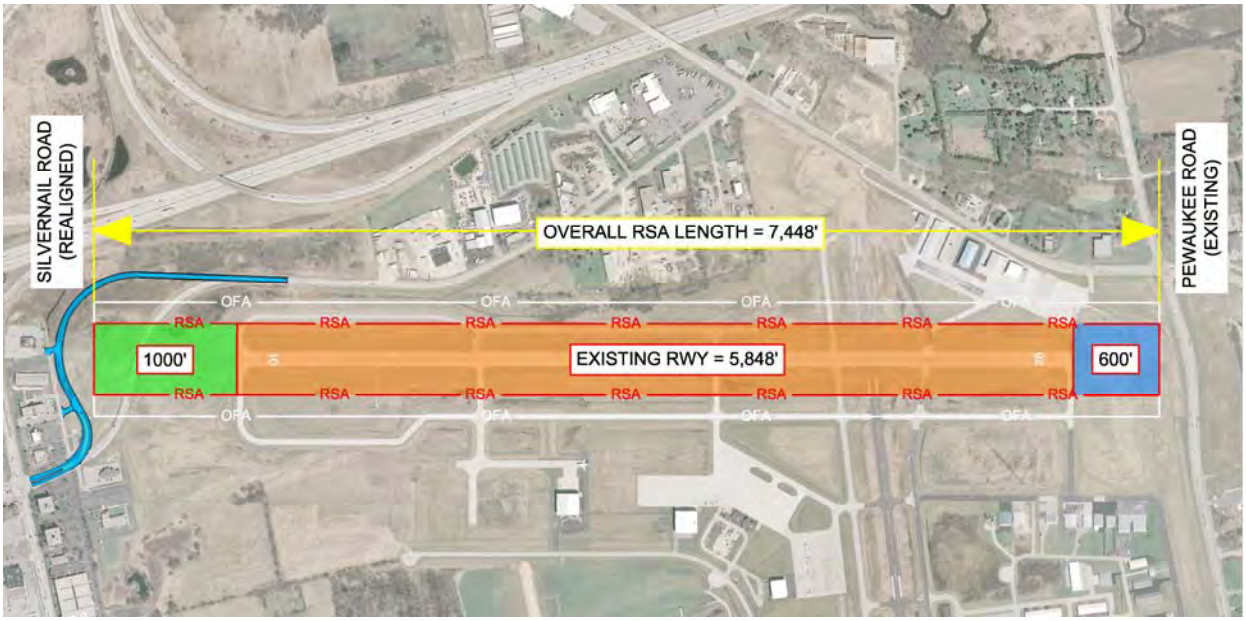


Figure 3-7 Overall Runway Safety Area Length Provided by a realigned Silvernail Road

As shown above, a realignment of Silvernail Road would provide fully compliant safety areas for takeoffs and landings to the west by maintaining the 600 feet of safety area in advance of the Runway 28 threshold and providing 1,000 feet of safety area beyond the end of Runway 10. Alternative development then focused on incorporating other improvements in combination with the realigned Silvernail roadway so as to also maintain runway length for takeoff and landing operations to the east. Alternatives 11 and 12 which comprise these combinations are presented in the following sections.

3.7.1 Alternative 11 - Realign Silvernail Road, Extend Runway 10, Establish Declared Distances

This alternative would combine a realignment of Silvernail Road with a 400-foot extension of Runway 10 as illustrated on **Figure 3-8**. By realigning the existing Silvernail Road right-of-way to the west, an additional 600 feet of safety area can be provided off the approach end of Runway 10. This would create enough room for a full 1,000-foot long by 500-foot wide safety area off the west end of the runway while maintaining existing runway length for both landings and takeoffs to the west. Adding 400 feet of runway pavement off the end of Runway 10 would shift the starting point for landings and takeoffs to the east. This shift, combined with declared distances, would create enough room for a full 1,000-foot long by 500-foot wide safety area off the end of Runway 28 that would also maintain existing useable runway length.

The property impacts associated with a realigned Silvernail Road were discussed in Section 3.5.2 and include the acquisition and relocation of one bank business property (0.509 acres). Transfer of ownership between Airport property and City right-of-way is also needed to accommodate the new road alignment and the expanded runway safety area off Runway 10. The shifting of the Runway 10 approach lights to the west will require isolated partial property acquisitions of a nearby restaurant and an office building located on either side of the wider '1,000-ft bar station' associated with the approach light system. The size of these acquisitions is estimate to be approximately 500 square feet (for each property) and will likely require the adjustment of parking stalls and an access drive, but will not affect the buildings or the use of these properties. Shifting the Runway 10 approach by 400 feet to the west will also lower the airspace clearances over nearby properties by roughly 10 feet, and existing avigation easements over these properties would need to be adjusted to correspond with the new approach. The County's existing Height Limitation Zoning Ordinance would also need to be revised to correspond with the shifted airspace. Based on preliminary design efforts, the profile of a realigned Silvernail Road can be designed to provide at least 15 feet of clearance with the shifted Part 77 approach surface airspace to Runway 10.

The Runway Protection Zone (RPZ) is a trapezoidal area located off the ends of runways and is intended to enhance the protection of people and property on the ground by maintaining them clear of incompatible objects and land use activities. As shown in **Figure 3-8**, the approach RPZ for Runway 10 would also shift west by 400 feet, resulting in some properties being added and some properties being removed from the RPZ. The shifted RPZ would completely remove an existing gas station property from this area. The modified land uses and the modified Part 77 airspace clearances were evaluated as part of an RPZ Analysis completed for the project. This analysis was submitted to the FAA in April of 2014 and included the full range of alternatives evaluated within this chapter. The FAA reviewed the RPZ analysis and provided their support for Alternative 11 in July 2014. The FAA correspondence and exhibits from the RPZ analysis illustrating the modified land uses and airspace clearances are provided in **Appendix G**.

The wetland impacts associated with a realigned Silvernail Road were discussed in Section 3.5.2 and include 3.918 acres of ADID wetlands for both the realigned road and the expanded safety area grading off Runway 10. For this alternative, an additional 0.386 acres of ADID wetlands would also be impacted with the shifted western-most approach light stations and their corresponding access road. Non-ADID wetland impacts include 0.549 acres for the expanded runway and taxiway pavements and an additional 1.916 acres for side safety area improvements and shifted glideslope critical area grading. Total wetland impacts for this alternative are 6.769 acres, of which 4.304 acres have the ADID wetland designation.

In considering the east end, the existing localizer antenna array is currently within the runway safety area (RSA), and the equipment shelter for the localizer is located within the runway object free area (OFA). This alternative proposes to relocate the localizer outside these safety critical areas and includes construction of a new access road to both the localizer equipment shelter and the antenna itself. The perimeter access road off the east end of the runway would also remain outside the RSA and OFA for Runway 28. This access road is shown extended to the Airport's fuel farm facility as it would provide a route for mobile fuel trucks to access the north side of the airport without needing to enter the airfield movement areas or the safety critical areas for Runway 10-28. The east end improvements would not impact any wetlands or property.

The estimated cost for Alternative 11 is $12.17 million, and includes property acquisition and relocation costs, the realignment of Silvernail Road, airfield pavement and access roads, the grading for traditional RSAs off both the ends and sides of Runway 10-28, and the relocation of existing navigational instruments. This alternative's cost is consistent with the maximum feasible cost identified in Section 3.1.2, and the acreages of wetland impact are the highest of all alternatives identified. Alternative 11 would provide standard safety areas off both ends of Runway 10-28 as well as the side safety areas and was determined to be a practicable and feasible alternative. Alternative 11 was carried forward for further evaluation and cost comparison.

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AIRPORT PROPERTY LIMIT
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT
ADID WETLAND IMPACT
RUNWAY SAFETY AREA
RUNWAY OBJECT FREE AREA
RUNWAY PROTECTION ZONE (EXISTING)
RUNWAY PROTECTION ZONE (FUTURE)

RWY 10 TODA = 6,248'
RWY 10 TORA = 6,248'
RWY 10 ASDA = 5,848'
RWY 10 LDA = 5,848'
600'
1,000'
INTERSTATE I-94
ADID WETLAND ROADWAY IMPACTS: 2.142 ACRES
EXISTING APPROACH RPZ
FUTURE APPROACH RPZ
PROPERTY ACQUISITION REQUIRED FOR SHIFTED MALSR LIGHTS
PROPOSED SILVERNAIL ROAD
ADID WETLAND RSA IMPACT: 1.292 ACRES
REMOVE EXIST. PARALLEL TAXIWAY
WETLAND SIDE AREA IMPACTS: 0.074 ACRES
ADID WETLAND RSA IMPACT: 0.484 ACRES
400' EXTENSION
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 6,248' (PROPOSED)
ADID WETLAND IMPACTS EXTENDED MALSR ROAD 0.386 ACRES
RELOCATED MALSR APPROACH LIGHTS AND SHELTER
SHIFTED GLIDESLOPE, PAPI AND AWOS
EXISTING SILVERNAIL ROAD
EXISTING AIRPORT PROPERTY TO BE TRANSFERRED TO THE CITY OF WAUKESHA FOR NEW SILVERNAIL RD. RIGHT-OF-WAY 2.437 ACRES
TAXIWAY A
WETLAND RSA IMPACTS: 0.549 ACRES
EXISTING SILVERNAIL RD. TO BE REMOVED & R-O-W TRANSFERRED TO AIRPORT 3.614 ACRES
WETLAND SIDE AREA IMPACTS: 1.662 ACRES
SILVERNAIL ROAD
CTH T - GRANDVIEW BLVD
EXISTING GAS STATION PROPERTY TO BE SHIFTED COMPLETELY OUTSIDE OF RWY 10 APPROACH RPZ.
EXISTING BANK PROPERTY TO BE ACQUIRED AND RELOCATED 0.509 ACRES
RWY 28 LDA = 5,848'
RWY 28 ASDA = 5,848'
RWY 28 TORA = 5,848'
RWY 28 TODA = 5,848'
1,000'
600'
BLUEMOUND ROAD
SHIFTED LOCALIZER, AND ACCESS ROAD OUTSIDE RSA / OFA
EXIST. & FUTURE APPROACH RPZ
TAXIWAY A
CTH J - PEWAUKEE ROAD
FUEL FARM

0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES
APPROACH LIGHT ROAD EXTENSION ADID WETLAND IMPACTS:	0.386 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.549 ACRES
WETLAND SIDE AREA IMPACTS:	1.916 ACRES
TOTAL WETLAND IMPACTS:	**6.769 ACRES**

FIGURE 3-8
REALIGN SILVERNAIL, EXTEND RWY 10, DECLARED DISTANCES (ALTERNATIVE 11)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-8 - ALTERNATIVE 11.DWG

3.7.2 Alternative 12 - Realign Silvernail Road and Install EMAS off Runway 28

This alternative would combine a realignment of Silvernail Road with the installation of a standard EMAS arresting bed and lead-in ramp off the Runway 28 end, and is illustrated on **Figure 3-9**. Like Alternative 11, the realignment of Silvernail Road to the west would create enough room for a full 1,000-foot long by 500-foot wide safety area off the west end of the runway while maintaining existing runway length for both landings and takeoffs to the west. By adding EMAS off the end of Runway 28, it would shorten the 1,000 foot length of safety area to 600 feet and maintain runway length for both landings and takeoffs to the east.

The property impacts associated with a realigned Silvernail Road were discussed in Section 3.5.2 and include the acquisition and relocation of one bank business property (0.509 acres), and the transfer of ownership between Airport property and City right-of-way for the new road alignment and the expanded runway safety area off Runway 10.

The wetland impacts associated with a realigned Silvernail Road were discussed in Section 3.5.2 and include 3.918 acres of ADID wetlands for both the realigned road and the expanded safety area grading off Runway 10. Non-ADID wetland impacts include 0.344 acres for the Runway 10 RSA grading and an additional 1.717 acres for side safety area improvements. Total wetland impacts for this alternative are 5.979 acres, of which 3.918 acres have the ADID wetland designation.

The east end runway improvements would be the same as those discussed in Section 3.7.1 for Alternative 11, but would also include the construction of a Runway 28 EMAS. The EMAS installation of this alternative would replace the need to extend Runway 10 in order to maintain runway length. As such, this alternative would not have any impact to the existing Runway Protection Zones (RPZs), approach procedures, airspace clearances or surrounding land uses.

The estimated cost for Alternative 12 is $12.66 million, and includes property acquisition and relocation costs, the realignment of Silvernail Road, a Runway 28 EMAS installation, the grading for traditional RSAs off both the ends and sides of Runway 10-28, and the relocation of existing navigational instruments. Like Alternative 11, this alternative's cost is right at the maximum feasible identified in Section 3.1.2. Alternative 12 would provide standard safety areas off both ends of Runway 10-28 as well as the side safety areas and was determined to be a practicable and feasible alternative. Alternative 12 was carried forward for further evaluation and cost comparison.

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AIRPORT PROPERTY LIMIT
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT
ADID WETLAND IMPACT
RUNWAY SAFETY AREA
RUNWAY OBJECT FREE AREA
RUNWAY PROTECTION ZONE (EXISTING)
RUNWAY PROTECTION ZONE (FUTURE)

RWY 10 TODA = 5,848'
RWY 10 TORA = 5,848'
RWY 10 ASDA = 5,848'
RWY 10 LDA = 5,848'

ADID WETLAND ROADWAY IMPACTS: 2.142 ACRES
INTERSTATE I-94
EXISTING AND FUTURE APPROACH RPZ
600'
PROPOSED SILVERNAIL ROAD
ADID WETLAND RSA IMPACT: 1.292 ACRES
REMOVE EXIST. PARALLEL TAXIWAY
ADID WETLAND RSA IMPACT: 0.484 ACRES
WETLAND SIDE AREA IMPACTS: 0.074 ACRES
EXISTING SILVERNAIL ROAD
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 5,848' (PROPOSED)
WETLAND RSA IMPACTS: 0.344 ACRES
EXISTING AIRPORT PROPERTY TO BE TRANSFERRED TO THE CITY OF WAUKESHA FOR NEW SILVERNAIL RD. RIGHT-OF-WAY 2.437 ACRES
TAXIWAY A
WETLAND SIDE AREA IMPACTS: 1.466 ACRES
EXISTING SILVERNAIL RD. TO BE REMOVED & R-O-W TRANSFERRED TO AIRPORT 3.614 ACRES
SILVERNAIL ROAD
CTH T - GRANDVIEW BLVD
1,000'
RWY 28 LDA = 5,848'
RWY 28 ASDA = 5,848'
RWY 28 TORA = 5,848'
RWY 28 TODA = 5,848'
EXISTING BANK PROPERTY TO BE ACQUIRED AND RELOCATED 0.509 ACRES

600'
BLUEMOUND ROAD
EXIST. & FUTURE APPROACH RPZ
SHIFTED LOCALIZER, AND ACCESS ROAD OUTSIDE RSA / OFA
600'
EMAS
270' X 120' EMAS BED
330' ASPHALT LEAD-IN TO EMAS
TAXIWAY A
600'
CTH J - PEWAUKEE ROAD
FUEL FARM

0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**5.979 ACRES**

FIGURE 3-9
REALIGN SILVERNAIL, INSTALL EMAS OFF RUNWAY 28 (ALTERNATIVE 12)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04\08\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-9 - ALTERNATIVE 12.DWG

3.8 Alternative Summary and Comparison

Using the guidance provided in FAA Order 5200.8 and FAA Order 5200.9, initial build alternatives were developed that included both roadway and airfield modifications. Alternatives were then developed that considered combinations of these alternatives to provide an overall safety area solution for both ends while maintaining runway length. This section summarizes the findings of the build alternatives analysis, presents a comparison of the practicable and feasible alternatives, and identifies a preferred alternative. Exhibits and a tiered analysis of alternatives dismissed earlier in this chapter are provided in **Appendix F**. A summary of initial and life-cycle costs for all of the alternatives analyzed is provided in **Appendix H**.

3.8.1 Summary of Build Alternatives

In evaluating roadway modification alternatives, it was determined that neither Silvernail Road to the west or Pewaukee Road to the east could be closed. This conclusion was reached through meetings with the agencies and municipalities who own and maintain these adjacent roadways, and in consideration of the volume of traffic and regional benefits they provide to the traveling public. Minutes from these meetings are provided in **Appendix E**. Options for tunneling either roadway exceeded the maximum feasible cost established in FAA Order 5200.9, as did a realignment of Pewaukee Road. Of the roadway modification alternatives, only the realignment of Silvernail Road was determined to be practicable and feasible.

In evaluating airfield modification alternatives, the users of the Airport were surveyed to determine their operational needs. The critical aircraft at Waukesha County Airport (UES) are business jets. Based on the feedback received from the users, it was determined that the existing runway length (5,848 feet) needed to remain for both takeoff and landing operations. The FAA reviewed the aircraft operations conducted at UES and the user survey responses and concurred with the need to maintain the existing runway length. A copy of the survey and FAA concurrence on runway length is provided in **Appendix C**. Of the airfield modifications alternatives analyzed, an EMAS installation on the end of Runway 28 was determined to be a practicable and feasible alternative. Other options for incorporating declared distances or otherwise shifting the runway starting and stopping points by themselves did not meet the stated purpose and need, but were also carried forward for further evaluation in combination with other improvements.

Considering the site constraints and the need to maintain runway length, a realignment of Silvernail Road was determined to be the only practicable and feasible way to provide the overall runway safety area length needed between Silvernail Road and Pewaukee Road. Two feasible alternatives were considered for maintaining existing runway length in both directions within the overall safety area length provided by a Silvernail Road realignment. These included extending Runway 10 by 400 feet west (Alternative 11) or installing an EMAS bed off the end of Runway 28 (Alternative 12).

3.8.2 Comparison

Both Alternatives 11 and 12 provide standard RSAs to both ends of Runway 10-28 while maintaining runway length. Both require the realignment of Silvernail Road, the grading of a full safety area off Runway 10, and the corresponding impacts to wetlands and property. A tiered analysis summary of build Alternatives 11 and 12 are presented in comparison to the no build alternatives on **Table 3-5**. A life cycle cost comparison and other considerations of an EMAS installation are also discussed in the following paragraphs.

Table 3-5 - Tiered Analysis for Runway 10-28 Safety Areas Alternatives

Parameters		No Build Alternatives		Build Alternatives			
		No Action	Request Waiver	Alternative 11		Alternative 12	
				Runway 10 (West) End	Runway 28 (East) End	Runway 10 (West) End	Runway 28 (East) End
Tier Level 1							
Purpose and Need	Provides Compliant Runway Safety Areas?	No	No	Yes	Yes	Yes	Yes
	Continue to Next Level?	No	No	Yes	Yes	Yes	Yes
Tier Level 2		(Retained for Comparison)					
Project Criteria	Maintain Existing Useable Runway Lengths?	NA	NA	Yes	Yes	Yes	Yes
	Complies with Maximum Feasible Cost Oultined in FAA Order 5200.9?	NA	NA	Yes	Yes	Yes	Yes
	Continue to Next Level?	No	No	Yes	Yes	Yes	Yes
Tier Level 3							
Practicability and Feasibility	Construction Impacts - *Scope of Improvements*	None	None	Realign Silvernail Road to the west around Runway 10 Safety Area. Extend Runway 10 by 400'. Relcoate MALSR, PAPI, Glideslope and AWOS.	Relocate Localizer Antenna and equipment shelter outside Runway 28 RSA & OFA. Construct perimeter service road outside Runway 28 RSA & OFA.	Realign Silvernail Road to the west around Runway 10 Safety Area.	Construct 270' long by 100' wide EMAS arresting bed with 330' lead-in ramp. Relocate Localizer Antenna and equipment shelter outside Runway 28 RSA & OFA. Construct perimeter service road outside Runway 28 RSA & OFA.
	Required Property Acquisitions and/or Relocations	None	None	Acquisition and relocation of 1 commercial bank property & various segments of other properties for appproach light shift would be required at an estimated cost of $1,000,000. Transfer of land between Airport and City for new road R-O-W.	None	Acquisition and relocation of 1 commercial bank property would be required at an estimated cost of $940,000. Transfer of land between Airport and City for new road R-O-W.	None
	Fish, Wildlife, and Plants	None	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with a realigned Silvernail Road, airside wetland impacts, and additional impacts associated with the extended MALSR approach lights. The removal of existing fill within portions of Silvernail to be removed could restore continuity between wetland areas on either side of the existing roadway.	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with a realigned Silvernail Road and airside wetland impacts. The removal of existing fill within portions of Silvernail to be removed could restore continuity between wetland areas on either side of the existing roadway.	None
	Runway Protection Zone (RPZ)	None	None	Runway 10 Approach RPZ would shift west by 400', reducing area within Airport ownership. A Fueling Station would be moved outside of the RPZ under the future condition.	None	None	None
	Part 77 Airspace	None	None	Part 77 airspace would be lowered by just under 10 feet. Roadway realignments and existing properties would have sufficient clearances.	None	None	None
	Navigational Instruments	None	None	Runway 10 Glideslope, PAPI, MALSR and AWOS would need to shift by 400' west with the proposed extension of Runway 10. Equipment shelters for both glideslope and MALSR would also need to be relocated.	Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.	Equipment shelter for the Runway 10 MALSR Approach lights to be shifted outside the relocated right-of-way for Silvernail Road.	Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.
	Noise	None	None	Would slightly shift noise contours to the west with No significant impacts.	None - may improve noise levels over residences off the approach end of Runway 28	None	None
	Wetlands	None	None	4.30 Acres (ADID) 2.29 (non-ADID)	0.18 (non-ADID)	3.92 Acres (ADID) 1.88 (non-ADID)	0.18 (non-ADID)
	Total Wetland Impacts:			6.59 (Total West End)	0.18 (Total East End)	5.80 (Total West End)	0.18 (Total East End)
	Capital Cost	$0	$0	$9,223,956	$2,946,344	$5,156,035	$7,509,566
	Total Capital Cost:			$12,170,301		$12,665,602	
	Life Cycle	$688,611	$688,611	$9,705,635	$3,305,899	$5,515,883	$9,592,155
	Total 20-Yr Life Cycle Cost:			$13,011,534		$15,108,039	
Continue for Further Analysis and Comparison?		No	No	Yes. The improvements are more consistent with existing Airport Infrastructure and maintenance. This Alterntive represent a more cost-effective solution and is supported by the FAA.		No. Despite an overall reduction in impacts, an EMAS installation at UES would represent a substantial burden to the Airport and raise concerns related to maintenance, inspection, replacement and overall liability. The overall solution is more expensive both in the short term and over a 20-year life cycle.	

The EMAS Alternative (Alt-12) would allow the runway ends to remain unchanged, resulting in no modifications to the approach procedures, airspace or RPZs. Additionally, Alternative 12 would not require the implementation of declared distances, and requires less impact to existing navigational instruments. The realigned Silvernail Road would be located further away from the resulting end of Runway 10 when compared to Alternative 11, with slightly less property and wetland impacts.

However, an EMAS installation at a general aviation airport like Waukesha County Airport presents many concerns given the harsh winter environment and the limited resources available for the periodic inspections, replacements, and maintenance required to keep the EMAS functional. Snow removal from the constructed EMAS arresting blocks must be accomplished by means of special low impact equipment so as to not damage the blocks. This additional equipment would need to be stored on the Airport and would itself require periodic maintenance. In addition, it would be necessary for anyone operating the specialized snow removal equipment to be properly trained in its operation and use.

Waukesha County Airport (UES) does not have a dedicated Maintenance or Operations staff, and snow removal and grass cutting operations are bid to private contractors. Without consistent and dedicated Maintenance or Operations staff, a general aviation facility like UES will have difficulty maintaining the EMAS infrastructure, or protecting it from accidental encroachment from Airport tenants, mobile fuel trucks, tugs or other maintenance contractors.

Per guidance provided in FAA Order 5200.9, an EMAS bed needs to be replaced every ten years. The EMAS would be more expensive, both in the short term and to a much greater extent when factored over a twenty year life cycle, as illustrated in **Table 3-6**. The life cycle costs were developed using guidance provided within FAA Order 5200.9. More detailed cost estimates and 20-year life-cycle cost analyses for the full range of alternatives evaluated are provided within **Appendix H**.

Table 3-6 Alternative Cost Comparison (Alternative 11 vs. Alternative 12)

	Initial Cost			20 Yr. Life-Cycle Cost		
	Rwy 10	**Rwy 28**	**Total**	**Rwy 10**	**Rwy 28**	**Total**
Alternative 11:	$ 9,223,956	$ 2,946,344	**$ 12,170,301**	$ 9,705,635	$ 3,305,899	**$ 13,011,534**
Alternative 12:	$ 5,156,035	$ 7,509,566	**$ 12,665,602**	$ 5,515,883	$ 9,592,155	**$ 15,108,039**
Difference:			**$ (495,301)**			**$ (2,096,504)**

The Runway 10 Extension Alternative (Alt-11) would require approach procedure changes, modification of existing avigation easements, and greater impacts to navigational aids, property and wetlands. However, the Alternative 11 solution is consistent with the existing infrastructure and maintenance operations at the Airport and is the more cost effective solution. The departure RPZ off the Runway 10 end would remain unchanged, as well as the RPZs off the Runway 28 end. The Runway 10 approach RPZ would shift 400' west and the area of airport ownership within the RPZ would be modified, however it would shift an incompatible land use of fuel handling/storage outside the RPZ.

In considering the size and climate of the Waukesha County Airport, an EMAS installation (Alternative 12) presents a number of concerns related to cost, maintenance, liability for replacement if damaged, and overall compatibility with the Airport's infrastructure and environment. The FAA has analyzed both alternatives as part of an RPZ Analysis completed for the RSA project, and has provided their support for Alternative 11 (see documentation in **Appendix G**). In consideration of these factors, Alternative 11 is the more practicable and cost-effective solution and is identified as the preferred alternative for bringing the safety areas for Runway 10-28 into compliance with federal standards.

3.9 Proposed Action

Design standards have been set by the FAA for runway safety areas to enhance the safe operation of an airport. Currently, Runway 10-28 at the Waukesha County Airport is in non-compliance with FAA standards for these design elements. In the FAA's opinion, there are alternatives to correct the problems that are practicable to implement. Based on the alternatives analysis developed in this EA, Alternative 11 was selected as the preferred alternative (see **Figure 3-8**), and the corresponding proposed action has been identified:

To provide a standard safety area for the Runway 10 end, the project proposes to realign Silvernail Road to the west. The new road alignment will maintain access to existing businesses and will include design elements that have been coordinated with the City and County of Waukesha through preliminary design efforts and meetings. The realignment of Silvernail Road will require an existing bank property to be acquired and relocated (0.509 acres), and will additionally require transfer of property between the Airport and the City of Waukesha in order to accommodate the new road right-of-way and the expanded safety area for Runway10.

To provide a standard safety area for the Runway 28 end, the project proposes to shift Runway 10 by 400 feet to the west. A corresponding extension of Taxiway A and connection to the new runway end are also proposed. The 400-foot shift of Runway 10 will also move the approach procedures and airspace surfaces to the west, requiring the height limitation zoning ordinance and avigation easements over adjacent properties to be lowered by roughly ten feet. The shifted Runway 10 end will require the navigational instruments tied to this approach to be moved as well. These instruments include the MALSR approach lights, the glideslope antenna, the precision approach path indicators (PAPIs), and the Automated Weather Observation System (AWOS). The glideslope and approach lights have equipment shelters that will also need to be relocated. The shifted approach light system will impact small segments of two adjacent properties (restaurant / office building) to accommodate a wider light station located 1,000 feet from the Runway 10 threshold. The impacts to these properties are estimated at 500 s.f. (each) and will involve modification of an access drive for the restaurant and replacing two lost parking stalls for the office building. The shifted approach light system will also require the two western-most light stations to extend into adjacent wetlands and will require an extended roadway for their access. Additional actions proposed for the east end include relocating the existing localizer antenna and equipment shelter outside the critical areas for Runway 28 and construction of a perimeter access road to these facilities.

Declared distances will be implemented for both directions of operation on Runway 10-28 to identify the useable lengths of pavement for landings and takeoffs.

To provide standard safety areas on the sides of Runway 10-28, the project proposes to remove the abandoned north side parallel taxiway, grade and fill existing ditch lines and wetlands located within the safety area limits, and relocate and extend existing storm sewer structures and culverts. The project also proposes to construct new access roads to the relocated navigational aids at locations outside the Runway 10-28 safety critical areas, and to bring the alignment transition of Taxiway A into conformance with Taxiway Design Group 2 standards.

The proposed action will impact 6.769 acres of wetlands. Of these, 4.304 acres have an ADID wetland designation assigned by the Southeast Wisconsin Regional Planning Commission. The wetland impacts will need to be permitted in accordance with the requirements of the U.S. Army Corps of Engineers and the Wisconsin Department of Natural Resources, including mitigation.

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4. Affected Environment

4.1 Airport Location and History

Waukesha County Airport (Crites Field) is located within the jurisdictional boundaries of the city of Waukesha, just ten miles west of downtown Milwaukee and 100 miles northwest of Chicago. The Airport is categorized as a general aviation (GA) airport and serves the aviation needs of the western Milwaukee metropolitan area, as well as southeastern Wisconsin. The Airport was officially dedicated in 1935 and on May 20, 1938, Dean Crites made the first airmail flight into Waukesha County Airport in a Waco 10, inaugurating airmail service at the Airport and to the County. Over the past 74 years, the Airport has evolved into a premiere corporate airport. A location map of the Airport is provided within **Figure 1-1**, an aerial photograph of the airport is provided in **Figure 1-2**, and the first three sheets of the Airport Layout Plan (ALP) are provided in **Appendix A**.

The Airport serves as a reliever to General Mitchell International Airport and plays a vital role in the transportation needs of businesses from Milwaukee to Chicago. Under the FAA's new GA classification system published in May of 2012, Crites Field is designated as a 'National' General Aviation Airport. Crites Field is one of only 84 such GA airports in the nation, and the only one in the State of Wisconsin.

4.2 Existing Airport Facilities

Waukesha County Airport (UES) is situated on approximately 600 acres of land owned by Waukesha County. The Airport also controls approximately 100 acres of land through purchase of avigation easements, which provide essential height controls to the runway approach areas.

4.2.1 Airfield Facilities

The airfield facilities consist of many components that are required to accommodate safe aircraft operations. These include runways, taxiways, an apron network, visual and electronic navigational aids, and runway protection zones.

Waukesha County Airport has two runways, Runway 10-28 and Runway 18-36. Primary Runway 10-28 is 5,848 feet long by 100 feet wide with a grooved concrete surface. Crosswind Runway 18-36 is 3,599 feet long by 75 feet wide with an asphalt surface. An extensive taxiway system and apron network support aircraft operations. The apron network is categorized as apron and hangar areas. The total apron area is approximately 16 acres with numerous tie-downs available. The hangar areas encompass 4.5 acres and include the southeast, north, and corporate hangar area.

Waukesha County Airport is identified at night by a rotating beacon, which is located atop the Air Traffic Control Tower. Runway edge lighting is used to outline runways during periods of darkness and/or restricted visibility and can be seen several miles from the airport under good visibility conditions. Runway 10-28 has High Intensity Runway Lights (HIRL) and Runway 18-36 has Medium Intensity Runway Lights (MIRL). All but two of the taxiways at the Airport are marked with Medium Intensity Taxiway Lights on the edges. The remaining two taxiways are marked with retro-reflective markers in lieu of lighting.

4.2.2 Landside Facilities

Landside facilities are considered all those facilities at the Airport which do not fall into the airside facilities category as previously discussed. The existing landside facilities at the Airport include the airport terminal building, automobile parking and vehicular access, general aviation facilities, and other support facilities such as airport maintenance and snow removal equipment and fuel facilities. Atlantic Aviation, the primary fixed base operator (FBO), leases space in the airport terminal building for their operations, training and administrative functions. The general aviation facilities include approximately 40 structures which house aircraft and aviation-related operations.

4.3 Land Use and Zoning

In 1994, the city of Waukesha annexed county-owned lands, which included the airport property, and has jurisdiction of the Waukesha County Airport.

4.3.1 Land Use

A seven-county region that includes Waukesha County is joined together under the Southeastern Wisconsin Regional Planning Commission (SEWRPC). SEWRPC has prepared and adopted regional land use plans in 1966, 1977, 1992, 1997, and the most recent in June of 2006. Each plan is intended to guide growth and development into the future, with the 2006 plan extending to the year 2035. According to the SEWPRC plan, the Airport and the surrounding area are designated as a medium density urban area. **Figure 4-1** shows the land use surrounding the Airport in 2000. This land use data was obtained from the Waukesha County Land Information GIS Internet Mapping site.

Figure 4-1 shows the majority of the area within the Airport boundary as transportation related land use with some “unused or open” land uses. Commercial and industrial land uses along with Interstate 94 borders the Airport to the north. Commercial and governmental and institutional land uses border the airport to the west and southwest. Further south and west, residential neighborhoods and a variety of governmental offices and businesses continue to downtown Waukesha, which is the seat of Waukesha County government. To the east of the Airport is CTH J, with primarily industrial and commercial land uses along this corridor in the vicinity of the airport. Some residential land uses exist further east of these properties. There are no national or state forests or wilderness areas within five miles of the airport – the nearest state forest is the south unit of the Kettle Moraine State Forest, about 12 miles southwest of the airport. Besides county courts and offices for county zoning, health, veterans and transportation services, the most significant public feature of the area is the 135-acre Waukesha County Exposition Center, on Northview Road immediately adjacent to the airport. The Center includes 3 exhibit halls totaling 22,500 square feet, a 21,000 square-foot arena and one of the region’s largest horse complexes, with three barns and show rings with capacity for 200 horses. **Figure 4-2** shows potential US DOT Section 4(f) and public facilities in the vicinity of the airport.



WAUKESHA COUNTY AIRPORT
SAFETY AREA IMPROVEMENT
ENVIRONMENTAL ASSESSMENT
Waukesha County, Wisconsin

Legend

Landuse (2000)

- AGRICULTURAL
- COMMERCIAL
- COMMUNICATION & UTILITIES
- EXTRACTIVE
- GOVERNMENT & INSTITUTIONAL
- INDUSTRIAL
- LANDFILLS & DUMPS
- RECREATION
- RESIDENTIAL
- TRANSPORTATION RELATED
- UNUSED OR OPEN
- WATER
- WETLANDS
- WOODLANDS
- Existing Airport Property Line
- Mile Buffer

N

0 1,250 2,500 5,000 7,500
Feet

FIGURE 4-1
LAND USE MAP
(2000)

Data Sources:
2000 Land use data provided by Waukesha County LIO.

Image: (c) 2010 Microsoft Corporation and its data suppliers

Path: X:\23099-90\04008\TECH\gis\Maps\UES_LandUse.mxd

WAUKESHA COUNTY AIRPORT
SAFETY AREA IMPROVEMENT
ENVIRONMENTAL ASSESSMENT
Waukesha County, Wisconsin

Waukesha County Airport

1mile
2mile
3mile

Legend

- Golf course
- Recreation Facility
- Church
- Medical Facility
- Local Park or Recreational Area
- Education Facility
- Existing Airport Property Line
- Mile Buffer

N

0 1,250 2,500 5,000 7,500
Feet

FIGURE 4-2
SECTION 4(f) RESOURCES AND PUBLIC FACILITIES

Data Sources:
Facility locations based on ESRI, Inc data supplemented with other on-line data sources including Google Earth, Bing, and Waukesha County.

Image: (c) 2010 Microsoft Corporation and its data suppliers

Path: X:\23099-90\04008\TECH\gis\Maps\UES_4FProperties.mxd

With no national or state forests, wilderness areas, or eligible and designated wild and scenic rivers within the area of potential effect, there is no potential for any effect on these resources by any project build alternative or the no action alternative. The project would also have no effect on any publicly-owned and used parks, recreational areas, or waterfowl/wildlife refuges based on their proximity from the proposed project. Accordingly, no lands that are subject to the DOT's Section 4(f) Act for these categories are concluded to be affected. As there is no land in agricultural production or zoned agriculture in the vicinity of the airport, it is concluded that the project would have no effect on farmland.

4.3.2 Zoning

Figure 4-3A shows the City of Waukesha's Official zoning map. The Airport is zoned A-1, Airport District and the adjoining properties are zoned for community business, institutional, light manufacturing, limited business and industrial park, lowland conservancy, and office and professional business. Waukesha County enforces height limitation zoning which limits the height of structures and trees within the vicinity of the Airport. **Figure 4-3B** illustrates the County's Height Ordinance Map.

4.4 Population characteristics

Socioeconomic data provides an independent variable for observing the trends at the Airport and the community as a whole. According to *A Regional Land Use Plan for Southeastern Wisconsin: 2035*, prepared by SEWRPC in June of 2006, Waukesha County experienced the highest population growth rate of the Southeastern Wisconsin Region over the past 50 years. The county had a population of 85,901 in 1950 and 360,767 in 2000 and went from 6.9 percent of the total population in the region to 18.7 percent.

Population characteristics of the study area were obtained from the United States Census Bureau 2010 demographic data (see **Appendix I**). For purposes of this Environmental Assessment, census data for the area within a one-half mile buffer of Airport property was included. Analysis of this census block data determined a racial composition of 88.7 percent white and 11.3 percent non-white population within the census blocks within one half mile of the Airport. Census data considers Hispanic as an ethnicity and as such overlaps several races (ie, white-Hispanic, African-American Hispanic). The Census block data indicated an average Hispanic population of 7.8 percent. It should be noted that the analysis included entire block data, even if only a portion of it was within the ½ mile radius. **Figure I-1** in **Appendix I** is a map showing the blocks and percentage of minority population of each. The detailed breakdown by ethnic group follows **Figure I-1**. Much of the area contains a population with a minority percentage below 11.3 percent, the area average. However, as seen in **Figure I-1** there are some blocks with a minority population in excess of the area average. These areas are west of North Grandview Boulevard, east of CTH J, and south of adjacent and south of West Moreland Boulevard.

CITY OF WAUKESHA
OFFICIAL ZONING MAP

1 inch equals 1,125 feet

Last Updated: JULY 2008

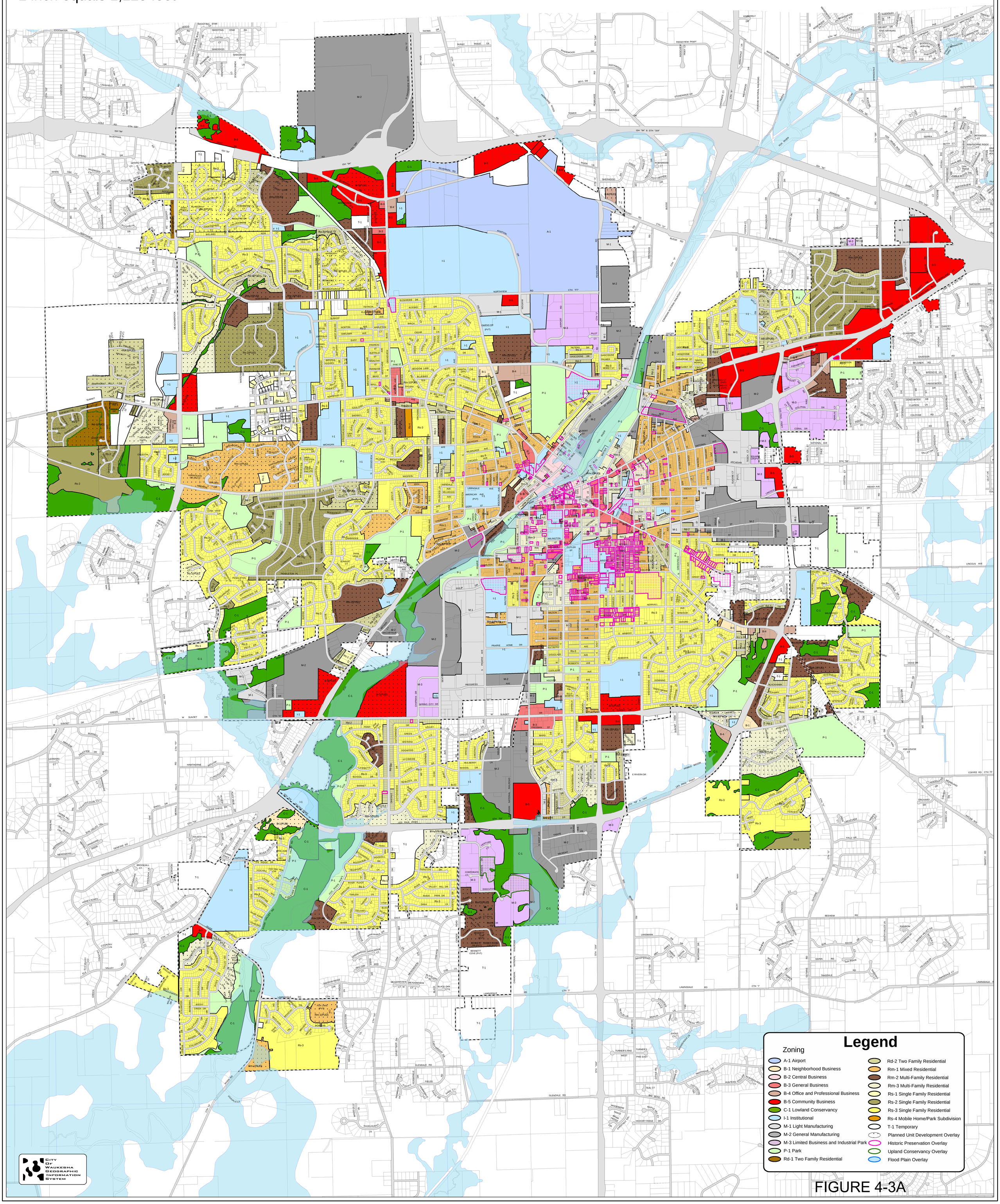
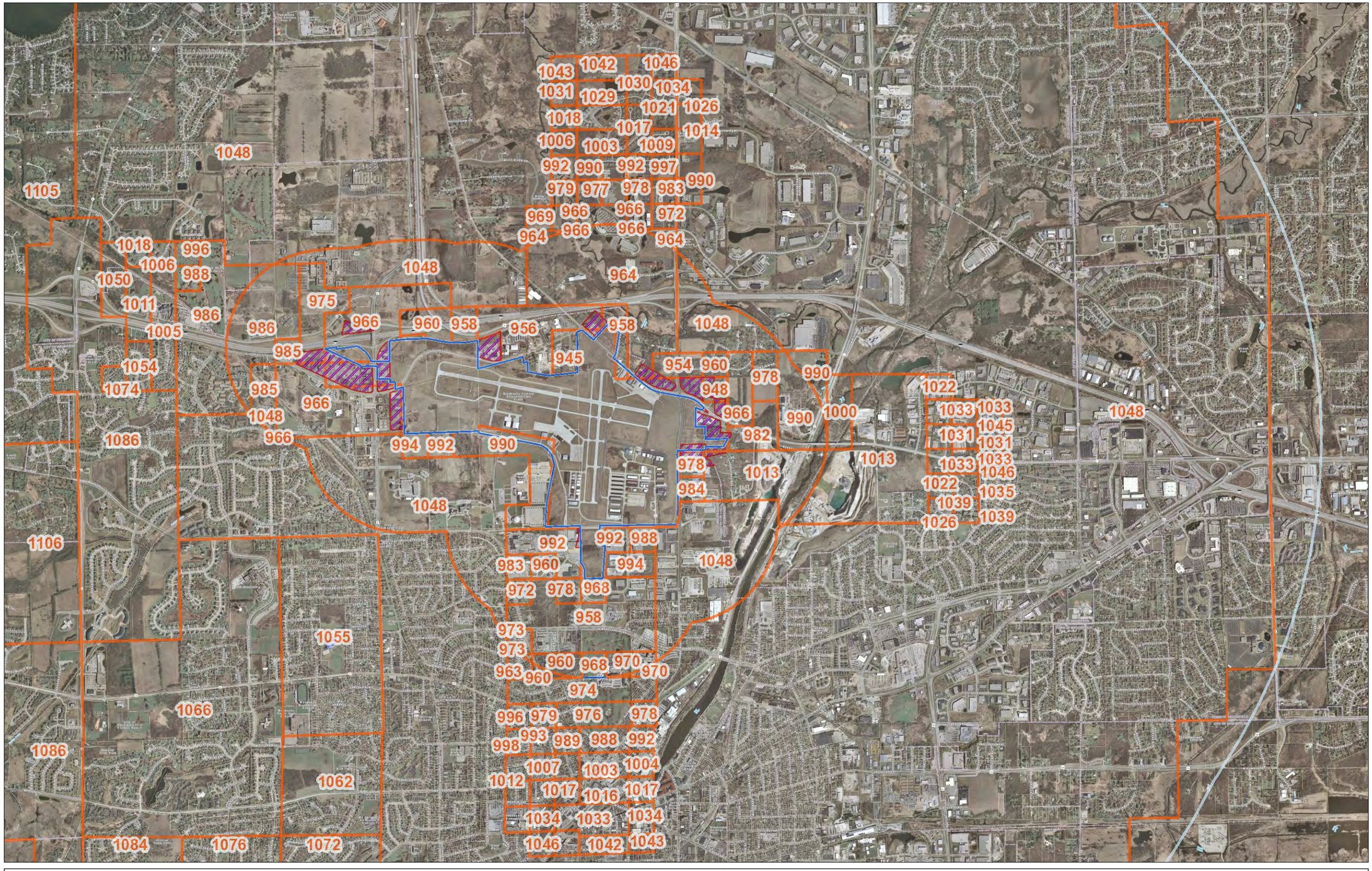


FIGURE 4-3A

WAUKESHA COUNTY LEADING THE WAY

LAND INFORMATION SYSTEMS DIVISION

Airport Height Ordinance





Legend

Airport Height Ordinance

- Max. Permitted Elev. Above
- 0.5 Mile Buffer
- 3 Mile Buffer
- Airport Boundary
- Easement

Plats

- Assessor Plat
- CSM
- Condo Plat
- Subdivision Plat

0 2,531.41 Feet

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Notes

FIGURE 4-3B

CEQ's definition of minority population states that 1) the minority population of an affected area exceeds 50 percent, or 2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate geographic analysis. Based on the first definition, there is one block east of CTH J that contains a minority population over 50 percent.

Census data shows an average household size of just over two and average family size of just under three for area within a one-half mile of the airport. The 2013 poverty guideline for a household of three is $19,530. Census tract data (note household data was only found by tract) shows that the average household income for tracts in the vicinity of the Airport is well above the poverty guideline. It can be concluded that no low-income populations will be disproportionately affected by the proposed action.

4.5 Industrial and Commercial Growth Characteristics

According to *A Regional Land Use Plan for Southeastern Wisconsin: 2035*, prepared by SEWRPC in June of 2006, Waukesha County accounted for approximately 50% of the total increase in the region's employment rate during the 1990s, with 81,100 jobs. Waukesha County has experienced continuous growth in employment rate since from 1950 to 2000, with 16,400 persons employed in 1950 (2.9% of the total in the seven county region) to 270,800 persons employed in 2000 (22.2% of the total in the seven county region). The services sector comprised 33% of the regional employment in 2000, while manufacturing and retail trade made up 18% and 16%, respectively.

In 2000, urban land use within the seven-county region encompassed approximately 761 square miles, which represents 28% of the total area within the region. Urban land use includes industrial and commercial uses, as well as residential, transportation/communication/utilities, governmental/institutional, recreational, and unused urban land. Both commercial and industrial land use areas have increased from 1963 to 2000). In 2000, approximately 67.1 square miles (2.5% of regional total land) were zoned for commercial use and 114.6 square miles (4.3% of regional total land) was zoned for industrial use. These numbers represent a 6.6% and 12.4% increase of commercial and industrial zoned lands, respectively, since 1985.

The 2035 land use plan projection shows an increase of 12.8 square miles for commercial land use and an increase of 5.3 square miles for industrial land use within the seven-county region. For Waukesha County, the land use plan projects an increase of commercial land use from 8.4 square miles in 2000 to 11.9 square miles in 2035 and 8.6 to 10.4 square miles for industrial land use.

4.6 Natural Resources-Existing Environment

Regulatory agencies were contacted and an initial agency scoping meeting was held on March 16, 2004 (meeting minutes are included in **Appendix J**). Follow up coordination occurred with agencies in 2007 when the concept of a new FAA-recommended alternative (Alternative 10) was presented to the agencies. More recent coordination has occurred with the agencies regarding the current preferred alternative (Alternative 11), in an August 2015 meeting, with minutes also provided in **Appendix J**.

Additional agency coordination also occurred as part of other stakeholder coordination meetings held in late 2013 and early 2014. Minutes from these meetings are provided in **Appendix E**.

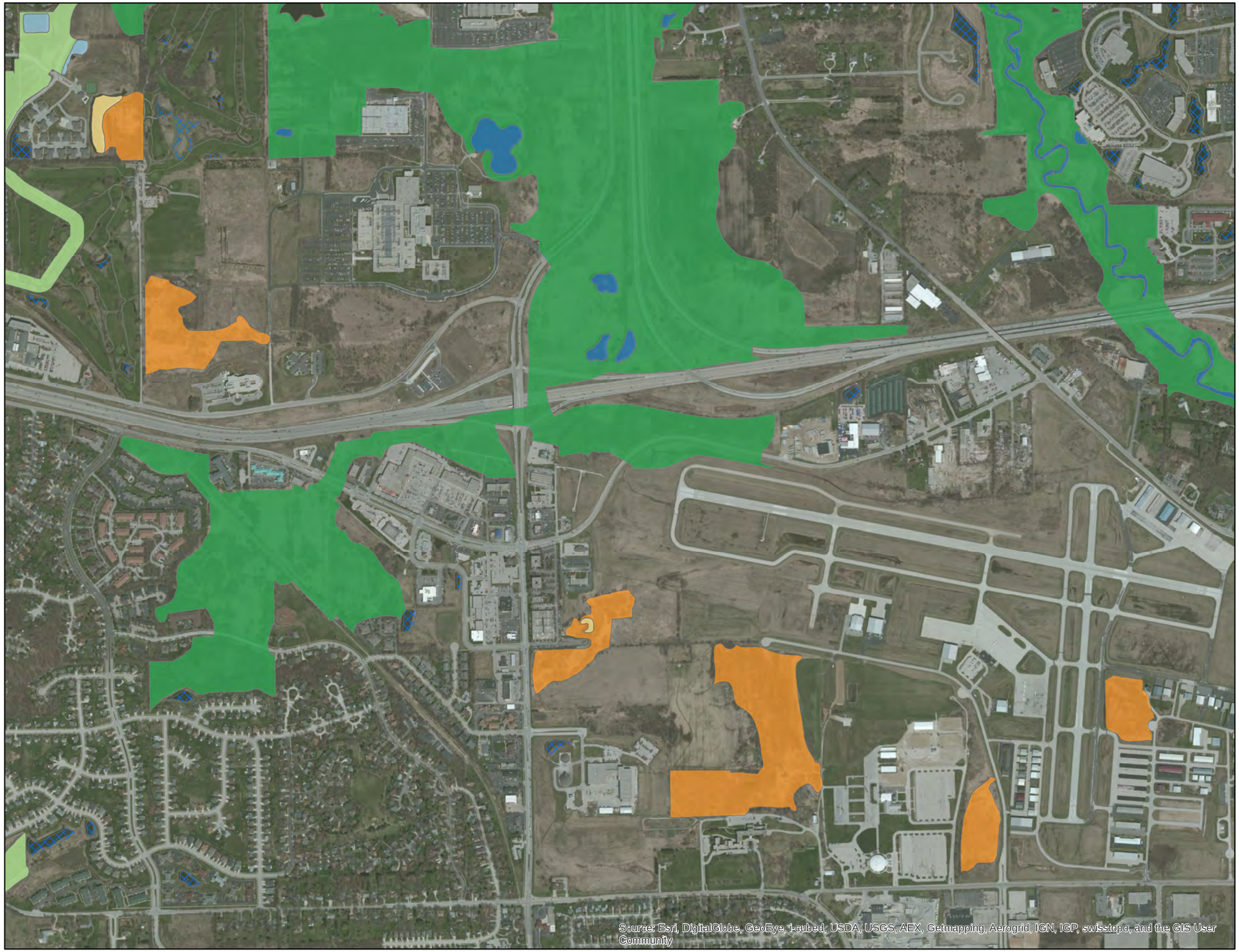
Comments received from Wisconsin Department of Natural Resources (WDNR), US Fish & Wildlife Services (USFWS), and SEWPRC and the U.S. Army Corps of Engineers (Corps) are incorporated in this section and also as appropriate in the next Section, Environmental Consequences.

4.6.1 Biotic Communities

The project area lies within the Southeastern Ridges and Lowlands Deciduous Forest, Savanna and Prairie province of Wisconsin. Natural plant communities include oak forests, oak savannas and prairies on a rolling to hilly topography with silt loams over highly-permeable calcareous glacial till and outwash.

The area has been heavily altered by development including residential, industrial, agricultural, forestry and transportation uses to the extent that large areas of undeveloped lands are mostly associated with state forest lands, floodplains and other similar features. Habitats unmodified by the 170-year history of settlement and development are very rare, but areas of natural vegetation remain quite common and include mesic woodlands of oak, hickory, cherry and ironwood, floodplains with emergent marshes, meadows and forests of elm, box elder, silver maple, and old fields with a variety of native and ruderal, weedy wildflowers mixed with cool-season turf and forage grasses. In wetland areas, the influence of groundwater contact with calcareous till is often shown by the presence of indicator plants such as marsh marigold and Riddell's goldenrod.

The SEWRPC has mapped a number of Environmental corridors within the vicinity of the airport. These are linear areas in the landscape containing concentrations of significant natural or cultural resources and resource-related features. **Figure 4-4** shows these mapped corridors in the vicinity of the Airport.





Legend

Environmental Corridors 2010

- Primary Environmental Corridor
- Primary Env. Corridor Water
- Secondary Environmental Corridor
- Secondary Env. Corridor Water
- Isolated Natural Resource Area
- Isolated Natural Resource Area Water
- Water

N

0 500 1,000 1,500 2,000

Feet

Environmental Corridor Data: Waukesha County - Department of Parks & Land Use Land Information System, Waukesha County GIS Internet Mapping Site. Data was originally compiled by the SouthEastern Wisconsin Regional Planning Commission (SEWRPC). Waukesha County has obtainedthe data for internal planning purposes. The information and depictions herein are for informational purposes and Waukesha County specifically disclaims accuracy in this reproduction and specifically admonishes and advises that if specific and precise accuracy is required, the same should be determined by procurement of certified maps, surveys, plats, Flood Insurance Studies, or other official means. Waukesha County will not be responsible for any damages which result from third party use of the information and depictions herein, or for use which ignores this warning.

FIGURE 4-4

The SEWRPC distinguishes between primary and secondary environmental corridors and isolated natural resource areas. Primary environmental corridors are concentrations of significant natural resources at least 400 acres in area, at least two miles in length, and at least 200 feet in width. Secondary environmental corridors are concentrations of significant natural resources at least 100 acres in area and at least one mile in length. Isolated natural resource areas are those remaining significant natural resources at least five acres in area and at least 200 feet in width.

There is an extensive primary environmental corridor complex associated with the Pewaukee River and the Highway 16 corridor that terminates near the northwest end of the airport as seen in **Figure 4-4**. The primary environmental corridor is an assemblage of seasonally-flooded wet meadows, old field, scrub shrub wetlands, small ponds and woodlots and relatively large areas of riparian marsh, wet meadow and floodplain forest along the Pewaukee River. The various elements of the corridor are hydraulically connected by watercourses that extend beneath the Highway 16 right-of-way as well as I-90/94. Close to the Airport, the primary corridor includes an area of wet meadow, scrub-shrub wetland, with a forested border. Dominant plants include sedges, goldenrods, asters, cattail, reed canary grass, willow, dogwood, elm and maple.

4.7 Wetlands and Water Resources

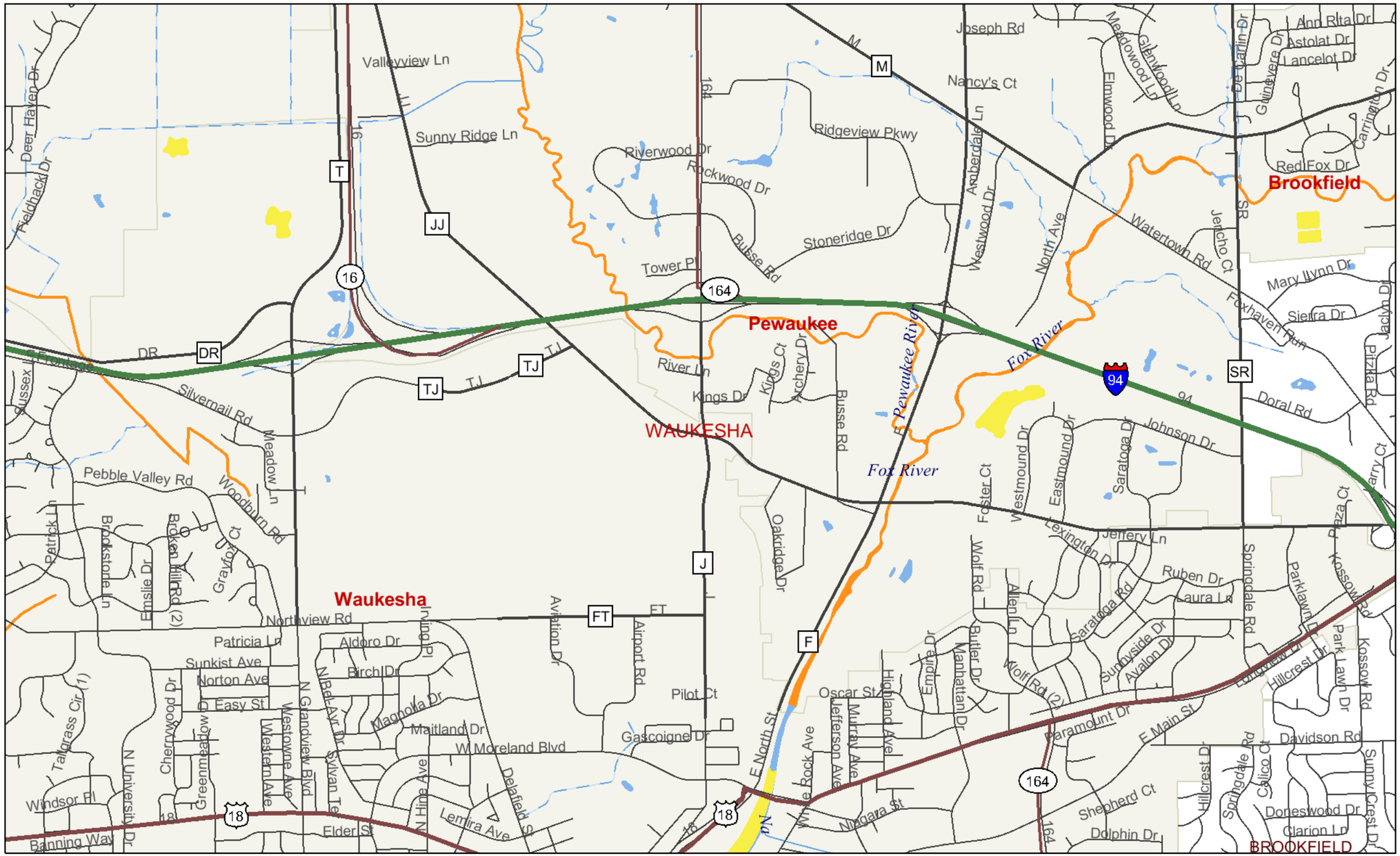
4.7.1 Water Resources

The Airport and project area are located in the Upper Fox River Basin watershed, outside the Coastal Zone of Lake Michigan. The Fox River is a tributary of the Mississippi which flows south through Racine and Kenosha counties into Illinois. **Figure 4-5** is a map showing water features in the area. There are no mapped floodplains in the immediate vicinity of the project that would be affected. These floodplains were identified through FEMA Floodplain Maps (1996, 2008), DNR Flood Storage Maps, and SEWRPC Floodplain Maps (1994) as shown in **Figure 4-6**.

The Pewaukee River, a tributary of the Fox River that originates at the east end of Pewaukee Lake, is the chief water resource feature of the project area because of its extensive floodplain, environmental corridor and Advanced Identification of Wetland Disposal Areas (ADID) wetlands. The Pewaukee River, which is the receiving water body for airport drainage, joins the Fox River immediately east of County Highway F, about a mile east of the airport. The Pewaukee River, the Fox River and Pewaukee Lake are all classified by the Wisconsin Department of Natural Resources as Areas of Special Natural Resources Interest under Section 281.15 of the Wisconsin Statutes. Other than these state-designated waters, there are no eligible or federally-designated wild and scenic rivers in the vicinity of the Waukesha County Airport project area.

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Map Created on Feb 01, 2012



0 2400 4800 7200 ft.

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes: Designated Water Bodies



Legend

Major Highways
- Interstate
- State Highway
- U.S. Highways
- County Roads
- Local Roads
- 24K County Boundaries

Civil Towns
- Civil Town
- PRF Other River Public Rights Features
- PRF Sensitive Rivers
- PRF Other Public Rights Features
- PRF Sensitive Areas of Lakes
- ASNRI Wild Rice Streams
- ASNRI Outstanding and Exceptional Streams
- ERW
- ORW
- ORW
- ASNRI Wild and Scenic Rivers
- ASNRI Trout Streams
- Class I Trout
- Class II Trout
- Class III Trout
- ASNRI Wild Rice Areas
- ASNRI Outstanding and Exceptional Lakes
- ERW
- ORW
- ORW
- ASNRI Quality Wetland Streams
- ASNRI Quality Wetland Areas
- ASNRI NHI Streams
- ASNRI NHI Areas
- PNW Musky Streams
- PNW Musky Areas
- PNW Sturgeon Streams
- PNW Sturgeon Areas
- PNW Walleye Areas
- PNW Perennial Trout Stream Tributaries
- PNW Lakes Less Than 50 Acres
- ASNRI State Natural Areas
- 24K Open Water
- 24K Rivers and Shorelines

N

Scale: 1:24,785

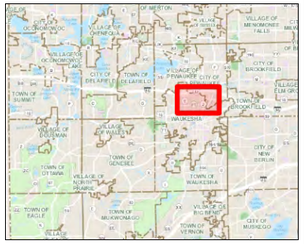
FIGURE 4-5

WAUKESHA COUNTY
LEADING THE WAY

LAND INFORMATION SYSTEMS DIVISION

Floodplain





Legend

FEMA Floodplain (2008)
- 1% Chance Flood Area (Zone A Nc
- 1% Chance Flood Area (Zone AE w
- Floodway (Zone AE)

DNR Flood Storage Maps

FEMA Floodplain (1996)

SEWRPC Floodplain (1994)

Plats
- Assessor Plat
- CSM
- Condo Plat
- Subdivision Plat

0 1,265.70 Feet

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Notes

FIGURE 4-6

Two impaired water bodies near the airport are listed by the WDNR as impaired under Section 303d of the Clean Water Act. These are the Fox River and Zion Creek. Zion Creek flows north to Pewaukee Lake about 1.5 miles west of the airport and is not a receiving water body for airport drainage. The Fox River is polluted by PCBs, phosphorus, sediment and suspended solids. Fish tissues are contaminated and dissolved oxygen is low. Pollution sources cited include contaminated sediments, rural and urban non-point runoff and discharges from separate municipal storm sewers.

The no action, proposed actions, and reasonable alternatives would not affect floodplains or coastal barriers.

4.7.2 Wetlands

Wetlands exist on and in the vicinity of the Airport and have been mapped by the WDNR (**Figure 4-7**). Many wetlands of various types are mapped on airport lands and in the vicinity of the airport boundary. These include ADID which are wetlands mapped as an inter-agency wetland identification project initiated within SEWRPC counties to identify high-value wetlands inappropriate for the disposal of fill and dredged materials. The SEWRPC works cooperatively with the U.S. Department of the Army, Corps, the U.S. Environmental Protection Agency, and the WDNR in identifying and mapping wetlands in the region that are unlikely to be found suitable for the disposal of spoil and dredged materials. This mapping program is authorized under Federal law and is intended to help landowners and developers avoid the expenditure of time and resources in seeking approvals for wetland fill permits where such approval is unlikely to be forthcoming.

ADID wetlands are often associated with mapped environmental corridors. In the project vicinity, the wetlands mapped and delineated on either side of Silvernail Road are ADID wetlands, which status puts greater weight on wetland impact avoidance during any permit sequencing process.

Wetlands were delineated on airport lands to assess potential impacts on this resource by project alternatives in accordance with the current field procedures of the Corps' recent delineation supplement for the Northcentral/Northeast Region. A map of wetland resources that is a composite of the field delineations is included in **Figure 4-8A**, with more detailed exhibits provided in **Figure 4-8B**, **Figure 4-8C** and **Figure 4-8D**. An analysis of impacts to wetlands is included in Section 5. Environmental Consequences.

4.8 Federally or State-listed species or critical habitat

On November 16, 2015, the USFWS Information for Planning and Conservation (IPAC) website was accessed to determine the presence of listed species in the project area. The IPAC website identifies three federally-listed species in Waukesha County - the Eastern Prairie Fringed Orchid (Threatened), the Poweshiek Skipperling (Endangered) and the Northern Long-Eared Bat (Threatened).

The Eastern Prairie Fringed Orchid has been known to grow in a wide variety of habitats from mesic prairie to wetlands such as sedge meadows, marsh edges, and bogs. This plant also requires full sun for optimum growth and is sensitive to habitat disturbance, including changes in hydrology and invasive

species. Although there are marsh wetlands located within the project site it is unlikely for this plant to occur because the wetlands present are so degraded and dominated by invasive species.

The Poweshiek Skipperling was listed under the Endangered Species Act in 2014 because of precipitous, nationwide declines in its populations. Poweshiek skipperlings are small butterflies most often found in remnants of native tallgrass prairie in Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin and in fens in Michigan.

In September 2015, the USFWS designated Critical Habitat for this butterfly in several states, including two sites in Wisconsin's Waukesha and Green Lake counties. The Endangered Species Act defines critical habitat as an area that contains habitat features that are essential for the survival and recovery of a listed species, which may require special management considerations or protections. Regulation of critical habitat is limited to the requirement that federal agencies consult with the Service on any actions that may affect critical habitat. The Service can then recommend ways to minimize adverse effects to the habitat.

The Waukesha County critical habitat is a native prairie complex within the Southern Unit of the Kettle Moraine State Forest about 17 miles southwest of the airport. No native prairie habitat exists in the vicinity of the airport. As the designated critical habitat is remote from the airport and no suitable habitat exists nearby, the project will have no effect on the Poweshiek Skipperling.

On April 2, 2015, the USFWS listed the Northern Long-Eared Bat as Threatened under the Endangered Species Act. The bat is a nocturnal, insect-eating mammal that has been known to occur throughout Wisconsin. The listing was prompted by large-scale and rapid population declines of the bat due to white-nose syndrome (WNS), a fungal infection that kills bats in their winter hibernacula. Northern long-eared bats hibernate in caves during the winter and often raise their young in trees during the summer pup season of June 1 through July 31. The bats use their maternity roost trees and hibernacula repeatedly for many years.

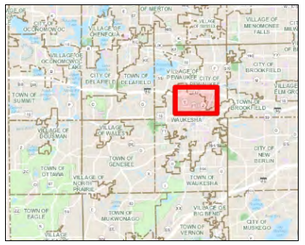
Although the USFWS has not designated Critical Habitat for this bat, it is currently being managed under a Section 4d Rule published on January 14, 2016 that has different procedures for dealing with impacts to hibernaculae or summer roost trees based on whether or not counties are where WNS has been reported. Counties near those where WNS has been reported are managed under Buffer Zone 4d rules. Waukesha County lies within the WNS buffer zone and the proposed project would impact a total of approximately 0.76 acres of forested habitat for the Runway 10 Safety Area and the extended Approach Lighting System. Tree clearing would be prohibited during the maternal roosting period of June 1 through July 31 and no bat hibernacula are known to exist within 0.25 miles of the location. Under the 4d rule, tree removal outside of the maternal roost calendar dates and in the absence of hibernacula within 0.25 miles of the project is not likely to adversely affect the bat and the FAA can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill the project-specific section 7 ESA responsibilities.

WAUKESHA COUNTY LEADING THE WAY

LAND INFORMATION SYSTEMS DIVISION

Wetlands





Legend

- DNR Wetlands < .25 Acres
- DNR Wetlands > .25 Acres
- Wetlands (2000 Land Use)
- Drainage Ditch
- Plats
  - Assessor Plat
  - CSM
  - Condo Plat
  - Subdivision Plat

0 1,265.70 Feet

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Notes

FIGURE 4-7

2013 WETLAND BOUNDARY OVERVIEW MAP

Legend

- Area of Interest
- Wetland Boundary 2013
- Wetland Boundary 2012
- Wetland Boundary 2010/2011
- Data Point

N

0 125 250

X:\2309990\113203.011\TECH\CAD\vendor\wetlands\Updated 2013 wetland boundary.dwg 5/8/2017

WAUKESHA COUNTY AIRPORT
WAUKESHA, WISCONSIN

WETLAND DELINEATION
FIGURE 4-8A

Legend

- Area of Interest
- Wetland Boundary 2013
- Wetland Boundary 2012
- Wetland Boundary 2010/2011
- Data Point

WETLAND 26
Area: 17.23 Acres
WWI Wetland Type: S3/E2K
WisDOT Wetland Type: SM

INTERSTATE I-94

DP 27 (Wetland)

DP 28 (Upland)

N

0 125 250

WETLAND 27
Area: 4.23 Acres
WWI Wetland Type: E2K
WisDOT Wetland Type: SM

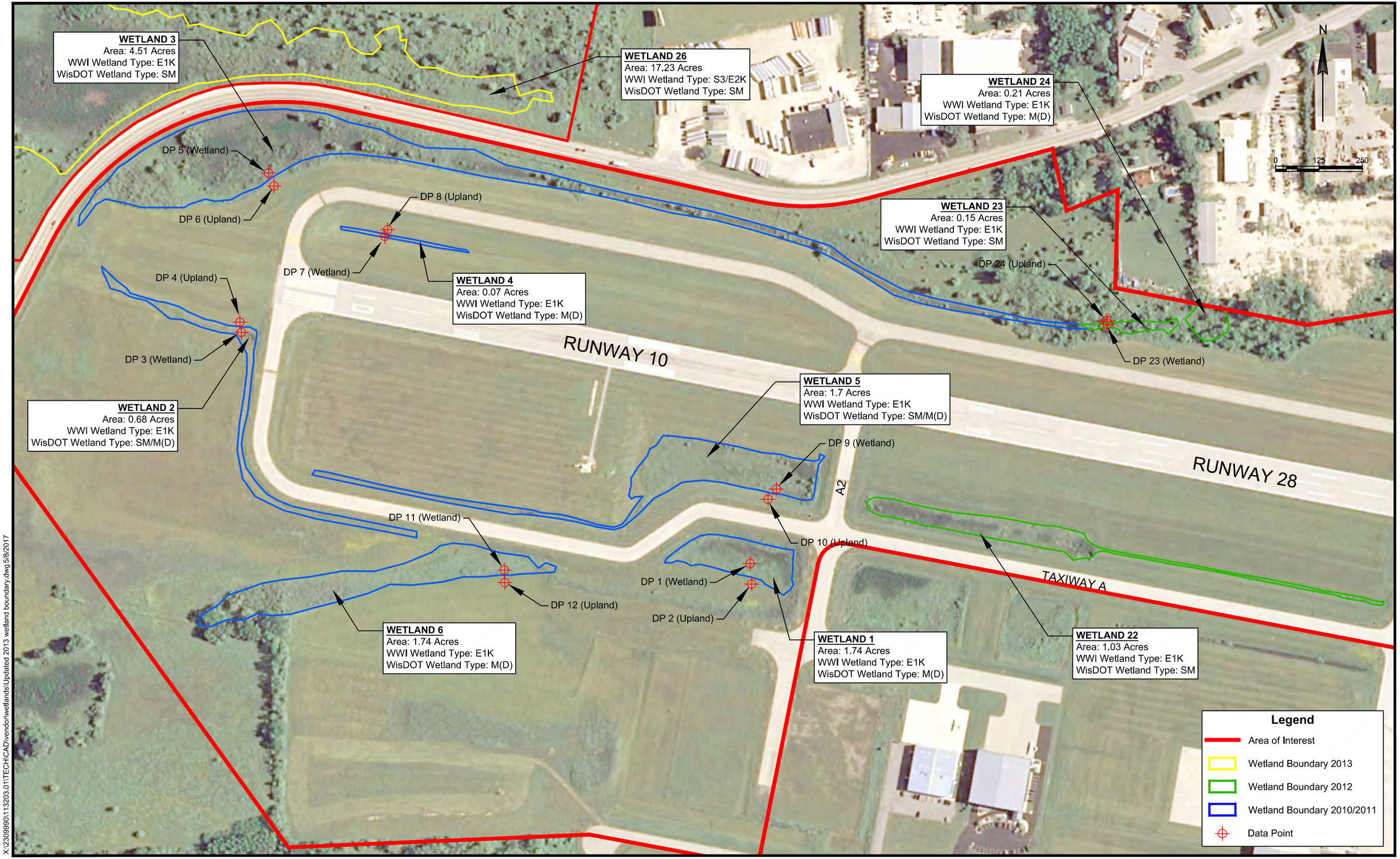
SILVERNAIL ROAD

RUNWAY 10

X:\2309990\113203.01\TECH\CAD\vendor\wetlands\Updated 2013 wetland boundary.dwg 5/8/2017

WAUKESHA COUNTY AIRPORT
WAUKESHA, WISCONSIN

WETLAND DELINEATION
FIGURE 4-8B



X:\230999\0113203.01\TECH\CAD\vendor\wetlands\Updated 2013 wetland boundary.dwg 5/8/2017

WAUKESHA COUNTY AIRPORT
WAUKESHA, WISCONSIN

WETLAND DELINEATION
FIGURE 4-8C

Legend

- Area of Interest
- Wetland Boundary 2012
- Wetland Boundary 2010/2011
- Data Point

N

0 125 250

WETLAND 7
Area: 0.009 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

DP 13 (Wetland)

DP 14 (Upland)

DP 15 (Wetland)

WETLAND 9
Area: 0.05 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: SM/M(D)

DP 16 (Upland)

WETLAND 10
Area: 0.59 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: SM/M(D)

WETLAND 8
Area: 0.02 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 12
Area: 3.06 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 13
Area: 0.03 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

DP 18 (Upland)

DP 17 (Wetland)

DP 19 (Wetland)

DP 20 (Upland)

WETLAND 15
Area: 1.16 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 11
Area: 0.004 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 14
Area: 0.07 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 18
Area: 0.06 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 17
Area: 0.05 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 16
Area: 0.02 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

WETLAND 19
Area: 0.06 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: SM

WETLAND 20
Area: 0.02 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: SM

WETLAND 25
Area: 0.10 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: M(D)

DP 22 (Upland)

WETLAND 21
Area: 0.34 Acres
WWI Wetland Type: E1K
WisDOT Wetland Type: SM

DP 21 (Wetland)

RUNWAY 36

RUNWAY 18

TAXIWAY A

RUNWAY 28

X:\230999\0113203.011\TECH\CAD\vendor\wetlands\Updated 2013 wetland boundary.dwg 5/8/2017

WAUKESHA COUNTY AIRPORT
WAUKESHA, WISCONSIN

WETLAND DELINEATION
FIGURE 4-8D

A WDNR review of the state Natural Heritage Inventory Database early in the project showed the presence of the state-threatened Butler's Garter snake (*Thamnophis butleri*) in the area. On January 1, 2014 the snake was removed from the Wisconsin Endangered/Threatened resources list and downgraded to Special Concern per administrative rule ER-27-11. The Butler's garter snake is a small reptile from 15 to 20 inches long as an adult. It prefers moist to wet, grassy, open-canopy areas, such as meadows, wet prairies, marshes, savannas and grasslands and can also be found in dry, adjacent grassy habitats such as old fields, prairies and lots in suburban and residential areas. The snake can often be found under rocks, logs, trash and boards. Butler's garter snakes subsist on a diet of earthworms, but may also eat leeches, salamanders and frogs. The species hibernates communally, often with other garter snake species. Butler's garter snakes are a relatively short-lived species and they reach sexual maturity in their second spring.

A Butler's Garter snake Environmental Assessment and Conservation Recommendations report was prepared by herpetologist Gary Casper and submitted to the Wisconsin Department of Transportation Bureau of Aeronautics on January 29, 2006. This report, available upon request, summarized the findings of a snake study that was done on the Airport property in June of 2004. Habitat suitable for Butler's Garter snake was found in two locations or patches in the project area. An analysis of impacts associated with the project is included in the Environmental Consequences section.

4.9 Historic, Archaeological or Cultural Resources

The Airport and surrounding landscape have been disturbed by years of agricultural use and more recently through modern/urban development. Prior to documented field survey, a literature/archival investigation was undertaken to find previously identified architecture/history and archaeological resources in the project area. As part of the initial investigation, resources recorded in the Wisconsin Historical Society's (WHS) Historic Preservation Database (WHPD) were reviewed. In addition, local historical societies and Native American Tribes were notified of the proposed project activities and were provided the opportunity to comment and/or become consulting parties as part of the Section 106 process (of the National Historic Preservation Act).

The Area of Potential Effects (APE) for the project includes the geographic areas within which the proposed action may directly or indirectly cause alterations to the character or use of historic properties. For indirect effects, the 65 DNL noise contour was considered. However, the APE for archaeology was defined to encompass areas of proposed ground disturbance. No architecture/history or archaeological resources that qualify as eligible for listing in the National Register of Historic Places (National Register) were identified. See Section 5 for additional documentation.

4.10 Past, Present, and Reasonably Foreseeable Actions

4.10.1 Airport Projects

Waukesha County Airport completed a Master Plan Update in 2001 with short and mid-term improvements that were identified through 2011, and more long-term improvements that have been identified through 2021. A Master Plan is a long range planning effort, which assesses the Airport's constraints and identifies projects to meet the Airport's long-term needs. The need to address the deficient safety areas on Runway 10-28 was a major component of the 2001 Master Plan Update. The

RSA project is a high priority safety issue mandated by Congress. The Master Plan Update serves as the outline for the past, present and contemplated future actions more fully described in the following paragraphs.

Past Actions

Past projects undertaken by the Airport are identified from the Year 2000, and include those associated with meeting user demands, maintaining levels of service, and maintenance. In 2000, a project involving the construction of taxilanes and utilities was completed on the south side of the Airport, just east of Aviation Drive which has since been completely developed with the construction of 19 hangar structures. In 2006, the Airport completed a project that included the reconstruction of the secondary cross-wind Runway 18-36, the expansion of the terminal parking lot, and the addition of three taxilanes and utilities to accommodate future hangars on the southeast side of the Airport. In 2010, new security gates, cameras and improved access roadways and medians were constructed for the two access points to the southeast hangar area from Northview Road. In 2013, segments of Taxiways F and D were reconstructed within their existing paving limits. In 2015, Runway 10-28 was reconstructed in its current location along with portions of intersecting runway and taxiways. The Runway 10-28 reconstruction also included replacement of the edge lighting and cabling. Lastly, since the Year 2000, other individual hangar developments have occurred around the terminal and corporate hangar development areas of the Airport including the construction of a medical response flight hangar at the far west end of the Airport, the SkyCom hangar located south of the terminal, and a hangar located just west of the terminal.

Present Actions

In addition to the safety area improvements for Runway 10-28 that have been outlined within the proposed actions of this environmental document, there are other current and near-term improvements that are in the development and/or planning stages. The Airport currently is involved in plans for reconstructing the north ramp asphalt pavements and new lighting as funding limitations did not allow for that portion of the project to be included in the 2012/2013 construction season. The Airport is also working with the Bureau of Aeronautics to expand the concrete apron pavement areas on both the west and south sides of the terminal that will accommodate private development of corporate hangars within each area.

The Airport is also pursuing a project to secure avigation easements and remove obstructions on its existing runway 10-28 approaches. This project is being undertaken independent of the proposed action and is required regardless of what decision is made on the proposed action evaluated in this EA.

Future Actions

Future projects planned at the Airport are based on the improvements identified within the 2001 Master Plan, as well as current information provided by the Airport. The Airport Layout Plan (ALP) provided in **Appendix A** illustrates these proposed future actions. The parallel taxiway on the east side of Runway 18-36 (Taxiway C) is in need of reconstruction and the south half of the taxiway is located too close to the runway. The Airport plans to reconstruct Taxiway C and Taxiway D, with relocations of these taxiways to accommodate current FAA standards and to improve circulation on the airfield. Other airfield pavement improvements include the widening and strengthening of both runway and taxiway pavements to full Design Group C-III standards. Other long term developments include the additional expansion of the

terminal area parking lot, the expansion of hangar development areas on the southeast and west corporate areas of the airfield, and the construction of a Snow Removal Equipment (SRE) storage building within the Airport property.

4.10.2 Other Transportation Projects

The SEWRPC is the official metropolitan planning organization and regional planning commission for the seven county southeastern Wisconsin area. As part of their mission, they have prepared regional transportation plans. These include the long range *Regional Transportation System Plan for Southeastern Wisconsin: 2035 (Planning Report No. 49)* which was completed in 2006. Recently SEWPRC issued *Memorandum Report No. 197, Review, Update, and Reaffirmation of the Year 2035 Regional Transportation Plan*. Additionally, SEWRPC prepared a more near term look at transportation needs with *Memorandum Report No. 202, Regional Transportation Operations Plan for Southeastern Wisconsin: 2012-2016*. Review of these documents for projects did not identify any in the immediate vicinity that would need to be included as part of the cumulative impact analysis.

The Waukesha County Highway Department, the Wisconsin Department of Transportation and the City Engineer for Waukesha were contacted to identify projects that have been completed or are planned for completion within a 4-mile radius of the Airport and within the past/future 5 year window.

Past Projects

- Waukesha County is completing improvements for County Trunk Highway JJ between County Trunk Highway J and US Highway 18. The project is funded with Highway Safety Improvement Program money.
- In 2011, the Waukesha County Highway Department completed a roadway lighting project that replaced many of the existing high pressure sodium street light fixtures with LED luminaires.
- In 2010/2011, the Wisconsin Department of Transportation completed a resurfacing of Interstate I-94 that spanned from Highway 16 to Milwaukee.
- In 2009, the Waukesha County Highway Department resurfaced Highway J (Pewaukee Road).
- In 2009, the Waukesha County Highway Department completed construction of 10,000 cubic yard salt dome structure within their Highway facility located just west of the Airport on the east side of GrandView.

Reasonably Foreseeable Actions

- Waukesha County is involved in the development of a West Waukesha Bypass roadway proposed from State Trunk Highway 59 to Interstate 94. Construction for this project is estimated within a five year window.
- Waukesha County has plans for rehabilitation of County Highway F, from Busse Road to State Trunk Highway 190 within the 5 year planning window.
- Waukesha County noted the possibility of resurfacing or rehabilitating County Trunk Highway T from Delafield Road to Silvernail Road within the 5 year planning window.

- The Wisconsin DOT has three reconstruction projects planned within the defined 5 year planning window. These include:
  - S East Avenue from Waubash Avenue to College Avenue
  - West Waukesha ByPass from Summit Avenue (Highway 18) to Northview Road.
  - West Waukesha ByPass from Summit Avenue to Genesse Road.

- The Wisconsin DOT has a number of resurfacing and pavement replacement projects planned within the defined 5 year planning window. These include:
  - County Trunk Highway F between Busse Road and STH 190 (South Ramp)
  - Moreland Boulevard between Manhattan Drive and Interstate 94
  - S East Avenue between Sunset Drive and Wabash Avenue
  - Capitol Drive between STH 74 and Brookfield Road.

In conversations with Airport management and representatives from the Waukesha City Engineering, Waukesha County Highways and State Department of Transportation, no plans were known for any commercial projects or developments within the defined 4-mile radius of the Airport. The City of Waukesha was therefore contacted for such information, which is described in the following section.

4.10.3 Private Developments

The City of Waukesha Department of Community Development was asked to provide general descriptions and locations of private development proposals that, in their opinion, had a reasonably foreseeable probability of execution over the next five years. A total of eight locations around the periphery of the City were identified as described below:

- Southeast corner of Saylesville Rd and Les Paul Parkway – Commercial
- South side of Northview Rd. west of Tall Grass Circle – Residential
- West side of Saylesville Rd. across from West High School – Residential and Institutional
- Tenny Avenue south of Sunset Drive – Residential
- West side of Meadowbrook Road north of Summit Avenue - Residential
- North of Broadway west of Springdale Road. - Residential
- SE corner of Oakdale Dr. and Les Paul Parkway – Residential
- NE corner of Lawnsdale Rd and Center Rd. - Residential

The cumulative total of land included in these sites is about 300 to 350 acres. These undeveloped areas were reviewed using online resources for recent aerial photography, hydric soils and wetland mapping. All but one location contained some wetland or hydric soil coverage, woodlands or environmental corridor feature combining woodlands, wetlands or streams. Land use, however, was predominantly agricultural among all the sites and reasonable road access for infrastructure development appeared possible without major wetland impacts at each site.

5. Environmental Consequences

This section provides an analysis of the preferred alternative for the environmental impact categories identified in DOT FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, dated June 8, 2004. A summary of each category is presented. The categories of impacts that were identified in Section 4 that are not applicable to the Runway Safety Area Improvements Project at Crites Field include: Coastal barriers, Coastal Zone Management, Farmlands, Federally-listed species, floodplains, DOT Section 4(f) and wild and scenic rivers. These categories are therefore not included in this Chapter. Correspondence with each of the review agencies is presented in the appropriate appendices.

5.1 Air Quality

Two primary regulations apply to air quality, and include NEPA and the Clean Air Act (CAA). The FAA provides guidance on when an air quality assessment is required. The need for an assessment depends on the nature of the project, the size of the airport and project, and the project area's air quality classification. The proposed project is being initiated to bring the Airport into compliance with FAA safety standards. It is not a capacity project or a capacity-inducing project. The preferred alternative brings Runway 10-28 into compliance with FAA standards while maintaining the existing runway length. Under current regulation, air quality analyses for NEPA is only required if the airport has 180,000 operations or more. According to the FAA's Terminal Area Forecasts (TAF), Waukesha County Airport (UES) conducted 42,202 total operations in 2014, considerably less than this operational threshold.

The Clean Air Act and its amendments include a comprehensive strategy to achieve and maintain National Ambient Air Quality Standards (NAAQS) for specified criteria pollutants, further reductions in mobile source emissions, regulation of air toxins, establishment of a new acid rain control scheme, the phase-out of production and sale of ozone-depleting chemicals, and new enforcement sanctions. The State of Wisconsin has adopted a State Implementation Plan (SIP) to attain these goals. Waukesha County is currently in attainment for all NAAQS pollutants except for the particulate matter $PM_{2.5}$. The CAA required the United States Environmental Protection Agency (USEPA) to issue rules that would ensure federal actions conform to the SIP, which for FAA projects falls under General Conformity.

The FAA has identified actions that are exempt from the General Conformity rule requirement, as they are presumed to conform due to their low emissions or because they result in no emissions. The preferred alternative is being initiated for safety reasons and is not anticipated to increase capacity, aircraft operations, nor would it alter the aircraft fleet mix that uses the Airport. Safety area improvements are included in the FAA's Presumed to Conform Actions under General Conformity as published in the July 30, 2007 Federal Register (vol.72, No. 456, July 30, 2007) unless a new road or relocation of a road is included in the improvement. The preferred alternative for the Runway 10-28 does not include any new roads. Although Silvernail Road needs to be relocated on its general existing route to accommodate the preferred alternative, this action would not increase traffic nor would additional destinations be added that would increase vehicle traffic and associated emissions. Based on the above, this project is presumed to conform to the CAA and requires no further analysis.

An estimate of construction emissions was made with the EPA's NIMS model. Results indicated that NAAQS pollutant levels are well below thresholds of significance. The WDNR requests that the Airport consider voluntary air quality construction best management practices during construction; including practices such as idling restrictions and use of non-road construction equipment that has been retrofitted with diesel emission control devices to reduce overall emissions. Implementing these best management practices would require including provisions for their use in construction documents. Construction documents would consider implementation of such best management practices.

Based on this analysis, it is assumed that no air quality impacts are associated with either the preferred alternative or the no action.

5.2 Biotic Resources

Section 4.6 provides a description of the biotic resources in the vicinity of the Airport. Much of the area that would be impacted by the preferred alternative has previously been disturbed. Vegetative cover is primarily mowed grass on the Airport except in wet or low areas.

Butler's Garter Snake

The DNR's Natural Heritage files indicated the presence of the Butler's garter snake (*Thamnophis butleri*) in the project area. The Butler's garter snake was removed from the Wisconsin endangered/threatened species list on January 1, 2014 per administrative rule ER-27-11. It is now listed as a Special Concern species. Although technically not requiring a WDNR Incidental Take Authorization because of this new status, project impacts to this species would be minimized and mitigated to the extent practicable under the environmental liaison process of the WisDOT/WDNR Cooperative Agreement.

As described in Section 4.8, a field study was undertaken for this species. The Butler's garter snake habitat research completed at the airport in 2006 (available upon request) identified two habitat patches for the snake near the end of Runway 10 and Silvernail Road.

Habitat Patch One, covering 11.1 acres, includes ADID Wetland 3 (**reference Figure 4-8C**) and surrounding upland grassy habitat and was classified as a Tier 1 (Minimal Conservation Value) site because it was between 10 to 20 acres and had poor wetland habitat quality, with more than 75% cattail cover. Two Butler's garter snakes were observed in Habitat Patch One during the survey. Habitat Patch Two, covering 26.3 acres of wetlands and uplands between the north side of Silvernail Road and the I-94 right of way, includes ADID Wetland 2 and was classed as a Tier 2 (Moderate Conservation Value) site, because it was between 20 and 30 acres and poor-quality wetland dominated by cattail and reed canary grass. Two Butler's garter snakes were observed in Habitat Patch Two during the survey. Mr. Casper observed in his report that connection of these two habitat patches, via removal of Silvernail Road, would result in a Tier 3 (High Conservation Value) habitat patch.

The Preferred Alternative would impact about 1.292 acres of ADID Wetland 3 within Habitat Patch One (Tier 1 habitat) and 2.626 acres of ADID Wetland 2 within Habitat Patch Two (Tier 2 habitat). Although the field research was completed earlier in this EA process, no modifications have been made to the study area and therefore it is assumed that the conclusions are still valid.

On August 26, 2015 an agency meeting was held at the airport to discuss project impacts, including potential impacts to ADID wetlands and the Butler's garter snake (minutes provided in **Appendix J**).
A purpose of the meeting was to discuss the findings of a wetland functional impact assessment (see Section 5.13, Wetlands) which had identified potential increased road kill of reptiles and amphibians due to the proposed relocation of Silvernail Road as part of the preferred alternative. Among the mitigative measures discussed at the meeting was the provision of wildlife underpasses beneath the proposed road alignment, a measure also identified in the 2006 Butler's Garter Snake report. Practical WisDOT experience with such measures indicates they can perform well if designed correctly for local conditions. The WDNR suggested a wetland wildlife species inventory be done to identify the species present in order to accurately mitigate for these wildlife effects. The study of wildlife passages to minimize road kill and provide hydraulic connection between remaining wetland areas could then be implemented most cost-effectively. Explicit mitigative measures would be explored in more detail during project design.

Based on the above, it is concluded that there would be no substantial impacts to the Butler's garter snake and associated wetland and terrestrial wildlife with the preferred alternative. With the no action, there are no impacts.

Northern Long-eared Bat

On April 2, 2015, the USFWS listed the Northern Long-Eared Bat as Threatened under the Endangered Species Act. The listing was prompted by large-scale and rapid population declines of the bat due to white-nose syndrome (WNS), a fungal infection that kills bats in their winter hibernacula.

As discussed in Section 4.8, the USFWS has not designated Critical Habitat for this bat, but it is currently being managed under a Section 4d Rule published on January 14, 2016 that has different procedures for dealing with impacts to hibernacula or summer roost trees based on whether or not counties are where WNS has been reported. Counties near those where WNS has been reported are managed under Buffer Zone 4d rules. Waukesha County lies within the WNS buffer zone and the proposed project would impact a total of approximately 0.76 acres of forested habitat for the Runway 10 Safety Area and the extended Approach Lighting System.

Tree clearing would be prohibited during the maternal roosting period of June 1 through July 31 and no bat hibernacula are known to exist within 0.25 miles of the location. Under the 4d rule, tree removal outside of the maternal roost calendar dates and in the absence of hibernacula within 0.25 miles of the project is not likely to adversely affect the bat. Based on the above, it is concluded that there would be no substantial impacts to the Northern Long-eared bat. With the no action, there are no impacts.

5.3 Compatible Land Use

FAA Order 5050.4B states "*the compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the noise impacts.*" The FAA also considers compatible land uses to be those that will not hinder the safe operations of aircraft, both on the ground and in the air. Included are elements which have the potential to be a wildlife attractant, such as wet detention ponds and wetland mitigation. FAA Advisory Circular (AC) 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports***,** provides guidance on wildlife attractants and non-compatible land uses. FAA AC 150/5300-13A, *Design*

Standards, provides guidance on various safety areas in proximity to the runway ends and approach areas near the runway which require special consideration. This section evaluates these two aspects of compatible land use.

5.3.1 Airport Noise

A noise analysis was conducted for the EA using the Integrated Noise Model (INM). The noise analysis was completed using year 2013 for a baseline and operation projections from the Federal Aviation Administration's Terminal Area Forecasts (TAF). Noise exposure maps were generated for the year 2013 (considered as the existing condition), and the year 2016 (considered as the year of implementation for the project). Based on this noise analysis, which is described in Section 5.9, it was concluded that there would be no significant noise impacts resulting from the preferred alternative.

5.3.2 Wildlife Attractant and Safety Critical Areas

The operation of the airport is not anticipated to change as a result of the project, as it is initiated to enhance safety for the existing airfield facilities and aircraft operations. No wet detention ponds are included in the project's storm water management systems, although dry detention ponds are proposed as part of the preferred alternative and would be constructed to temporarily detain storm water before releasing. All ponds would be designed to drain within 48 hours of an event, in accordance with FAA AC 150/5200-33B. Although an acre of onsite wetland mitigation is technically possible via removal of Silvernail Road fill (see Section 5.13, Wetlands), this would only be pursued under the direction and review of USDA Wildlife Services to assure compliance with FAA AC 150/5200-33B. Therefore, the project is not anticipated to result in an increase in wildlife attractants.

Safety critical areas include Runway Safety Areas (RSAs), Object Free Areas (OFAs), and Runway Protection Zones (RPZs). Bringing the RSAs into compliance is the purpose for this project. An OFA is the two-dimensional area surrounding the runway from which all above-ground objects must be removed unless they are fixed by function. For Runway 10-28 the width of the OFA is 800 feet. The Runway 10 Localizer array and its associated equipment shelter are located within the existing OFA extending off the east (Runway 28 end) of the runway. Additionally, the OFAs extend into the roadway right-of-ways on either runway end. Both of these will be corrected with the proposed alternative. Runway Protection Zones (RPZs) are the two-dimensional trapezoidal areas beginning 200 feet beyond each runway end and were established to both preclude obstructions potentially hazardous to aircraft and also to control building construction for protection of the public on the ground. Land uses within the RPZ are federally restricted and there are varying means to control the land uses within them. As stated in FAA AC 150/5300-13A, "*Control is preferably exercised through the acquisition of sufficient property interest in the RPZ*." It is most desirable to own the RPZ in fee simple. Alternate means to control land include avigation easements and height restriction ordinances.

The preferred alternative (Alternative 11) would result in a shift of the Runway 10 approach RPZ by 400 feet west. The following **Table 5-1** provides information related to land uses within the existing and proposed portions of the full and central RPZ areas. Exhibits providing greater information and distances from the Runway 10 threshold are also provided in **Appendix G**.

Table 5-1 Runway 10 Existing and Proposed RPZ Land Uses

Existing Conditions	RPZ Total Acres		Central RPZ Acres		RPZ (Controlled Activity) Acres	
Aviation Easement	23.7	30.1%	13.4	23.3%	10.4	48.2%
Fee Simple - County	33.1	41.9%	30.0	51.8%	3.1	14.3%
Fee Simple - City	1.3	1.7%	1.2	2.1%	0.1	0.4%
Road Right-of-way	20.8	26.3%	12.8	22.3%	8.0	37.1%
No Control	0.0	0.0%	0.0	0.0%	0.0	0.0%
Total	78.9		57.4		21.5	

Alternative 11	RPZ Acres		Central RPZ Acres		RPZ (Controlled Activity) Acres	
Aviation Easement	30.6	38.8%	18.6	32.5%	12.0	55.7%
Fee Simple - County	23.5	29.8%	22.1	38.5%	1.4	6.5%
Fee Simple - City	1.3	1.7%	1.2	2.1%	0.1	0.4%
Road Right-of-way	23.0	29.1%	15.4	26.9%	7.6	35.1%
No Control	0.5	0.6%	0.0	0.0%	0.5	2.3%
Total	78.9		57.4		21.5	

Runway 10 RPZ land currently outside of Airport control is comprised of roadway right-of-ways. These consist of a Federal/State Interstate (I-94), a County Highway (County Trunk Highway T) and a City Roadway (Silvernail Road). The remaining portions of the RPZ are either controlled via avigation easement or land owned by the City or County of Waukesha. The County's Airport Layout Plan identifies the properties located east of County Trunk Highway T (Grandview Boulevard) for future acquisition.

Under the proposed alternative, small portions of three new properties would be introduced into the controlled activity areas of the Runway 10 approach RPZ and the Airport would work to acquire avigation easements over these properties. Some of the existing avigation easements may need to be lowered or amended to account for the shifted airspace, depending on their current wording and level of control. As a result of the westerly shift, segments of an incompatible fueling station would be removed completely from the RPZ for Runway 10. The departure RPZ for Runway 10 would remain unchanged and there are no changes to either the approach or departure RPZs for Runway 28.

An FAA RPZ alternatives analysis was completed for the RSA project in early 2014 which included all the alternatives analyzed as part of this Environmental Assessment. The FAA reviewed the existing and resulting land uses within the RPZs for each alternative and provided their support of Alternative 11, as documented in **Appendix G**.

Based on the above, it is concluded that the preferred alternative would have no substantial impact on compatible land use. With the no action, there are no impacts.

5.4 Construction Impacts

The preferred alternative's construction activities include relocating Silvernail Road, adding and removing pavement and access roads on the airfield, modification to runway approach lighting, fill and grading and navigational aids. Consideration of construction phasing would be needed in order to minimize airport operations and off-site impacts. Care would also need to be taken to contain construction disturbance to practical limits.

Construction equipment noise, dust, and soil erosion would be temporary in nature and their impacts minimized and mitigated through the implementation of appropriate construction Best Management Practices (BMPs) as specified in FAA AC 150/5370-10 (as amended), entitled Standards For Specifying Construction of Airports.

The project would need to comply with state and local regulations and requirements as well. Construction plans, specifications, and necessary permits would be prepared and acquired in accordance with applicable federal, state, and local regulations.

By implementing mitigation measures described in this section and elsewhere in the document, no substantial impacts are anticipated to be associated with the preferred alternative. With the no action alternative, there is no construction and hence no impact.

5.5 Hazardous Materials, Pollution Prevention, and Solid Waste

In July 2012 Mead & Hunt, Inc. (Mead & Hunt) completed an Environmental Site Assessment (ESA) Phase I for the proposed Runway 10-28 Safety Improvement Project at Waukesha County/Crites Field Airport. The ESA evaluated approximately 41 acres of land located on existing airport property in the following sections:

- Area 1 is located at the west end of Runway 10-28 in the South half of the northeast quarter of section 28 T.7 N, R.19 E
- Area 2 is located at the east end of Runway 10-28 in the Southeast quarter of the Northeast quarter of section 27 and the Northeast quarter of the Southeast quarter of section 27 T.7 N, R. 19 E

Based on the records review, historic land use, site reconnaissance, and a comprehensive risk report prepared by FirstSearch Technology Corporation™ (FirstSearch), no evidence was found to suggest that contamination was present within Areas 1 or 2. No subsurface investigations were completed as part of the ESA. No further investigations on airport land area were recommended. The Preferred Alternative consists of extending Runway 10-28 400 feet west from the existing runway footprint and realigning Silvernail Road. In order to accommodate the realignment of Silvernail Road, a privately owned parcel located at 1620 Silvernail Road will be acquired and the c.1985 building on the parcel will be demolished. For property acquisitions, additional Phase 1 studies will be required.

5.5.1 Hazardous Materials

According to information found in the FirstSearch report, no previously recorded hazardous materials sites were identified within the proposed project area. Subsequent reviews of databases from the U.S. Environmental Protection Agency, Wisconsin Department of Safety & Professional Service, and Wisconsin Department of Natural Resources did not identify any previously reported hazardous materials contamination sites or concerns within the proposed project area. Therefore, no further hazardous materials investigations are recommended.

As a precaution, project documents, including specifications, would include language that states that users and those who handle hazardous materials would do so according to applicable regulations. Also, that the person or entity responsible for handling the hazardous material would take immediate corrective action, including notifying the National Response Center, if there is an accidental release or other incident that can endanger people or environmental resources.

5.5.2 Pollution Prevention

Pollution control of surface waters is addressed in Section 5.12 Water Quality. The Airport has a Spill Prevention, Control, and Countermeasure Plan. If the storage or use of hazardous wastes and materials, fuels, chemicals, or solvents presents a pollution potential, then these plans could be used to minimize the potential for pollutant contamination.

5.5.3 Solid Wastes

It is anticipated that the solid waste disposal associated with the construction and operation of the project would not result in a substantial change in current solid waste handling. Most of the waste generated from earth disturbance and pavement removal is anticipated to be used or wasted on-site. Other construction materials would be disposed of at an approved solid waste landfill. The proposed development projects would not generate substantially different quantities or types of solid waste, nor would the projects affect the method of collection or disposal of generated waste than with the no action alternative.

The ESA cannot unequivocally rule out the possibility of environmental contamination; however, it can reveal significant information relative to the environmental condition of the subject parcel and surrounding area. The assessment should be used as a tool to determine the likelihood that a parcel is contaminated. Based on the above, it is concluded that there are no impacts with the preferred alternative or the no action.

5.6 Historical, Architectural, Archaeological, and Cultural Resources

Architecture/history and archaeological investigations for the Airport RSA project were completed in compliance with the requirements of Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665) as amended and 36 CFR Part 800.

The Wisconsin Department of Transportation, Bureau of Aeronautics (WisDOT, BOA) and Wisconsin State Historic Preservation Office (SHPO) concurred that the proposed RSA project would have no effect on historic properties in March 2007. Because the proposed project activities changed in 2012 an

amended Section 106 packet, including architecture/history and archaeology reports, notification letters, and plan sheets was prepared and submitted to WisDOT, BOA, and SHPO for concurrence.

Architecture/History

The Area of Potential Effect (APE) was defined to encompass the geographic areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties. Within the APE, a search was conducted for buildings, structures, and objects that were at least 40 years old, retained sufficient historic integrity, and appeared to be potentially eligible for the National Register of Historic Places (National Register) based upon architectural/historical significance.

Mead & Hunt reviewed the records of the Wisconsin State Historic Preservation Office (SHPO) to identify previously surveyed properties, including those eligible or listed in the National Register. No eligible, listed, or previously identified properties were found in the APE. An architecture/history review was completed by Mead & Hunt in January 2013. No buildings, structures, or objects meeting the aforementioned survey criteria were identified; therefore, no properties were surveyed. Further architecture/history work is not recommended for this project.

Archaeology

The APE for archaeology was defined to encompass the areas of proposed ground disturbance. AVD Archaeological Services, Inc. (AVD) reviewed SHPO records for previously reported archaeology sites located within or adjacent to the proposed project area. AVD completed a Phase I archaeology survey in October 2012. Approximately 44 acres of land on existing Airport property were evaluated as part of the survey. No new or previously identified archaeological sites or artifacts were identified in the APE; therefore, no further archaeology work is recommended.

WisDOT, BOA and SHPO concurred that the proposed project has no effect on historic properties on May 2, 2013 and the approved Section 106 form is provided in **Appendix K**.

5.7 Light Emissions and Visual Impacts

Aviation lighting required for security, obstruction clearance, and navigation are the chief contributors to light emissions radiating from airports. An analysis is necessary when projects include the introduction of new or the relocation of existing airport lighting facilities that may affect residential or other sensitive areas.

For Runway 10, the approach lighting system is proposed to shift 400 feet west. The land use map in **Figure 4-1** shows that there are no residential areas in direct alignment with this lighting on the west side of the Airport. The land uses surrounding the Airport where the proposed development would take place do not contain residences or other sensitive types of light receptors within close proximity to the proposed alternative. It is concluded that there would be no light emissions or visual impacts associated with the preferred alternatives. There are no impacts with the no-action.

5.8 Natural Resources, Energy Supply, and Sustainable Design

Energy requirements associated with an airport usually fall into two categories: those that relate to changed demands for stationary facilities and those that involve the movement of air and ground vehicles. Examples of these are airfield lighting, terminal building heating and cooling systems, and aircraft and passenger vehicles.

There would be a slight increase in the production and consumption of energy required during the construction phases of the preferred alternative. The primary additional usage would be fuel required for construction machinery. Any other changes in additional workloads for the maintenance vehicles at the Airport are not expected to have an impact on energy requirements or natural resources. Aggregate and other mineral materials needed for base course and new pavements would originate from nearby, active quarries operating under existing permits. It is also anticipated that some of the existing pavement materials may be able to be recycled. Efforts would be made during design to identify opportunities for recycling pavements for use as the underlying base course of new or relocated pavements.

No additional habitat disturbances are anticipated to occur due to project demand for such materials.

There are no energy supply or natural resources impacts associated with either the preferred alternative or no action alternative.

5.9 Noise

Noise at an airport is simply defined as “unwanted sound.” Noise compatibility planning is essential for an airport to maintain a positive relationship with its airport neighbors. The Runway Safety Area Project is a safety compliance project. Although its implementation would not result in increased airfield capacity or changes in fleet mixes, it would result in some changes in take-off and landing locations for the runway, and therefore a noise analysis was completed to evaluate the noise impacts.

The noise modeling was performed using the FAA’s Integrated Noise Model (INM). The INM is an accepted industry tool for evaluating aircraft noise impacts in the vicinity of airports. The INM has many analytical uses, such as assessing changes in noise impacts resulting from new or extended runways or runway configurations, assessing new traffic demand and fleet mix, assessing alternative flight profiles, and assessing modifications to operational procedures.

INM is an average-value model and is designed to estimate the long-term effects of noise using average annual input conditions. The model uses the annual day-night average sound level for quantifying airport noise. Federal Aviation Regulations (FAR) Part 150 defines this as the 365-day average of day-night sound level (DNL), which is measured in decibels. DNL is a cumulative noise metric which represents the average daily noise level adjusted to an equivalent level in order to account for the lower tolerance of people to noise during the nighttime periods compared to the daytime periods. A nighttime penalty (equivalent to increasing decibel levels by ten) for increased annoyance is added to flights occurring between 10:00pm and 7:00am. DNL express the 24-hour average of the summed, energy adjusted levels. DNL does not precisely define noise impacts relative to specific locations at a specific time. The FAA requires the use of summations metrics in noise studies.

The noise analysis for this Environmental Assessment was prepared using existing FAA operational data for 2013 (the base year) and projected operations from the FAA's Terminal Area Forecasts (TAF) for 2016, the estimated year of implementation. The FAA's TAF records indicate that 48,743 operations were conducted at Waukesha County Airport (UES) in 2013. This number is down from the previous year and is reflective of lower total annual operations at the Airport since a peak of 95,276 operations in 2003. The history of operations at UES is presented in **Table 2-2**. Of note is that the air taxi, commuter and jet operations (business use) have seen small increases over the same time. At the time the noise analysis was developed, the FAA forecasts showed annual operations continuing to decrease at UES through 2014, with modest increases starting in 2015. The noise analysis presented in this Environmental Assessment is based on FAA Terminal Area Forecast (TAF) numbers of 48,743 annual operations for the 2013 base year, and a slightly reduced 47,713 annual operations for the projected year of implementation in 2016. The noise analysis is included in **Appendix L**. A review of the latest TAF forecasts (March 2016) projects the total 2016 operations for UES as 32,083, however this number is likely based on low 2015 numbers that were a result of a 4-month closure of Runway 10-28 for reconstruction. As such, the operational numbers used for the proposed condition noise levels are slightly conservative in consideration of the latest forecast data.

To summarize, the Integrated Noise Model requires a variety of user-supplied data, including physical airfield facilities, aircraft activity, fleet mix, day-night split, runway use, and flight tracks. Since the proposed action is not anticipated to change the fleet mix or operations, this data was held constant for both conditions.

Results

Noise contours are generated by plotting points of the noise level events that represent the average-annual day. The points are then connected to graphically represent the noise contours, which the aircraft generate. The preferred alternative involves a runway shift and implementing declared distances. Under the preferred alternative, the Runway 10 threshold for landings from the west, and takeoffs to the east is shifted by 400 feet west. The proposed actions would retain the existing Runway 28 threshold for landings from the east and takeoffs to the west.

The 60, 65, and 70 DNL noise contours are shown in **Figure 5-1, Figure 5-2 and Figure 5-3** respectively.

- **Figure 5-1** illustrates the DNL noise contours for the existing airport configuration, and the number of operations conducted in the 2013 base year.
- **Figure 5-2** illustrates the DNL noise contours for the existing airport configuration, and the number of operations forecasted by the FAA for the estimated year of implementation (2016).
- **Figure 5-3** illustrates the DNL noise contours for the preferred alternative's airport configuration, and the number of operations forecasted by the FAA for the estimated year of implementation (2016).

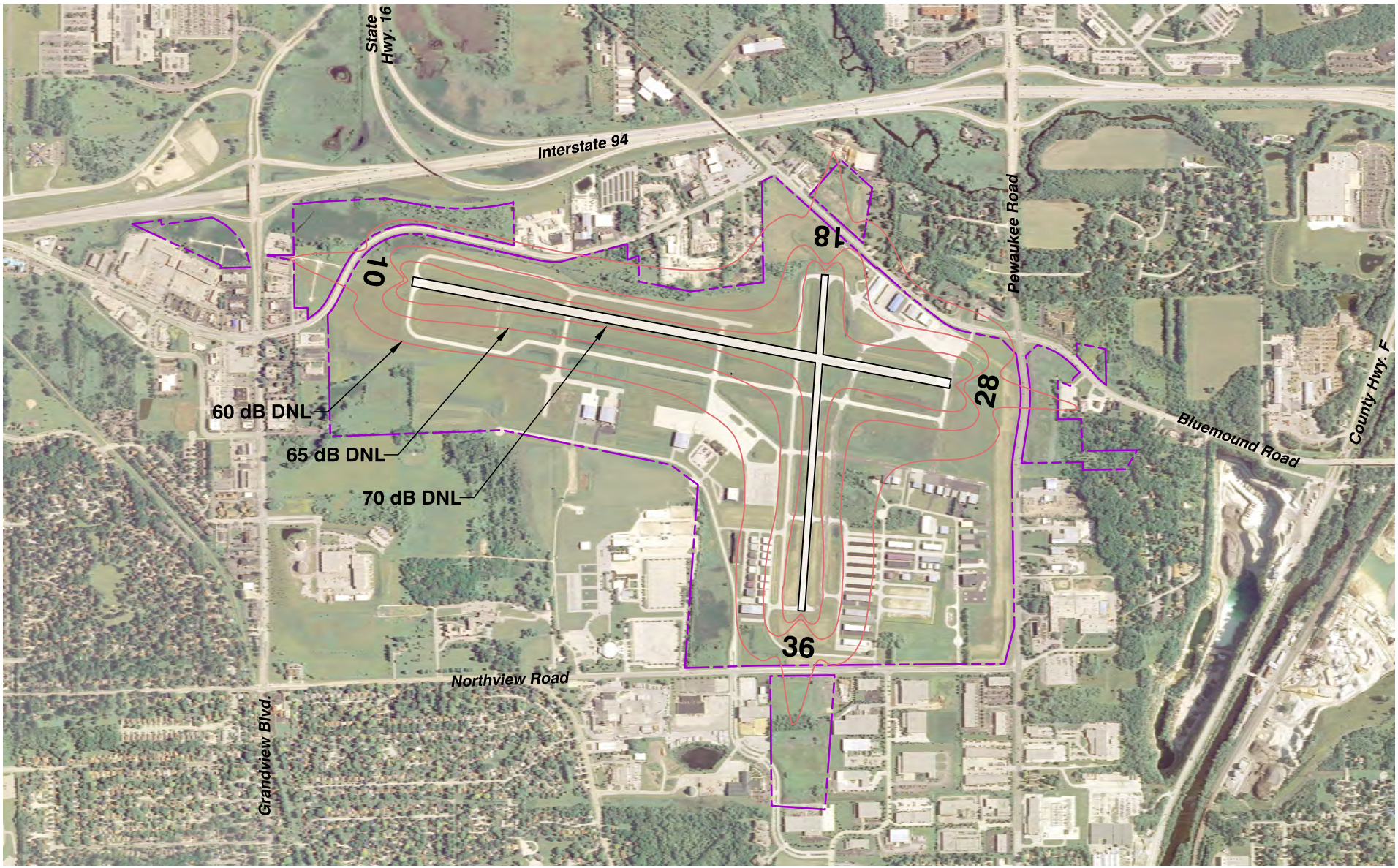
The FAA considers a 1.5 DNL increase over the 65 DNL as the threshold of significant noise impacts for noise sensitive areas. A noise-sensitive land use is defined to include residential areas, schools, churches, and hospitals. From review of **Figure 5-1**, under existing conditions (no project – 2013

annual operations) the 65 DNL is confined to airport property. **Figure 5-2** illustrates that the 65 DNL contour is also contained within the airport property under the no-project, 2016 condition, which is to be expected given that the total operations at UES are forecasted to be slightly lower.

Figure 5-3 illustrates that the noise contours under the preferred Alternative 11 condition will shift to the west with the proposed extension to Runway 10 when compared to the existing configuration in **Figure 5-2**. The 65 DNL contour under the proposed 2016 condition will also remain on Airport property with a shift in ROW for the realigned Silvernail Road, and there are no noise sensitive receptors off the west end of the runway. **Figure 5-3** further illustrates that the noise contours off the east (Runway 28) end will also shift west and further away from noise sensitive residential properties and a church located off the east end of the runway. This is a result of the starting point for takeoffs from Runway 10 being shifted by 400 feet west, resulting in the planes being higher in the air over these properties for takeoff operations to the east.

Based on this analysis, it is concluded that there are minimal noise impacts with the preferred alternative which do not require mitigation to the west, and that noise levels to the east will be reduced with the proposed actions. There are no impacts with the no-action.

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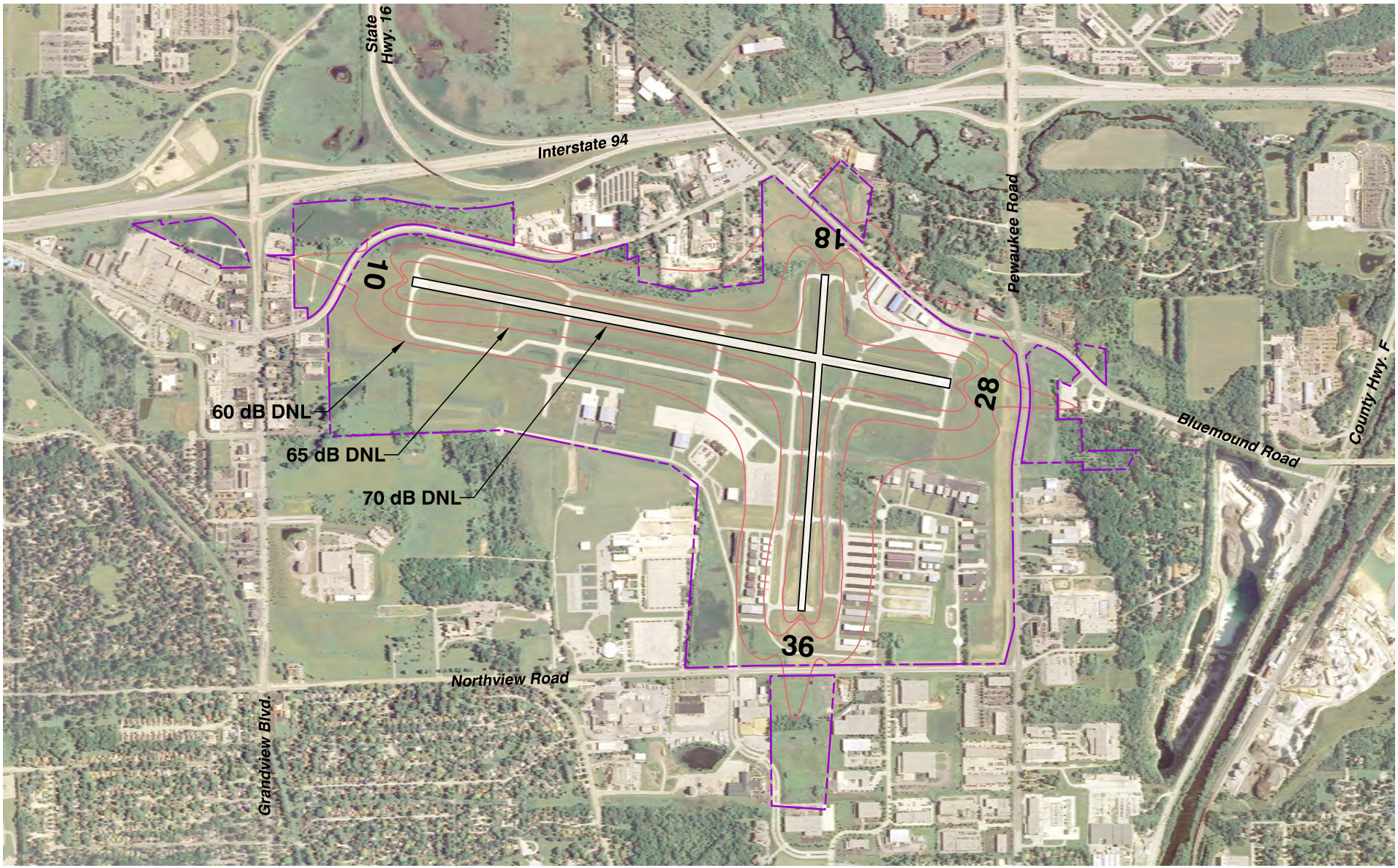
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Figure 5-1

Noise Contours: Existing Configuration

2013 Operations, Existing Runway Ends

Waukesha County Airport



750'
0 Feet 1,500'

N

LEGEND
Airport Property
Noise Contour

Mead&Hunt

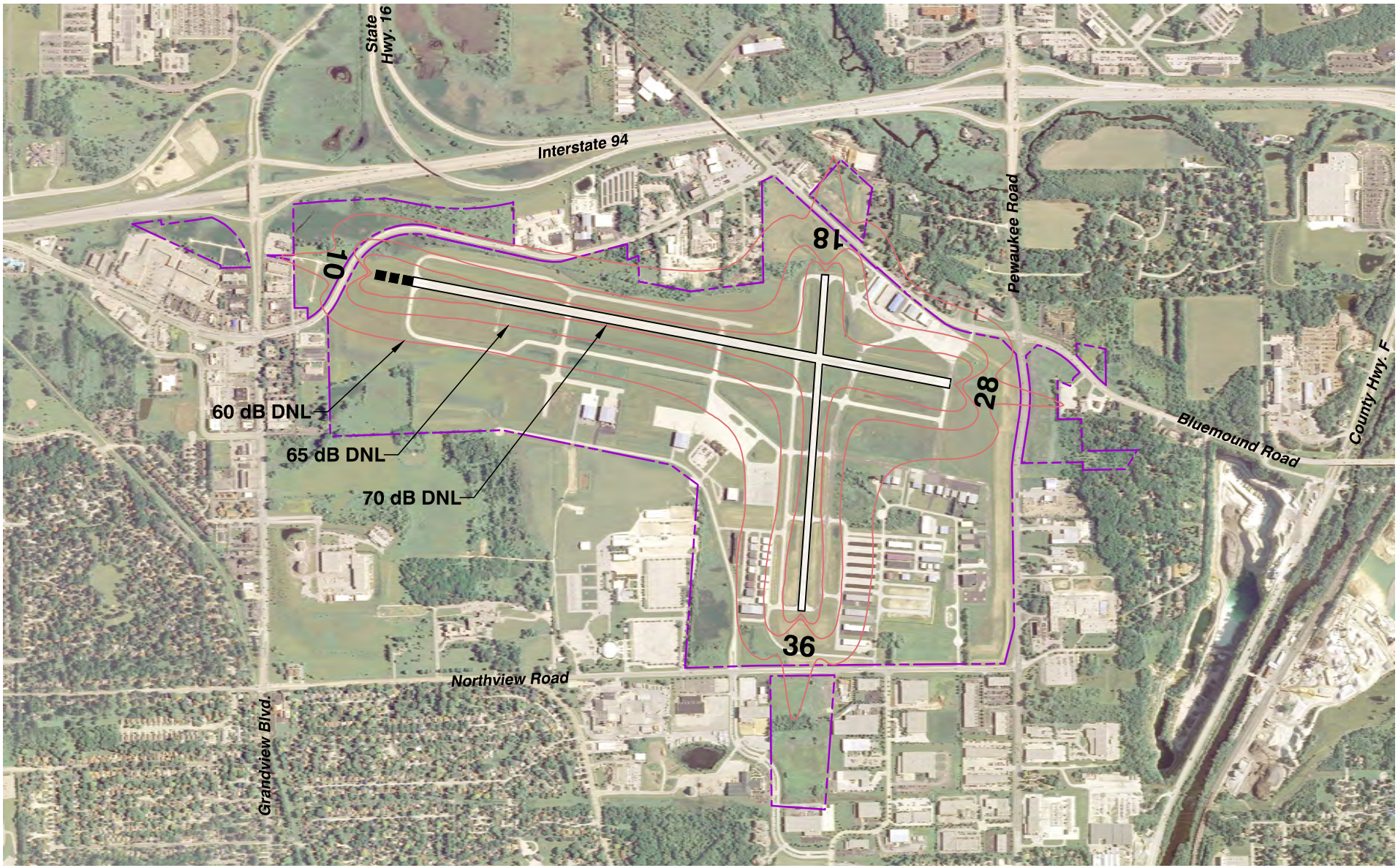
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Figure 5-2

Noise Contours: Existing Configuration

2016 Operations, Existing Runway Ends

Waukesha County Airport



750'
0 Feet 1,500'

N

LEGEND
- Proposed Runway Extension
- Airport Property
- Noise Contour

Mead&Hunt

X:\230990\040008\TECH\cadd\noise contours\UES.Noise2014EA.2016ops.Alt11c.dwg May 08, 2017 - 11:30am

Figure 5-3

Noise Contours: Preferred Alternative 11

2016 Operations, Extend Runway 10 400' West

Waukesha County Airport

5.10 Secondary (induced) Impacts

Secondary impacts are typically those associated with major development proposals that are large enough to possibly stimulate changes in socioeconomic or environmental conditions after construction. Induced impacts are generally not significant unless there are also significant impacts in other categories, which is not the case for the preferred alternatives, which are being implemented for safety compliance.

Therefore, it is concluded that there are no induced impacts associated with either the no-action or preferred alternative.

5.11 Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks

The proposed action would enhance the safety of current operations at the Airport, and no residential properties will be impacted by this project. The property impacts associated with a realigned Silvernail Road were discussed in Section 3.5.2 and include the acquisition and relocation of one bank business property (0.509 acres). Transfer of ownership between Airport property and City right-of-way is also needed to accommodate the new road alignment and the expanded runway safety area off Runway 10.

The property impacts associated with shifting the Runway 10 approach lights to the west were discussed in Section 3.7.1, and will require isolated partial property acquisitions of a nearby restaurant and an office building located on either side of the wider '1,000-ft bar station' associated with the approach light system. The size of these acquisitions is estimated to be approximately 500 square feet (for each property) and will likely require the adjustment of parking stalls and an access drive, but will not affect the buildings or the use of these properties.

As discussed in Section 5.3, Compatible Land Use, shifting the Runway 10 approach by 400 feet to the west will also lower the airspace clearances over nearby properties by roughly 10 feet, and existing avigation easements over these properties would need to be adjusted to correspond with the new approach. The County's existing Height Limitation Zoning Ordinance would also need to be revised to correspond with the shifted airspace.

All land acquisition will be completed in accordance with the provisions stipulated by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was established on February 11, 1994 to guide federal agencies to conduct programs and activities in a way that ensures no person is discriminated against as a result of their race, religion, color or national origin. Section 4 included a characterization of the population using 2010 census data. One census block was identified with a minority population exceeding 50 Percent east of CTH J. With the preferred alternative, noise contours are slightly lessened for properties east of the airport. It is concluded that there is not a disproportionate share of impact to minority or low income populations with the preferred alternative. Likewise, there is expected to be no impact on children's environmental health and safety with the preferred alternative.

Neither the preferred alternative nor the no action alternative would have a substantial impact on these categories.

5.12 Water Quality

According to FAA guidance, the principal framework for considering water quality in Federal decisions is contained in the Clean Water Act. Consideration of both point sources, non-point sources; including storm water runoff, and runoff pollutants is included.

The preferred alternative would result in disturbance of lands associated with grading, the installation of storm sewers, and an overall increase in impervious area associated with new or modified roadways and airfield pavements.

On the west end, pavements added for the extended Runway 10, Taxiway A, realigned Silvernail Road and navaid access roads result in an additional 5.8 acres of impervious area. This area would be offset by the removal of the non-standard north side parallel taxiway and a portion of the existing Silvernail Road alignment. As a result, the net impervious area on the west will be reduced by 0.38 acres.
The impervious area to the east will be increased by 2.02 acres with the addition of a perimeter access road around the Runway 28 end.
The actions proposed in the preferred Alternative 11 result in a net increase in impervious area of 1.64 acres.
Current surface drainage patterns on the west side of the Airport are to the north and west, discharging to the ADID wetlands which drain across Silvernail Road through a pipe. In coordination meetings documented in **Appendix E**, the City of Waukesha communicated that the existing drainage capacity under Silvernail Road was not adequate and cited several occasions where water had overtopped the roadway during large storm events. The realignment of Silvernail Road will need to account for proper storm water management and capacity. The proposed west side improvements would result in an overall reduction of 0.38 acres of impervious areas from these west side drainage areas, and it is anticipated that additional storm water quality measures can be installed outside the improved safety areas and object free areas of the runway such as swales and/or engineered soils to improve infiltration and lessen runoff. Stormwater conveyance beneath Silvernail Road may also be increased by the provision of wildlife underpasses (See Section 5.13.2 Wetland Mitigation).

Drainage on the east side of the Runway primarily flows overland through ditch lines and storm sewers and discharges to the north of the airfield just west of the Runway 18 end by means of an old and undersized 24-inch concrete pipe. This concrete pipe system originates at the Waukesha County Expo Grounds and meanders through the Airport along Runway 18-36 before exiting the Airport to the north. The storm sewer's alignment north of the Airport is not well known, and the County's Land Resources Division is currently working to more precisely survey and document the routing and discharge point of this storm sewer system.

To account for the 2.02 acre increase in impervious area on the east end of the proposed improvements, and to address other capacity and structural concerns associated with the old and undersized 24-inch

storm sewer, a dry detention pond is proposed at the confluence of the old storm sewer system and other surface drainage swales preceding the discharge point from the Airport to the north.

A storm water management plan, which would address both water quality and quantity, would be prepared to meet the requirements of the City of Waukesha's and Waukesha County's storm water ordinances and TRANS 401 Wisconsin Administrative Code Standards. These units of government would perform the required coordination with the Milwaukee Metropolitan Sewerage District (MMSD) to ensure compliance with MMSD's Chapter 13 regulations. MMSD's Chapter 13 regulates water quantity. The storm water management plan developed would need to assess pre and post development runoff rates and provide controls, if necessary, to meet the MMSD's release requirements.

Best management practices would be incorporated into the project with the goal of meeting the required release flow rates and pollutant reductions. However, because of the potential of becoming a wildlife attractant, wet detention, a very effective Best Management Practice (BMP), is not allowed within a 10,000 foot distance from the Air Operations Area. Dry detention for control of flow releases is proposed as part of the preferred alternative, and the ponds would be designed to be drawn down within 48 hours and their implementation is subject to both Airport and USDA-Wildlife Services review. The dry detention facility included in this proposed action was identified and sited in previous airport drainage studies. BMPs to be considered would include bio-swales, engineered infiltration areas, dry detention and other methods acceptable in an airport environment.

In addition to receiving approval for the storm water management plan from the City of Waukesha, the project would also need to receive State Water Quality Certification. Based on the above, it is assumed that the impacts to water quality can be satisfactorily mitigated to not result in a substantial water quality impact. With no action, there are no impacts.

5.13 Wetlands

As described in Section 4.7.2, wetlands were delineated on airport lands to assess potential impacts on this resource by project alternatives in accordance with the current field procedures of the U.S. Army Corps of Engineers. Potential wetland impacts of the project were studied during development of alternatives and are summarized in Section 3. *Alternatives.*

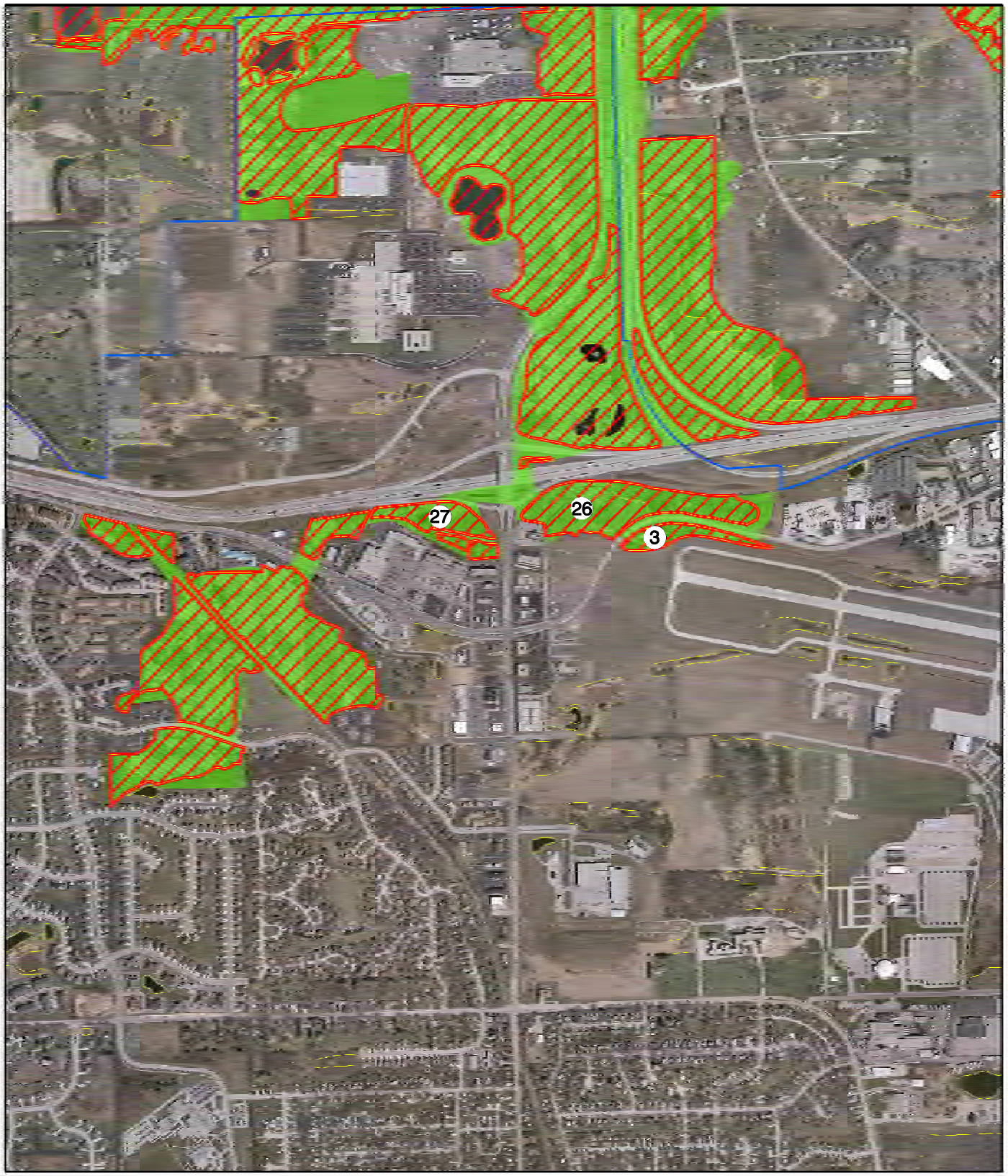
Wetland delineations completed for the project were reviewed and approved by the U.S. Army Corps of Engineers, and a copy of the preliminary jurisdictional determination and approved delineation report are available upon request**. Figure 4-8A, Figure 4-8B, Figure 4-8C and Figure 4-8D** show the delineated wetland boundaries in relationship to the Airport. A total of 27 wetlands were delineated within the identified area of interest from 2010 to 2013. These include both wetlands that lie within or very close to the project's area of potential effects and may be impacted by various project alternatives or by other planned airport projects in the reasonably foreseeable future. Of the 27 wetlands delineated, three have been mapped as Advanced Identification of Wetland Disposal Areas (ADID) wetlands. The three ADID wetlands located within the project delineation limits include Wetlands #3, #26 and #27. The location of these wetlands in relationship to the overall SEWRPC wetland mapping near the Airport is illustrated in **Figure 5-4**.

The Preferred Alternative 11 realigns Silvernail Road and shifts Runway 10 and Taxiway A by 400 feet west. The preferred alternative would fill a total wetland area of 6.769 acres, and includes 4.304 acres of the three ADID wetlands and 2.465 acres in seven other non-ADID wetland areas. The impacts are summarized by individual wetland and cause of impact in **Table 5-2** and are illustrated and labeled in **Figure 5-5**.

Table 5-2 Alternative 11 Wetland Impact Areas:

Wetland No.	Total Wetland Area (acre)	Wetland Impact (acre)	Cause of Impact
1	0.763	0.239	Taxiway radii widening
2	0.675	0.549	RSA Grading; Taxiway / Runway Extension
ADID Wetland 3	4.513	1.292	RSA Grading
4	0.074	0.074	RSA Grading
5	1.793	0.306	Shifted Glideslope & Access Road
		1.117	RSA Grading; Taxiway radii widening
19	0.060	0.060	Culvert Extension for side Safety Area
20	0.020	0.020	Culvert Extension for side Safety Area
25	0.100	0.100	Storm Water Detention Basin
ADID Wetland 26	17.230	0.484	Runway 10 RSA Grading
		2.142	Realigned Silvernail Road & Grading
ADID Wetland 27	----	0.386	MALSR Approach Light & Road Extension
	ADID Wetland Impact:	4.304	
	Non-ADID Wetland Impact:	2.465	
	Total Wetland Impact:	**6.769**	

ADID Wetlands In Southeast Wisconsin



Legend

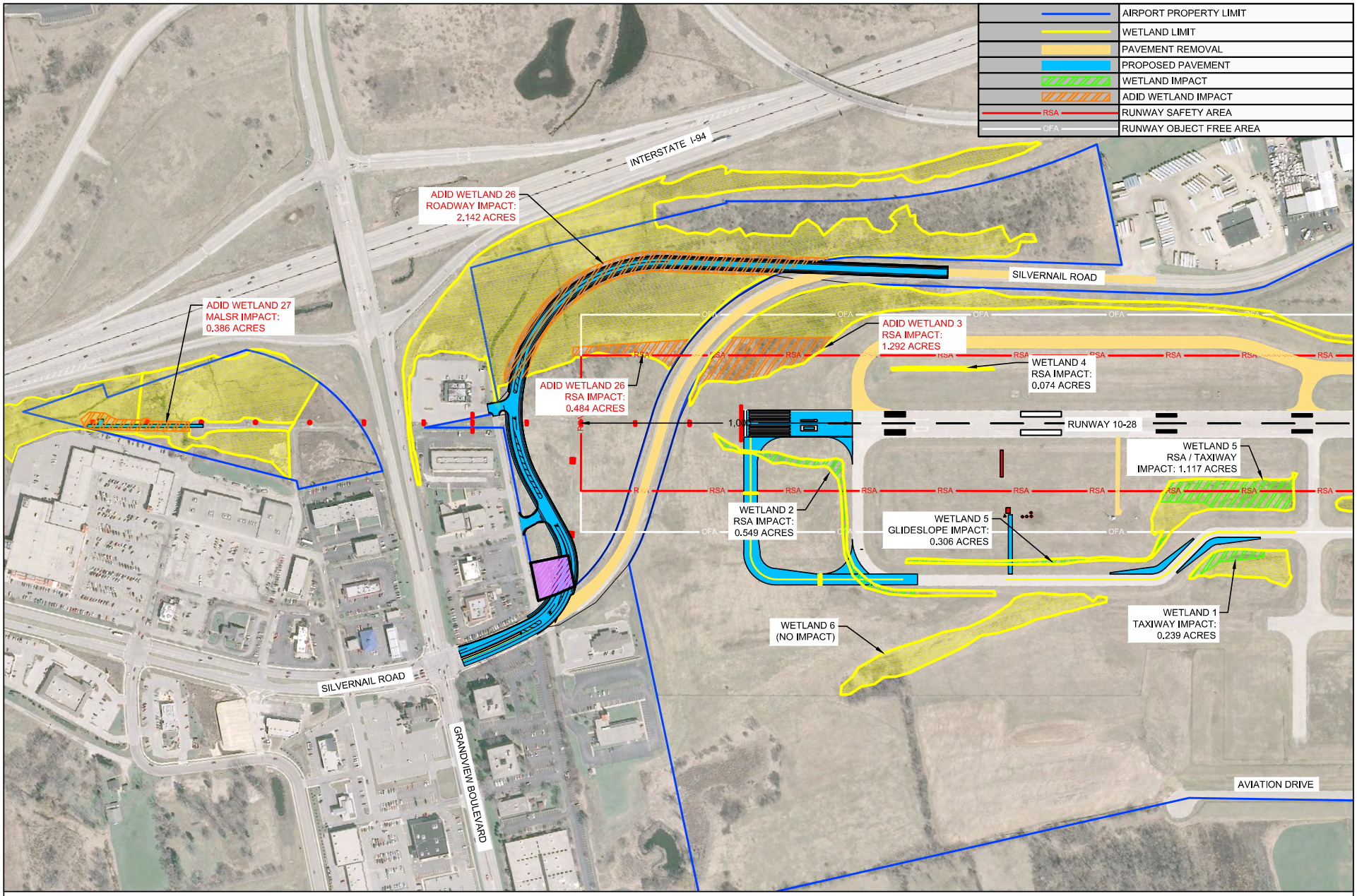
- 2005 Wetlands
- ADID Wetlands
- ADID Lakes and Ponds
- ADID Natural Area Wetlands
- 2005 Primary Environmental Corridors

FIGURE 5-4
ADID WETLANDS
SOUTHEAST WISCONSIN

1 inch = 1,389 feet

N
W E
S

10/22/2014 11:13:09 AM
X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 5-5 ALTERNATIVE 11 WETLAND IMPACTS.DWG



0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES	(WETLANDS #3 & #26)
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES	(WETLAND #26)
MALSR APPROACH LIGHT SHIFT IMPACTS:	0.386 ACRES	(WETLAND #27)
RSA NON-ADID WETLAND IMPACTS:	0.549 ACRES	(WETLAND #2)
SIDE RSA AREA WETLAND IMPACTS (WEST):	1.736 ACRES	(WETLANDS #1, #4, #5)
DETENTION & SIDE RSA WETLAND IMPACTS (EAST - NOT SHOWN):	0.180 ACRES	(WETLANDS #19, #20, #25)
TOTAL WETLAND IMPACTS:	**6.769 ACRES**	

FIGURE 5-5
WETLAND IMPACT SUMMARY (ALTERNATIVE 11)

WAUKESHA COUNTY AIRPORT CRITES FIELD

Of the total 6.769 acres of wetland impact associated with the preferred alternative, 0.386 acres are required for the extended approach lighting system, 4.467 acres are required for bringing the safety area ends into compliance, and the remaining 1.916 acres are required for the side safety area improvements.

The impacts summarized in **Table 5-2** and illustrated in **Figure 5-5** are based on the steepest-allowable fill slopes under FAA guidelines and Wisconsin DOT roadway standards.

Non-ADID Wetland Impacts

Wetland 1 impacts on the west are associated with bringing the Taxiway A alignment transition into conformance with Taxiway Design Group 2 standards. Wetland 2 impacts are a result of the extended pavements for Runway 10 and Taxiway A. The western impact to Wetland 5 is a result of the shifted glideslope antenna for Runway 10 and the required critical area grading that is tied to the location of this navigational instrument. The northern impact to Wetland 5 results from fill required to bring the side runway safety area into compliance with FAA standards, as are the impacts to Wetlands 4, 19, and 20. Wetland 25 is impacted by a proposed storm water detention pond on the east.

ADID Wetland Impacts

The realignment of Silvernail Road would impact 2.142 acres of Wetland 26 (ADID) and sever this wetland into two separate areas on either side of the resulting roadway alignment. The 400-foot shift in Runway 10 would also shift the MALSR approach lighting system to this runway by the same amount, and would impact 0.386 acres of Wetland 27(ADID) resulting from an extended gravel road needed to access these light stations. The grading required to provide a full 1,000-foot long by 500-foot wide safety area off the end of Runway 10 will impact 0.484 acres of the southern end of Wetland 26 (ADID) and an additional 1.292 acres of the southern end of Wetland 3 (ADID). It should be noted that providing a traditional graded RSA at the Runway 10 end would impact 1.292 acres of Wetland 3 for all alternatives even the EMAS as FAA requires a traditional graded safety area to the extent practicable.

The following is a more detailed description of the impacted wetlands.

Wetland 1

This wetland is located within a steep basin totaling 0.763 acres of degraded wet meadow (DM) and is used for storm water detention. It is located on the far west end of the airport adjacent to Taxiway A, directly north of the cul-de-sac of Aviation Drive. This wetland is almost completely dominated by reed canary grass and narrow-leaved cattail. A wetland fill of 0.239 acres would be caused by the Preferred Alternative.

Wetland 2

This wetland is 0.675-acres of shallow marsh (SM) and a degraded wet meadow (DM). This is a ditch wetland with an adverse drainage slope that appears to detain water during the growing season. It is located on the far west end of Runway 10. This wetland is dominated by both reed canary grass and narrow-leaved cattail. The Preferred Alternative would fill 0.549 acres of this 0.675 -acre wetland.

Wetland 3 (ADID)

This wetland is a 4.513-acre shallow marsh located in the far northwest end of the airport directly adjacent to the east side of Silvernail Road. This wetland is a fairly steep-sided basin that appears to detain water during the growing season. This wetland is filled with shallow marsh vegetation and dominated by reed canary grass and narrow-leaved cattail and also has water smartweed and scattered willow shrubs. The Preferred Alternative would fill 1.292 acres of this wetland. This wetland is part of a SEWRPC primary environmental corridor and ADID wetland complex.

Wetland 4

Wetland 4 is a small 0.074-acre sedge meadow ditch located in the far northwest end of the airport between Runway 10-28 and the abandoned taxiway to the north. This wetland ditch drains water partially from Runway 10-28 and the adjacent taxiway. This wetland is dominated by hairy-fruit sedge and reed canary grass. The entire area of this 0.074-acre wetland would be filled by the Preferred Alternative.

Wetland 5

Wetland 5 is a 1.793-acre shallow marsh and degraded wet meadow located between Runway 10-28 and Taxiway A. This wetland is a basin that was most likely created during the construction of the Airport. This wetland is dominated by reed canary grass but also contains sedges. The Preferred Alternative would fill 1.423 acres of this wetland.

Wetland 19 and Wetland 20

Wetlands 19 and 20 are shallow marshes of 0.06 and 0.02 acres respectively located in the infield south of Runway 10-28 and east of Runway 18-36. These wetlands are dominated by cattails and had standing water at the time of the visit. The entire areas of these wetlands would be filled by the Preferred Alternative.

Wetland 25

Wetland 25 is a 0.10 acre fresh (wet) meadow located west of Runway 18 at the north end of the Airport. This wetland lies within the area identified for a storm water management facility and will be completely impacted by the Preferred Alternative. The fresh (wet) meadow delineated is degraded by reed canary grass and regular mowing.

Wetland 26 (ADID)

This marsh occupies an elongated basin between the north side of the airport, as defined by Silvernail Road, and the east-west corridor of I-94. The marsh is dominated by narrow-leaved cattails and reed canary grass, with some shrub willow, red-osier, buckthorn and cottonwood in drier areas near the wetland boundary and within the narrow, elevated eastern portion of the wetland paralleling Silvernail Road. From the road, the marsh appears to be a nearly-uniform stand of tall cattail and native wetland wildflowers appear absent. It receives drainage from about 130 acres of surrounding land, via ditches along Silvernail Road, North Grandview Boulevard, and a local service road east of North Grandview Boulevard. Some road drainage is conveyed to the wetland by culverts beneath Silvernail Road. Water is normally prevented from accumulating in the wetland by a drainage culvert on its' northern boundary that conveys water beneath I-94 to a wetland complex on the Pewaukee

River floodplain. Marsh drainage is facilitated by a 15-foot wide ditch running northeast across the west end of the wetland to the I-94 culvert. The marsh is isolated from a 4-acre remnant wetland directly west across North Grandview Boulevard, but is connected by road culverts to a 2-acre remnant wetland on the south side of Silvernail Road.

Wetland 27 (ADID)

Wetland 27 is a shallow marsh that is completely dominated by narrow-leaved cattails. It covers a relatively deep basin between commercially-developed lands and the I-94 south-bound off ramp and receives runoff from about ten acres of adjacent developments and road surfaces via multiple culverts. It also receives drainage from about 300 acres south of Silvernail Road, including over 200 acres of developed land and about 45 acres of other ADID wetlands outside the project area. This drainage enters Wetland 27 on its west end and is directed east and north, via ditches through the wetland and culverts beneath I-94, to the Pewaukee River floodplain. A stub road through the south side of the wetland provides access to the Runway 10 approach lights. This lighting system would need to be extended by as much as four hundred feet for the proposed project.

The 6.769 acres of direct wetland impact represents 5.10% of the 132.6 acres of wetlands identified by SEWRPC in 2005 within the airport vicinity south of I-94. The primary impacts on the hydrologic and habitat functions of local wetlands can be generally considered as commensurate with this percent reduction in area.

Because of the ADID status of Wetlands 3, 26 and 27, a separate wetland functional impact assessment using the Wisconsin Rapid Assessment methodology was undertaken to provide more detail on the proposed project's effects on wetland functions and environmental features (**Appendix N**). The findings of the report are summarized in the following section.

5.13.1 ADID Wetlands Functional Assessment

The functional assessment report in **Appendix N** found that Wetland 27 has a high *Water Quality Protection* function because of the wetlands' high vegetative density, favorable low-watershed position and the opportunity afforded to treat runoff from a relatively large, developed watershed. In fact, the strength of this function probably exceeds that of Wetland 26, which has a much smaller watershed with less hardscape development. Wetland 27 rated moderate for *Wildlife Habitat* and *Flood/Stormwater Attenuation* because of its association with a large complex of ADID wetlands and the large size of the watershed in relationship to the wetlands' size provides opportunity for flood storage. *Fishery Habitat* also had a moderate rating because of high water connection with the Pewaukee River, via ditches through I-94 and north and east along Highway 16 and Fatima Drive. Wetland 27 had a low *Aesthetics/Recreation/Education* rating because it is completely surrounded by fill and development, has poor viewsheds and has roads and the runway approach lighting structures in it.

Wetland 26 also had a high *Water Quality Protection* function, due to the advantageous position of the marsh between runoff and receiving waters, the dense vegetation and the potential of adjacent development to deliver otherwise untreated nutrients to it. *Flood and Storm-water Attenuation* rated only moderate because of the large size of the wetland in relation to its watershed, the lack of evidence of large water level responses to storm events, and the penetration of the central area by large ditches.

Wildlife Habitat was also moderate because of the lack of plant community diversity, low amount of open water and the low quality of surrounding upland habitat. The wetland appears to be important mostly for invertebrates, amphibians and some reptiles – the Butler's garter snake was found here during a 2008 study. *Aesthetics/Recreation/Education* is of moderate strength because it is within a populated area, has long viewsheds, and appears relatively free of disturbance while providing visual relief from surrounding development.

Floral Diversity of Wetland 26 is ranked low because most of the wetland is dominated by just five plant species. *Fishery Habitat* is also low because open water is limited to simple, straight ditches running through the wetland, and riparian vegetation is coarse cattail, which limits its utility for spring high-water spawning fish such as northern pike.

Wetland 3 has the lowest functional performance of all three ADID wetlands. It's small size, lack of riparian position, overwhelming dominance of edge habitat with mown fill slopes and the presence of invasive species, fences and obstructed views are principal factors degrading the functional performance. Only *Water Quality Protection* was moderate because the wetland presents a good water treatment opportunity for its size, with a favorable watershed position and vegetative characteristics,

Groundwater functions for all three ADID wetlands are low because they lack a favorable landscape position for either recharge or discharge. The report also assessed potential options for mitigation which are summarized in the following section.

The impacts of the Preferred Alternative on wetland functional performance was found to be commensurate with the percentage of wetland filled in all cases, except for the case of Wetland 26 where the proposed fill for the re-alignment of Silvernail road would sever the wetland into two sections, footprinting an important central area of the wetland and having significant adverse effects on *Flood/Stormwater Attenuation*, *Water Quality Protection, Wildlife Habitat and Aesthetic* functions.

The projected road fill in Wetland 26 will divide it into two long, narrow remnants of comparable width on either side of the road, removing the most important central area of flood storage, reducing the capacity of filtration, severing long-distance views and greatly increasing edge effects and multiplying the risk of road kill, especially for reptiles and amphibians.

Edge effects refer to the changes in population or community structures that occur at the boundary of two habitats. In the case of edges between native plant communities, where the locations of edges preserve interior habitat conditions, the edges can enhance biodiversity and ecosystem functions. Alternatively, where disturbance penetrates a wildlife habitat and creates atypical disturbed (road fill slope) or abiotic (i.e., road) conditions, the effect will be adverse because the new edge is hostile to wildlife and introduces noise, pollution and dangerous vehicle movements.

Slow-moving, low-profile animals such as snakes, turtles and frogs are especially vulnerable to vehicle traffic and they are insensitive to larger-scale landscape clues that otherwise would help them find culverts that provide safe passage. This danger is compounded during the spring breeding season, when

nightly migrations during wet weather can lead to mortality rates of between 34 and 61% on secondary roads like Silvernail.

The proximity of the new road alignment to the only open-water feature of the wetland is especially dangerous for amphibians. During wet spring nights, any amphibian dispersal from the east side of the ditch will have a very high probability of encountering the road because the ditch will be less than 100 feet from the road. Considering the nature of the habitat, at-risk species may include green and leopard frogs and American toads. A lack of open water and basking structure in the wetland puts turtle species at lower risk, but common dispersing species such as painted turtles may also be subject to high road mortality here.

The cumulative effect of this new Silvernail alignment on breeding amphibian populations in ADID Wetland 26 will be significant, when habitat loss and the increase in adverse edge effects (road mortality and increased pollution load) are considered together. The wetland's environmental corridor value will also be largely eliminated because the interior, refuge area will be lost to road uses. Transiting wildlife, especially furbearers, will have a much greater tendency to move on through the wetland, with consequent greater exposure to road mortality as well.

Implicit in this impact scenario is the possibility that either or both remaining wetlands might become "mortality sinks" for remaining amphibians. A mortality sink is a habitat unable to support a viable long-term population by itself. It may offer suitable short-term cover, food, and water to a species or guild, but production of young in a local population is less than the mortality rate. Sink conditions can only be alleviated by provision of safe and effective passage configurations so that mobility between otherwise isolated habitat fragments is enhanced.

Mitigative actions that could counterbalance the significance of wildlife impacts include the removal of the non-functional Silvernail Road fill and the provision of wildlife culverts or underpasses of suitable dimension and configuration for passage by low-stature wildlife. Wetland mitigation is discussed in greater detail within the following section.

5.13.2 Wetlands Mitigation

Compensatory mitigation for the 6.769 acres of unavoidable wetland loss would be provided under the inter-agency procedures of the WDNR/WDOT Cooperative Agreement as well as the guidance of FAA Advisory Circular 150/5200-33B, which stipulates that wetland mitigation projects be designed so as not to attract wildlife hazardous to aircraft operations within a 10,000-foot radius of airports serving turbine-powered aircraft such as Waukesha.

On-Site Wetland Mitigation

The wetland functional assessment report in **Appendix N** outlines an area of potential on-site mitigation within the existing Silvernail Roadway to be removed as part of the proposed actions. This mitigation could remove 1.01 acres of the existing Silvernail Road embankment in an effort to partially reconnect Wetland 26 and Wetland 3 located on either side. While this concept will be coordinated and discussed with the agencies and the FAA, there is no other potential for on-site mitigation within this area given the proximity to the approach and departure surfaces extending out from the Runway 10 end. Even if the

area of removed fill is not restored to a wetland condition, restoration to other natural habitat suited for reptile and amphibian use could provide some compensation for the wildlife habitat impacts of the new road severance.

Wetland Banking

While local or watershed-based, project-specific mitigation would be coordinated and discussed with the agencies during project design and permitting, it is likely that part or all of the impact would be banked at the most appropriate WisDOT statewide mitigation bank. The comparatively small area of wetland fill and lack of whole-unit converted hydric soil areas in the Waukesha region places a premium on wetland banking for alternative habitat compensation and banking remains the preferred mitigation option under current inter-agency guidance.

Project impacts lie within the Pewaukee River sub-watershed of the Upper Fox River, an 8-digit HUC (hydrologic unit code) watershed that lies partially in Illinois. The WisDOT does not have any wetland bank sites within the Upper Fox watershed. However, WisDOT has two bank sites within the Rock River watershed that could be used for compensatory mitigation. The Kmetz wetland bank site is part of the Rock River floodplain in Jefferson County, just west of the Waukesha County line, and has about 40 usable credits dispersed among riparian forest, wet meadow, shallow marsh and scrub shrub. The Jacobsen wetland bank in Walworth County is a 360-acre wet meadow covering over a mile of riparian corridor along Turtle Creek, a tributary of the Rock River. The Jacobsen bank has approximately 70 credits remaining and is used by the WDOT for compensation of relatively small wetland impacts in the southeast Wisconsin region.

The wetland and environmental corridor functions of either of these bank sites are superior to the impacted wetland and both banks are within the same floristic province and watershed. Nevertheless, when banking ADID wetland impacts, an additional 0.5 credit is typically added to the banking ratio for a floor ratio of 1.5:1.0 for this type of compensatory mitigation. Actual mitigation ratios would be determined in consultation with the permitting agencies.

Wildlife Culverts and Barriers

Wildlife culverts or underpasses are measures to make otherwise hostile landscape features such as roads permeable to wildlife. In the effort to increase the landscape permeability of developed areas, each underpass must often be configured for the most critical species or species guild subject to road kill or adverse behavioral effects. For this project, the guild of most concern is amphibians, specifically frogs, and reptiles including snakes and turtles.

Successful wildlife crossings accommodate the requirements of multiple species, or are tuned to the requirements of a single important species or group of related species at locations having the maximum practical effect. Fences or large, steep embankments deter animals from crossing roads and can funnel animals to easy crossing points. This effect can be replicated by purpose-built barriers on each side of a wildlife passage tunnel, culvert or overpass. As Airport security fencing and drainage culverts will be required along and through the realigned Silvernail Road, it is anticipated that some barrier and wildlife underpass features could be incorporated into these facilities to additionally serve this purpose. The WDNR has suggested that the existing wildlife guild using the ADID wetlands be surveyed to provide

better information for effective underpass design. Such measures will be coordinated with the agencies and the FAA during project design as potential means for mitigating the loss of amphibian habitat and increased road kill potential resulting from the Silvernail Road wetland severance.

Based on proper implementation of the above mitigative measures, it is concluded that there would be no significant wetland impacts associated with the Preferred Alternative. With the no action, there are no wetland impacts.

5.14 Cumulative Impacts

The Council on Environmental Quality (CEQ) defines cumulative effects as, "*(The impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*."

In Section 4.10, past, present and reasonably foreseeable actions were identified that included several airport projects, eleven WisDOT and Waukesha County road projects and eight locations within the City of Waukesha potentially subject to private developments. According to FAA guidance, reasonably foreseeable Airport actions include those on an unconditionally approved ALP and for which the proponent has committed to complete and/or develop preliminary design plans. Therefore airport projects on the Airport Layout Plan (ALP) and current Master Plan Update were included.

Many of the public transportation projects were minor actions or on-location improvements such as the re-surfacing of existing facilities. However, some projects by definition involve additional hardscape development that could cause incremental impacts. These projects include:

- Airport: apron pavement expansion on the west and south sides of the terminal
- Airport: additional corporate aircraft hangars adjacent to these apron expansions
- Airport: relocation of Taxiways C and D to accommodate current FAA standards
- Airport: widening and strengthening of runway and taxiway pavements to aircraft Design Group C-III standards
- Airport: expansion of terminal parking lot and hangar development areas in the southeast and west corporate airfield areas
- Airport: construction of a Snow Removal Equipment (SRE) storage building
- Waukesha County: development of a West Waukesha Bypass roadway between WIS 59 and I-94
- WisDOT: reconstruction of West Waukesha Bypass from Summit Avenue (USH 18) to Northview Road.
- WisDOT: reconstruction of West Waukesha Bypass from Summit Avenue (USH 18) to Genesse Road
- All of the eight private residential, commercial or institutional projects identified by the City of Waukesha, as each of these projects would require construction of new local roads for parcel access and development.

Cumulative impact categories evaluated in this study include biotic communities, water quality and wetlands. Other impacts identified in Section 5 include minimal noise impacts, which are well below the FAA's threshold of significance. Other impacts identified in this EA are temporary, such as construction impacts.

Because these future projects are less defined than the proposed project and have yet to be subject to alternatives analysis or detailed resource definitions in their vicinity, cumulative effects analyses can only approximate the potential additive effects on any resource and to a great degree the analyses rely on professional judgement. Nevertheless, cumulative effects to Biotic Resources, Wetlands and Water Quality are assessed in the following sections.

5.14.1 Biotic Resources

An unavoidable impact has been identified with the preferred alternative to 1.292 acres of Tier 1 and 2.626 acres of Tier 2 Butler's garter snake habitat. For the airport, this project is the only one with potential effects to this animal. All other airport projects involve extremely disturbed or fragmentary habitats, such as mown turf or wetland drainage ditches, and will not affect this species.

The three West Waukesha Bypass projects planned by either WisDOT or Waukesha County involve a watershed area with mapped environmental corridors of significantly greater size and complexity than the ADID wetlands at the airport that are associated with Butler's garter snake activity. Although the presence and population characteristics of the Butler's garter snake in this area of Waukesha is unknown, it appears reasonable to assume that the snake is present in some of the environmental corridors. At the same time, these projects will be subjected to a WisDOT environmental assessment process that will be responsible for identifying and mitigating the effects of these projects on rare biota, including the possible provision of wildlife underpasses that the WisDOT has used on similar projects in the region to avoid reptile mortality. While some incidental mortality to this snake may occur, no significant adverse cumulative effect is foreseen due to these projects.

While not subject to listed species regulations, the eight private developments identified by the City of Waukesha involve primarily localized, vs. corridor impacts and do not appear to have the potential to affect significant areas of large environmental corridor or wetland features. Therefore, no additional impact to the Butler's garter snake is foreseen due to these projects.

The recent federal listing of the Northern long-eared bat has emphasized the avoidance and minimization of tree clearing to prevent or reduce impacts to summer maternal roosting habitat within cavities of living trees or dead snags. This is in addition to the avoidance of direct impacts to winter hibernation areas (hibernaculae) in caves or similar structures offering moderate temperatures and protection from the winter elements. While these requirements only apply to projects having federal funding, permitting or other form of direct oversight, the state has adopted a parallel threatened designation for the bat under NR 27. This Wisconsin law makes it illegal to take, transport, possess, process or sell any state-threatened or endangered species. Review of projects potentially impacting state-listed species applies to all state-funded infrastructure projects as well as private developments requiring state permits.

Although the location of bat hibernaculae throughout the Waukesha area is not known, summer roosting habitat in cavity trees is much more common and dispersed, as trees of only 3-inches diameter can provide this habitat. However, impacts to roosting trees can be avoided by not clearing trees for project purposes within 150 feet of roost trees during the pup season of June 1 to July 31. The proposed airport project will clear approximately 0.67 acres of forested habitat for the Runway 10 Safety Area and the extended Approach Lighting System, which impact will avoid any potential effects on the bat by prohibiting tree clearing from June 1 to July 31.

Although the other six airport projects listed in Section 5.14 have no forested habitat, the remaining eleven projects, including a new West Waukesha Bypass road, two reconstructions of an existing Waukesha bypass route and eight new private developments on between 300 and 350 acres of land are likely to remove a combined total of between 5 and 10 acres of forested land over the next 10 years.

While these tree removals may not directly affect maternal roosting trees, the loss of forested land cover would still be a direct cumulative impact on general roosting or foraging bat habitat, including forested patches as well as linear features such as fencerows and wooded corridors that can be used for spring staging or fall swarming prior to hibernation (USFWS, 2014).

5.14.2 Wetlands

A 2005 wetland area of 132.6 acres was cited in the SEWRPC letter of February 26, 2007 regarding alternatives with potential impacts to airport wetlands. The letter summarized staff review of potential wetland fill for a runway expansion in light of cumulative wetland impacts between 1985 and 2005. The area of analysis included airport and non-airport lands between I-94 and Northview Road, bounded on the east by Pewaukee Road and by the southwestern limit of the I94/Highway T interchange.

The SEWRPC staff found that between 1985 and 2005, 51.9 acres of 184.5 acres of wetland were lost in this study area; a 28 percent reduction over the twenty year period of analysis. About half of this wetland loss occurred on airport lands, while the other half were lost to developments outside the airport.

While the probability of wetland fill naturally declines with decreasing wetland area, the pressure for wetland fill can be expected to continue in light of the historical performance of the Waukesha area as a state-leader in terms of land development and population growth. The highly urbanized environment around the airport and the efficient access provided by the I-94 interchanges with local highways makes additional wetland fill even more likely. Counterbalancing this long-term trend is the probability that a significant amount of this wetland fill occurred during the unprecedented period of economic growth and prosperity experienced in the 1990s, while the current outlook for economic growth is less in comparison.

The position and ownership of remaining wetlands also affects the probability of cumulative wetland impacts. Outside the airport, publicly-owned conservancy or greenway includes about 35 acres of the remaining wetlands, and impacts are less likely in these areas. The rest of the approximately 100 acres of wetland can be considered at-risk, which includes wetlands around Silvernail Road west of the County Expo Center, on either side of Aviation Drive and around the airport control tower.

Given the above trends, factors and remaining wetland positions, it appears likely that between 10 and 20 acres of additional wetland loss can be expected within the Waukesha area over the next ten years, an impact which would include the public transportation projects as well as private developments identified in Section 4.10. Reasonably foreseeable airport projects could account for roughly 1/4 of this total.

5.14.3 Water Quality

The RSA project results in 1.82 acres of net additional impervious area in the Fox River watershed. The existing Airfield property comprises roughly 496 total acres, of which 139 acres are currently made up of impervious pavements or buildings (28% of the total Airport area). The addition of 1.82 acres of impervious area associated with the proposed actions would represent a 1.31% increase in the overall impervious area of the Airfield. The Pewaukee River, which is the receiving water body for airport drainage, joins the Fox River immediately east of County Highway F, about a mile east of the airport. The Pewaukee River, the Fox River and Pewaukee Lake are all classified by the Wisconsin Department of Natural Resources as Areas of Special Natural Resources Interest under Section 281.15 of the Wisconsin Statutes. The river's watershed has experienced extensive channelization, urban development and stream bank erosion that have all contributed to the river's current impaired water quality status.

There is a direct link between land development and resulting hydrologic modification (runoff enhancement) within a watershed and the water quality impairment caused by stream bank erosion. This erosion occurs as channels undergo continuous adjustment (down cutting and widening) in response to increasing runoff and storm flow volumes.

The hydrologic modification of developing watersheds, and associated stream erosion and water pollution, often goes un-mitigated due to loss of infiltration area as well as unintended, adverse-coordination of outflows from storm water detention practices within the watershed. This is especially true during large storm events outside the scope of traditional NPDES-compliant storm water practices. The impact of watershed development on stream water quality and channel stability is reflected by the generally-accepted observation that these impacts become apparent when development consumes 15 to 17% of the watershed area.

The Pewaukee River watershed includes about 32 square miles (20,500 acres) of land and the 2,437-acre Pewaukee Lake. According to the Upper Fox Watershed 2010 Plan (WDNR publication WT-940) about 29% of the watershed is developed in urban and suburban land uses. Although not all this area is in impervious land uses, the impacts of development are shown in the impairment of the Fox River east of the airport, both upstream and downstream of the Pewaukee River confluence as discussed in *Section 4.7, Wetlands and Water Resources*.

The proposed Runway 10-28 safety area improvements would add approximately 1.82 acres of impervious surface to the watershed for the net additions and reductions to runway and taxiway pavements, while construction would temporarily disturb about 92 acres of land over the course of several months for adjacent fills and land grading. This project would have to comply with the storm water and construction site erosion control requirements of Chapter 32 of the City of Waukesha, as well as State of Wisconsin TRANS 401 and NR 216 regulations and procedures. The FAA guidelines under Advisory

Circular 150/5320-5C that specify storm water drainage within 48 hours of design events would also have to be followed.

The local Chapter 32 requirements emphasize the use of infiltration and treatment swales while requiring that the calculated post-development peak storm water discharge rate not exceed the calculated pre-development discharge rates for the 2-year, 10-year, and 100-year, 24-hour design storms. The stated purpose of this requirement is to minimize downstream bank erosion and the failure of downstream conveyance systems and directly addresses the impact mechanism of watershed development discussed in this document, as well as the sedimentation and nutrient impacts to the Fox River cited by the WDNR.

Future airport projects would result in additional increases in impervious surfaces amounting to several acres including new hangars, apron and parking areas and increased runway and taxiway widths. The road reconstruction projects identified in Section 5.14 are also likely to add several more acres of impervious surface. Past airport projects, the RSA project and future projects have and would continue to need to comply with City of Waukesha and MMSD storm water regulations (Chapters 120 and Chapter 13, respectively). Transportation, highway and airport projects need to comply with TRANS 401 and NR 216. With compliance to these regulations, it is assumed that these projects would result in minimal adverse water quality impact.

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6. Environmental Consequences – Other Considerations

6.1 Conformance with Plans, and Policies and Controls

This proposed action complies with the Wisconsin Department of Transportation's State System Plan. As Southeastern Wisconsin's regional planning organization, SEWPRC, has worked with the Wisconsin Department of Transportation, Bureau of Aeronautics (BOA), in regional airport system planning since the mid-1970s. The first generation regional airport system plan was adopted by SEWRPC in 1976. A second generation plan was initially adopted in 1987 and comprehensively amended in 1996. That plan is found in SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010, 2nd Edition, November 1996. The SEWRPC plan recommends that a system of 11 public-use airports be maintained to meet the commercial, business, personal, and military aviation needs of the Region, including Waukesha County Airport (UES). The 1996 updated plan identified improvements to UES, including those to conform better to FAA standards, such as runway safety areas. It is concluded that the proposed action would conform with SEWRPC's Regional Airport System Plan.

The preferred alternative does not conflict with the Airport, county, regional, or state wide planning efforts.

6.2 Conformance with Law and Administrative Rules

There are no known federal, state, or local laws or administrative rules with which the proposed project would be inconsistent. All phases of the proposed project would adhere to appropriate regulations by obtaining appropriate permits and approvals.

6.3 Means to Mitigate Adverse Environmental Impacts

The various impacts and means to mitigate them were discussed in preceding sections of this report. These are summarized below and in **Table 6-1**.

- Air Quality

  The impacts are those associated with construction emissions, which are temporary and below de minimis levels. As requested by the WDNR, the Airport would implement voluntary best management practices associated with construction equipment as appropriate and practical. These can include measures such as idling restrictions and use of non-road construction equipment that has been retrofitted with diesel emission control devices to reduce overall emissions. Such measures would be incorporated into the construction specifications.

- Biotic

  There would be potential impacts to Butler's garter snake, a state Special Concern species. Because the snake is no longer listed as endangered or threatened, an Incidental Take Authorization is not needed. However, the Airport would continue to work with the DNR under the environmental liaison process of the WisDOT/WDNR Cooperative Agreement to avoid and minimize adverse project effects on any local populations of the Butler's garter snake. Snake relocation may be part of this work, as well as the installation of appropriate wildlife underpasses or culverts. Restoration of an acre of the former Silvernail Road alignment area in Wetland 26 may also help minimize adverse impacts to this reptile.

The Northern Long-eared Bat is listed as a threatened species by the US Fish and Wildlife Service. Approximately 0.76 acres of a forested area will be removed as part of the proposed action. No bat hibernacula are known to existing within 0.25 miles of the location. Tree removal associated with the project will be conducted outside the maternal roost dates of June 1 through July 31 to avoid potential impacts to summer roost trees habitat.

- Construction Impacts
  The project would be phased to minimize airport operations and off-site impacts. Construction equipment noise, dust and soil erosion would be temporary and mitigated through the implementation of appropriate Best Management Practices as specified in the FAA's AC 150/5370-10 (as amended), entitled Standard for Specifying Construction of Airports.

- Water Quality
  A storm water management plan to comply with TRANS 401 Wisconsin Administrative Code Standards and the City of Waukesha's storm water ordinance would be prepared to mitigate for surface water runoff impacts associated with the RSA project, both water quality and quantity. Best management practices would be incorporated into the project design.

- Wetlands
  It is anticipated that the preferred alternative for Runway 10-28 would impact approximately 6.769 acres of wetland. Of the impacted areas, 4.304 acres are designated as ADID wetlands. The impact would be mitigated in accordance with the Wisconsin DOT Wetland Mitigation Banking Technical Guidelines and may include a small amount of onsite mitigation associated with removal of road fill.

A summary of environmental impacts is included in **Table 6-1**, along with the mitigation or permitting requirements for the preferred alternative.

Table 6-1. Environmental Summary

Environmental Factor	Impact*	Mitigation/Permit Requirements
Air Quality	Presumed to Conform, Minimal during construction	Voluntary construction emission Best Management Practices
Biotic	Potential impact to Butler's garter snake Northern Long-eared Bat	Impacts minimized by mitigation to be coordinated with WDNR Tree Clearing to be conducted outside of the maternal roosting period of June 1 to July 31
Coastal Resources	None	None
Compatible Land Use	None	None
Construction Impacts	Potential	Potential impacts would be minimized through proper use of erosion control techniques and dust control specifications
DOT Section 4(f)	None	None
Farmlands	None	None
Floodplains	None	None
Hazardous Materials	None	None
Historical, Architectural, Archaeological and Cultural Resources	None	None
Light Emissions and Visual Impacts	None	None
Natural Resource and Energy Supply	None	None
Noise	minimal	None
Secondary Impacts	None	None
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	Acquisition and relocation of one commercial property for the relocation of Silvernail Rd. and transfer of land between Airport and City. Acquisition of isolated segments of two properties to accommodate shifted approach lights. Existing avigation easements to be lowered.	All land acquisition to be completed in accordance with the provisions stipulated by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.
Water Quality	Potential; can be mitigated	• Storm water Management Plan that complies with 1.City of Waukesha (Chapter 32), 2. MMSD (Chapter 13), 3. TRANS 401 storm water regulations • State Water Quality (401) Certification
Wetlands	Yes	USACOE 404 permit – Impact to be banked at WisDOT bank site, with possibly some onsite mitigation. Wildlife culverts provided.
Wild and Scenic Rivers	None	None

* Note: None of the impacts listed above are classified as a "Significant Impact".

6.4 Agency and Public Involvement

6.4.1 Agency and Public Official Coordination

In the early stages of the Environmental Assessment, an agency scoping meeting was held. Minutes of that March 16, 2004 meeting are included in **Appendix J**. As the alternatives were further developed, and a preferred alternative identified in coordination with the BOA, FAA and Airport, follow-up scoping letters were sent to resource agencies in 2007 to provide them with an update on the project and to obtain comments. Responses to the 2007 request for comments are also included in **Appendix J**. The WDNR, US Corps and SEWPRC all responded. Since then, a U.S. Army Corps representative visited the project site in November of 2012 for a field review of the wetland delineation. During this visit, she was briefed on the project by Mead & Hunt staff. With the change of DNR transportation liaison staff assigned to Waukesha County Airport since 2007, the BOA contacted the current DNR liaison in early 2013 to arrange a meeting about the project.

Through 2013 and into 2014 the preferred alternative continued to evolve through additional coordination with the FAA, the Wisconsin BOA, the Airport and its users. In November 2013, a coordination meeting was held with the Wisconsin DNR, the U.S. Corps of Engineers, the Wisconsin DOT Highways and representatives from the City and County of Waukesha. The meeting was held at the Airport with representatives from the Wisconsin BOA to provide an update on the RSA project's development. Follow up meetings more focused on the realignment or closure of Silvernail Road were conducted in February, March and April of 2014. An agency meeting was also held in August 2015 to discuss wetland functional impacts and the mitigation of wetland and wildlife impacts. Minutes from these most recent coordination meetings were provided to all agency representatives and are included in **Appendix E**.

6.4.2 Public Information and Involvement

In April of 2004, at the onset of the NEPA process, a public information meeting was held. The meeting was noticed in the local paper and Airport website. Additionally, postcard mailings were sent out to local businesses and other interested parties from a mailing list provided by the Airport. About 50 people attended this meeting (the sign-in sheet and mailing list are included in **Appendix M**). Additionally, a Fact Sheet was prepared which was available at the public information meeting and posted on the Airport web site.

A dozen written comments were received during this initial comment period in 2004. These included one from a local business, one from a user and ten from area residents. A number of the area residents' comments spoke to keeping the airport as is and not expanding. Several also commented on which alternatives they preferred and asked consideration of impacts including those to water and air quality and noise. One commenter requested that the public be kept informed as the project progresses. The user provided information regarding runway length needs. Since this initial meeting, new alternatives for both runway ends have been developed in coordination with the BOA and FAA. Updates on this project have occurred at Airport Commission Meetings, which are publicly noticed with agendas.

A Preliminary EA was released for public comment on February 25, 2017. Copies of the document were provided to all government agencies that received invitations to earlier coordination meetings, and a mailing list is provided within **Appendix M**. The notice of availability of the Preliminary EA was published in the local Waukesha Freeman newspaper. The published ad also included notice of a March 29th, 2017 public hearing for the project. An affidavit of the publication is provided in **Appendix M**. Copies of the Preliminary EA were made available to the public for a 40 day review period at the Waukesha County Department of Public Works and the Waukesha Public Library.

Following the public review period, an informal presentation and public hearing was held at the Waukesha County Expo Center on March 29th 2017. The purpose of the meeting was to provide the public with information on the Preliminary EA, an opportunity to submit oral or written statements, and opportunity to speak informally with WisDOT Bureau of Aeronautics, the County and consultant staff on the proposed improvements. Some neighboring business owners attended, as well as representatives from the City of Waukesha and the Waukesha County Airport. An attendance roster sign-in sheet is included in **Appendix M**. A court reporter was present during both the presentation and the hearing, but no oral testimony was given. A copy of the hearing transcripts can be provided upon request.

The WisDOT BOA accepted written statements from relevant, local, State, and Federal government agencies, as well as from the general public regarding the preliminary EA from February 25, 2017 through April 10th, 2017. No comments were received from the public. Five (5) government agencies provided written comments:

- Southeastern Wisconsin Regional Planning Commission (SEWRPC)
- U.S. Environmental Protection Agency (USEPA)
- Wisconsin DOT – Southeast Freeways Division
- City of Waukesha Engineering
- US Army Corp of Engineers

The comment letters submitted from these five agencies are included in **Appendix M**. A response to their comments is provided thereafter and comments are incorporated into this Final EA as stated in **Appendix M.**

This public involvement process was inclusive of all residents and population groups in the study area and did not exclude any persons based on income, race, color, religion, national origin, age or handicap.

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7. List of Preparers

This EA was prepared to assess the impacts associated with runway safety area improvements for Runway 10-28. The responsibility of this document is with the Wisconsin Department of Transportation - Bureau of Aeronautics (BOA) and FAA Airports District Office, Chicago, IL. This EA was prepared under contract with the BOA by Mead & Hunt, Inc. and the following subconsultants:

- AVD - Archaeology Consultants
- EMCS - traffic counts
- Gary Casper – Butler's garter snake survey (subconsultant to BOA)

A list of names and qualifications of the principal participants in the preparation of the EA is presented below:

Mead & Hunt, Inc.
Laura Morland – Project Manager
Ms. Morland has over 25 of experience in multi-disciplinary environmental projects, including NEPA documents for transportation projects. Ms. Morland has been project manager for several airport environmental assessments.

Greg Stern – Project Engineer/Planner
Fifteen years of engineering experience on a wide variety of aviation and transportation improvement projects. Stern's experience extends to planning and environmental services; including runway safety area analyses and environmental assessments.

Perry Rossa – Project Scientist
Over 25 years of experience in the evaluation, design and restoration of the wetland and upland native plant communities of the Midwest. Rossa also has extensive experience with the federal and state environmental document process, including NEPA, and special purpose laws, regulation and permitting.

8. References

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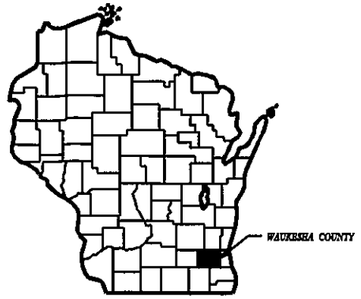
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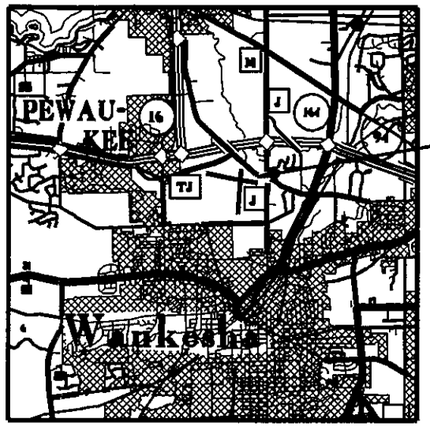
Appendix A. Airport Layout Plan (ALP)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS

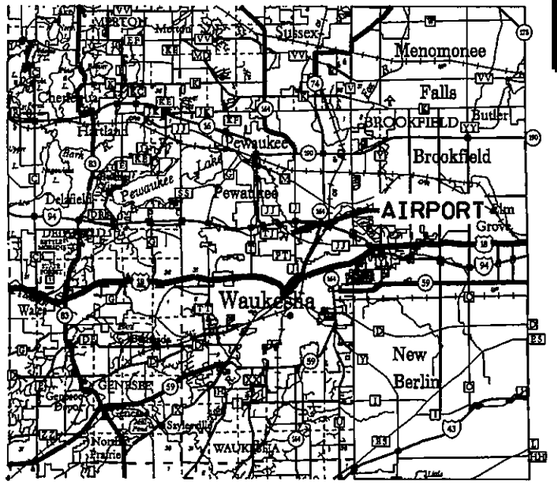
AIRPORT LAYOUT PLAN

WAUKESHA COUNTY AIRPORT
WAUKESHA, WISCONSIN

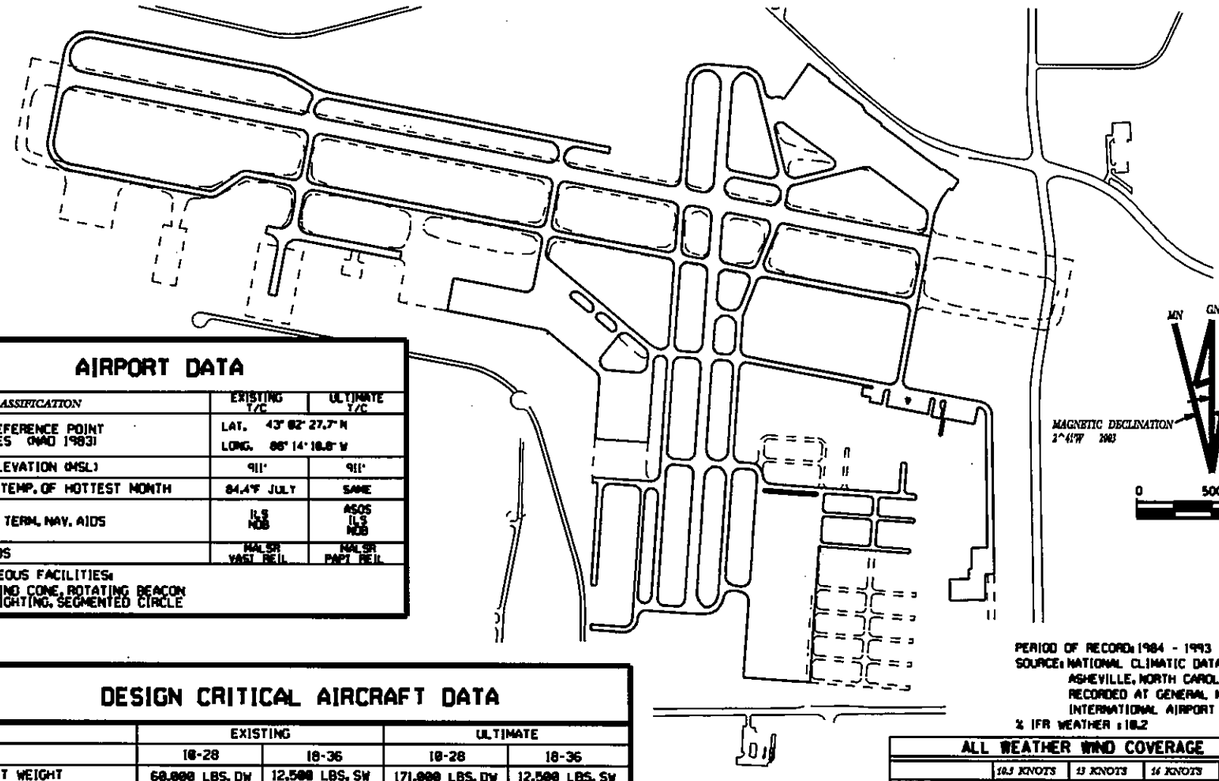




VICINITY MAP



LOCATION MAP



INDEX TO SHEETS	
SHEET	TITLE
1	TITLE & APPROVAL
2	EX. AIRPORT LAYOUT
3	ULT. AIRPORT LAYOUT
4	NORTH TERMINAL AREA LAYOUT
5	SOUTHEAST TERMINAL AREA LAYOUT
6	SOUTHWEST TERMINAL AREA LAYOUT
7	EX. RWY. 10 APPROACH
8	ULT. RWY 10 APPROACH
9	EX. RWY. 28 APPROACH
10	ULT. RWY. 28 APPROACH
11	EX. RWY. 18 APPROACH
12	ULT. RWY. 18 APPROACH
13	EX. RWY. 36 APPROACH
14	ULT. RWY. 36 APPROACH
15	LAND INVENTORY MAP
16	WETLAND DELINEATION
17	HEIGHT LIMITATION ZONING MAP

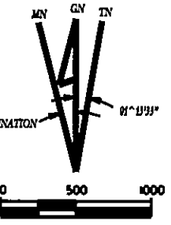
AIRPORT DATA

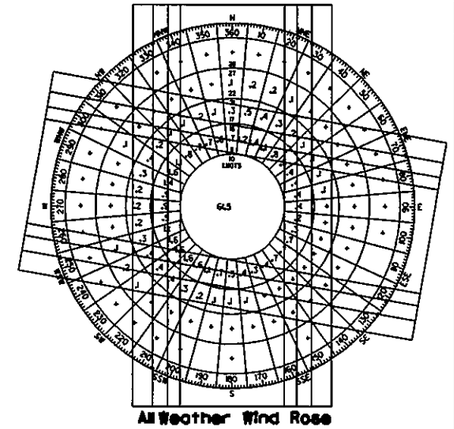
AIRPORT CLASSIFICATION	EXISTING T/C	ULTIMATE T/C
AIRPORT REFERENCE POINT COORDINATES (NAD 1983)	LAT. 43° 02' 27.7" N LONG. 88° 14' 18.8" W	
AIRPORT ELEVATION (MSL)	911'	911'
MEAN MAX. TEMP. OF HOTTEST MONTH	84.4°F JULY	SAME
AIRPORT & TERM. NAV. AIDS	ILS MOB	ASOS ILS MOB
VISUAL AIDS	MALSR VASI REIL	MALSR PAPI REIL
MISCELLANEOUS FACILITIES: LIGHTED WIND CONE, ROTATING BEACON TAXIWAY LIGHTING, SEGMENTED CIRCLE		

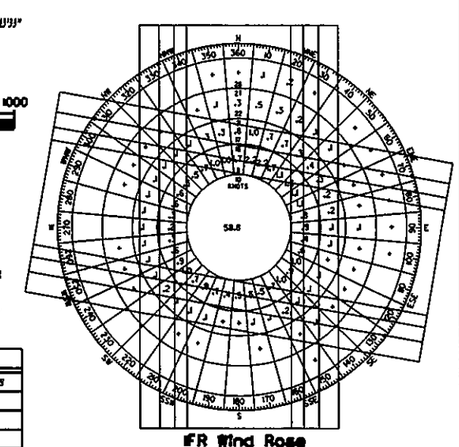
DESIGN CRITICAL AIRCRAFT DATA

	EXISTING		ULTIMATE	
RUNWAY	10-28	18-36	10-28	18-36
AIRCRAFT WEIGHT	60,000 LBS. DW	12,500 LBS. SW	171,000 LBS. DW	12,500 LBS. SW
APPROACH SPEED	<141 KNOTS	<121 KNOTS	<141 KNOTS	<121 KNOTS
WING SPAN	<118'	<49'	<118'	<79'
TAIL HEIGHT	41.2'	17'	41.2'	24.5'
AIRPORT REFERENCE CODE	C-III	B-I	C-III	B-II

DW- DUAL WHEEL, SW- SINGLE WHEEL







PERIOD OF RECORD: 1984 - 1993
SOURCE: NATIONAL CLIMATIC DATA CENTER
ASHEVILLE, NORTH CAROLINA
RECORDED AT GENERAL MITCHELL
INTERNATIONAL AIRPORT
% IFR WEATHER : 18.2

ALL WEATHER WIND COVERAGE				
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 10/28	82.88%	90.76%	94.90%	99.16%
RUNWAY 18/36	90.57%	98.64%	99.61%	99.62%
COMBINED	93.89%	98.64%	99.66%	99.94%

IFR WIND COVERAGE				
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 10/28	85.10%	92.57%	97.47%	99.26%
RUNWAY 18/36	75.51%	84.36%	92.91%	97.24%
COMBINED	93.89%	98.66%	99.69%	99.97%

FEDERAL AVIATION ADMINISTRATION	WISCONSIN DEPARTMENT OF TRANSPORTATION BUREAU OF AERONAUTICS	WAUKESHA COUNTY AIRPORT
THE WISCONSIN DEPARTMENT OF TRANSPORTATION, BUREAU OF AERONAUTICS - BOA APPROVES THE AIRPORT LAYOUT PLAN IN ACCORDANCE WITH THE FEDERAL AVIATION ADMINISTRATION BLOCK GRANT AGREEMENT AND SUBJECT TO AIRSPACE CASE APPROVED: _____ DAVID W. GREENE, BOA DIRECTOR DATE: _____	REVIEWED BY: _____ P.E. AIRPORT DEVELOPMENT ENGINEER DATE: _____	APPROVED _____ TITLE _____ DATE _____

NO.	REVISION	BY	APP.	DATE

WAUKESHA, WISCONSIN

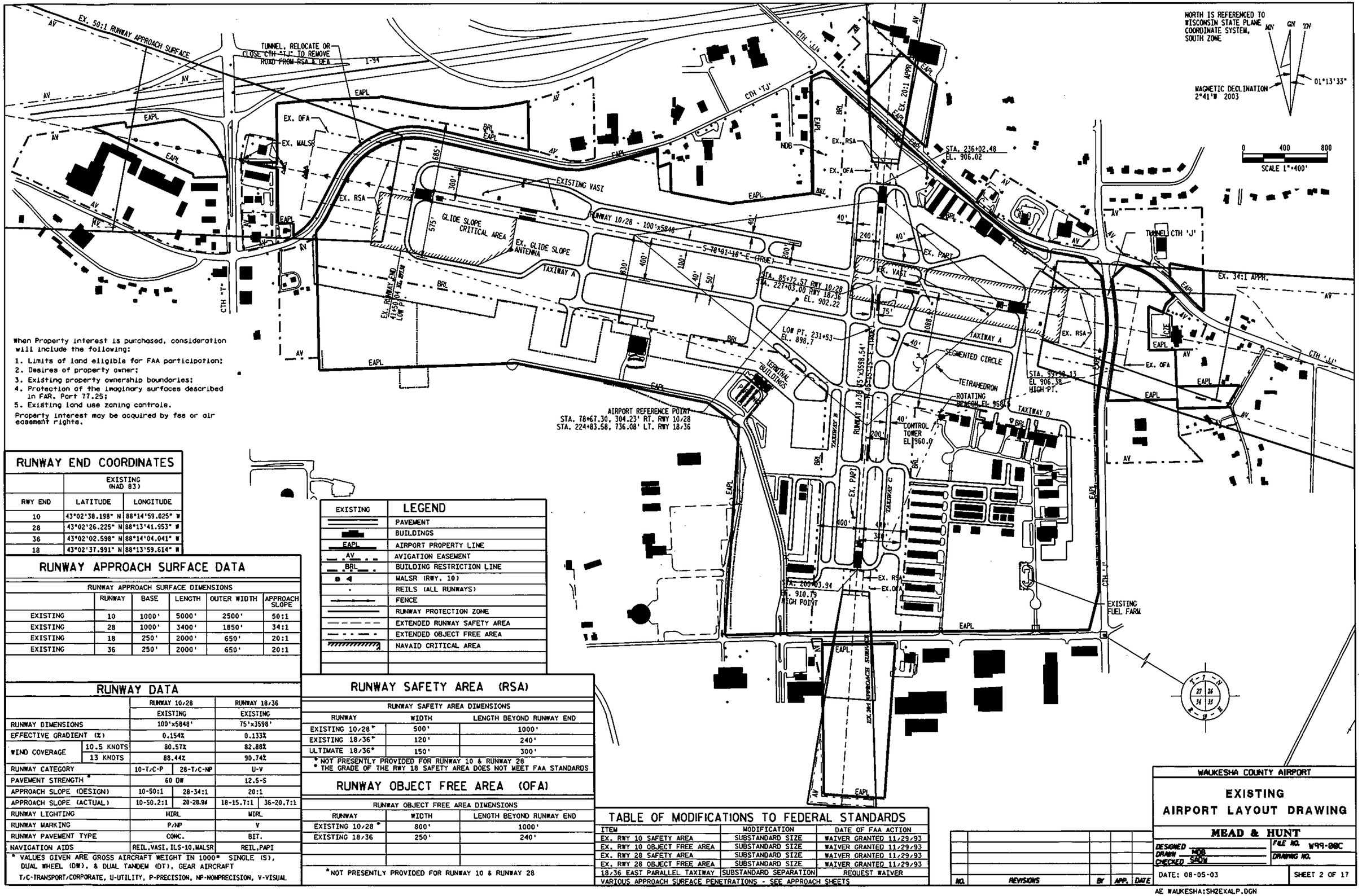
TITLE & APPROVAL SHEET

MEAD & HUNT, INC.
MADISON, WISCONSIN

DESIGNED	DATE	TRACED	DATE
DRAWN MOB	DATE 12/91	CHECKED SADH	DATE 6/92

DATE: 08-05-03 | DRAWING NO. | SHEET 1 OF 17

AE WAUKESHA:SH1TITLE.DGN WAUKESHA, WISCONSIN



When Property interest is purchased, consideration will include the following:

1. Limits of land eligible for FAA participation;
2. Desires of property owner;
3. Existing property ownership boundaries;
4. Protection of the imaginary surfaces described in FAR. Part 77.25;
5. Existing land use zoning controls.

Property interest may be acquired by fee or air easement rights.

RUNWAY END COORDINATES

RWY END	EXISTING (NAD 83) LATITUDE	LONGITUDE
10	43°02'38.198" N	88°14'59.025" W
28	43°02'26.225" N	88°13'41.953" W
36	43°02'02.598" N	88°14'04.041" W
18	43°02'37.991" N	88°13'59.614" W

RUNWAY APPROACH SURFACE DATA

RUNWAY APPROACH SURFACE DIMENSIONS

	RUNWAY	BASE	LENGTH	OUTER WIDTH	APPROACH SLOPE
EXISTING	10	1000'	5000'	2500'	50:1
EXISTING	28	1000'	3400'	1850'	34:1
EXISTING	18	250'	2000'	650'	20:1
EXISTING	36	250'	2000'	650'	20:1

RUNWAY DATA

		RUNWAY 10/28		RUNWAY 18/36	
		EXISTING		EXISTING	
RUNWAY DIMENSIONS		100'x5848'		75'x3598'	
EFFECTIVE GRADIENT (%)		0.154%		0.133%	
WIND COVERAGE	10.5 KNOTS	80.57%		82.88%	
	13 KNOTS	88.44%		90.74%	
RUNWAY CATEGORY		10-T/C-P	28-T/C-NP	U-V	
PAVEMENT STRENGTH *		60 DW		12.5-S	
APPROACH SLOPE (DESIGN)		10-50:1	28-34:1	20:1	
APPROACH SLOPE (ACTUAL)		10-50.2:1	28-28.9#	18-15.7:1	36-20.7:1
RUNWAY LIGHTING		HIRL		MIRL	
RUNWAY MARKING		P/NP		V	
RUNWAY PAVEMENT TYPE		CONC.		BIT.	
NAVIGATION AIDS		REIL,VASI, ILS-10,MALSR		REIL,PAPI	

* VALUES GIVEN ARE GROSS AIRCRAFT WEIGHT IN 1000# SINGLE (S), DUAL WHEEL (DW), & DUAL TANDEM (DT), GEAR AIRCRAFT

T/C-TRANSPORT/CORPORATE, U-UTILITY, P-PRECISION, NP-NONPRECISION, V-VISUAL

LEGEND

EXISTING	
	PAVEMENT
	BUILDINGS
EAPL	AIRPORT PROPERTY LINE
AV	AVIGATION EASEMENT
BRL	BUILDING RESTRICTION LINE
	MALSR (RWY. 10)
	REILS (ALL RUNWAYS)
	FENCE
	RUNWAY PROTECTION ZONE
	EXTENDED RUNWAY SAFETY AREA
	EXTENDED OBJECT FREE AREA
	NAVAID CRITICAL AREA

RUNWAY SAFETY AREA (RSA)

RUNWAY SAFETY AREA DIMENSIONS

RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
EXISTING 10/28 *	500'	1000'
EXISTING 18/36 *	120'	240'
ULTIMATE 18/36 *	150'	300'

* NOT PRESENTLY PROVIDED FOR RUNWAY 10 & RUNWAY 28
* THE GRADE OF THE RWY 18 SAFETY AREA DOES NOT MEET FAA STANDARDS

RUNWAY OBJECT FREE AREA (OFA)

RUNWAY OBJECT FREE AREA DIMENSIONS

RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
EXISTING 10/28 *	800'	1000'
EXISTING 18/36	250'	240'

*NOT PRESENTLY PROVIDED FOR RUNWAY 10 & RUNWAY 28

TABLE OF MODIFICATIONS TO FEDERAL STANDARDS

ITEM	MODIFICATION	DATE OF FAA ACTION
Ex. RWY 10 SAFETY AREA	SUBSTANDARD SIZE	WAIVER GRANTED 11/29/93
Ex. RWY 10 OBJECT FREE AREA	SUBSTANDARD SIZE	WAIVER GRANTED 11/29/93
Ex. RWY 28 SAFETY AREA	SUBSTANDARD SIZE	WAIVER GRANTED 11/29/93
Ex. RWY 28 OBJECT FREE AREA	SUBSTANDARD SIZE	WAIVER GRANTED 11/29/93
18/36 EAST PARALLEL TAXIWAY	SUBSTANDARD SEPARATION	REQUEST WAIVER
VARIOUS APPROACH SURFACE PENETRATIONS - SEE APPROACH SHEETS		

NO.	REVISIONS	BY	APP.	DATE

WAUKESHA COUNTY AIRPORT

EXISTING AIRPORT LAYOUT DRAWING

MEAD & HUNT

DESIGNED
DRAWN MDB
CHECKED SADW

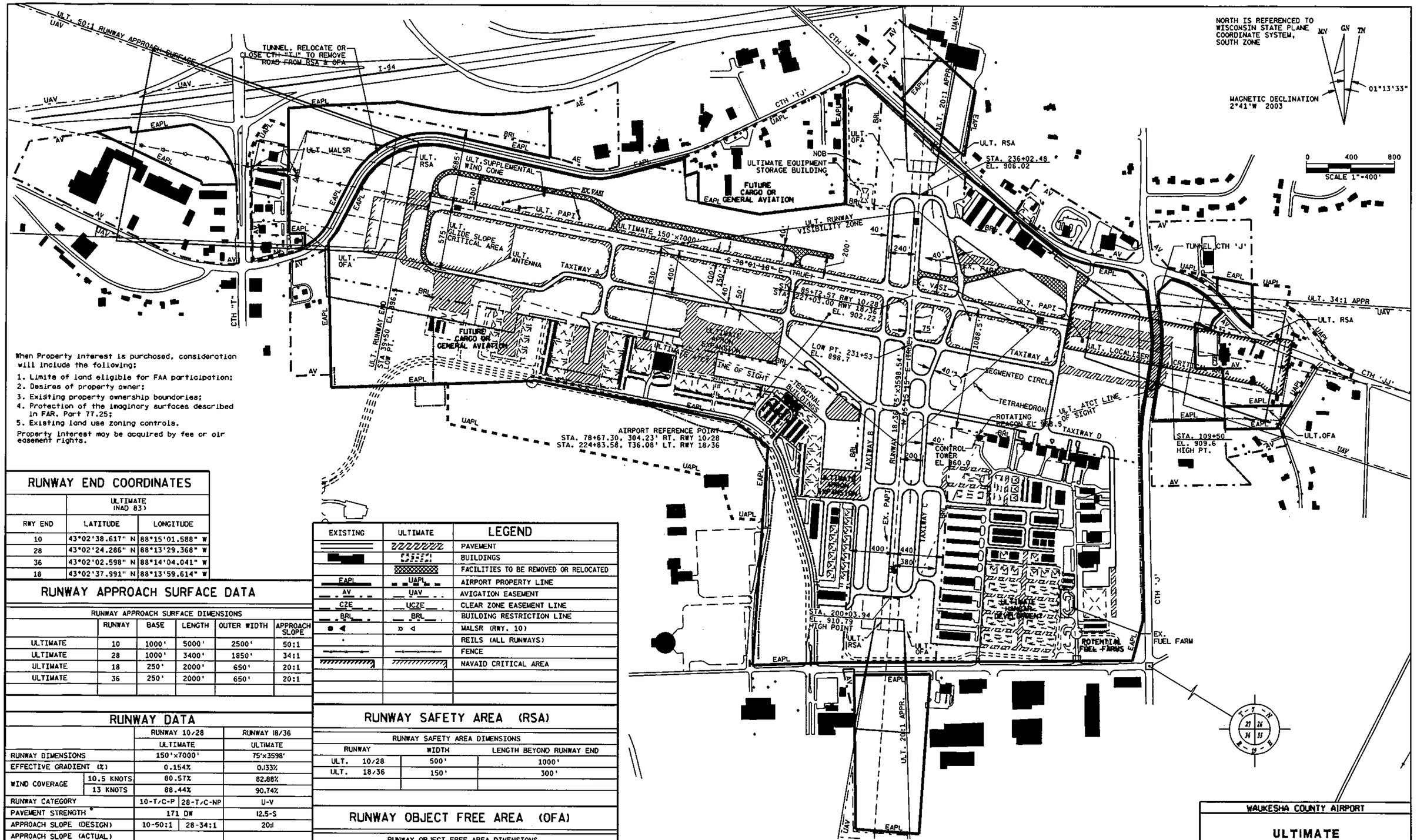
FILE NO. W99-08C

DRAWING NO.

DATE: 08-05-03

SHEET 2 OF 17

AE WAUKESHA:SH2EXALP.DGN



When Property interest is purchased, consideration will include the following:

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2. Desires of property owner;
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4. Protection of the imaginary surfaces described in FAR, Part 77.25;
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RUNWAY DATA

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PAVEMENT STRENGTH *		171 DW		12.5-S
APPROACH SLOPE (DESIGN)		10-50:1	28-34:1	20:1
APPROACH SLOPE (ACTUAL)				
RUNWAY LIGHTING		HIRL		MIRL
RUNWAY MARKING		P/NP		V
RUNWAY PAVEMENT TYPE		PCC		BIT.
NAVIGATION AIDS		REIL, PAPI, ILS_10, MALSR		REIL,PAPI

* VALUES GIVEN ARE GROSS AIRCRAFT WEIGHT IN 1000# SINGLE (S), DUAL WHEEL (DW), & DUAL TANDEM (DT), GEAR AIRCRAFT

T/C-TRANSPORT/CORPORATE, U-UTILITY, P-PRECISION, NP-NONPRECISION, V-VISUAL

EXISTING	ULTIMATE	LEGEND
		PAVEMENT
		BUILDINGS
		FACILITIES TO BE REMOVED OR RELOCATED
EAPL	UAPL	AIRPORT PROPERTY LINE
AV	UAV	AVIGATION EASEMENT
CZE	UCZE	CLEAR ZONE EASEMENT LINE
BRL	BRL	BUILDING RESTRICTION LINE
		MALSR (RWY. 10)
		REILS (ALL RUNWAYS)
		FENCE
		NAVAID CRITICAL AREA

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RUNWAY SAFETY AREA DIMENSIONS RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
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EX. RWY 28 OBJECT FREE AREA	SUBSTANDARD SIZE	WAIVER GRANTED 11/29/93
18/36 EAST PARALLEL TAXIWAY	SUBSTANDARD SEPARATION	REQUEST WAIVER
VARIOUS APPROACH SURFACE PENETRATIONS - SEE APPROACH SHEETS		

NO.	REVISIONS	BY	APP.	DATE

WAUKESHA COUNTY AIRPORT

ULTIMATE AIRPORT LAYOUT DRAWING

MEAD & HUNT

DESIGNED
DRAWN MJB
CHECKED SADH

FILE NO. W99-00C
DRAWING NO.

DATE: 08-05-03

SHEET 3 OF 17

AE WAUKESHA:SH3ULTALP.DGN

Appendix B. Correspondence for FAA Continuance of Waivers for Runway 10 and 28 Safety Areas

December 8, 2004

Ms. Nancy Nistler
Airports District Office Manager
Minneapolis Airports District Office, MSP-600
Federal Aviation Administration
6020 28th Avenue, South, Room 102
Minneapolis, Minnesota 55450

Re: Request for Continuance of Waivers
Waukesha County Airport (Crites Field), Waukesha, Wisconsin

Dear Ms. Nistler:

The purpose of this letter is to request the indefinite continuance of waivers granted by the FAA on November 29, 1993 for substandard runway safety areas and object free areas on each end of Runway 10/28 at the Waukesha County Airport (Crites Field) in Waukesha, Wisconsin. Attached is a copy of the original waiver letter.

Due to surrounding land uses, the impact of providing full 1,000-foot by 500-foot runway safety areas has always been considered potentially disruptive and costly to the surrounding community due to the presence of heavily traveled public roadways, high property values, and high quality wetland areas adjacent to the airport.

In the spring of 2004, the Waukesha County Airport along with the WisDOT Bureau of Aeronautics undertook an Environmental Assessment to explore alternatives to bring the runway safety areas for Runway 10/28 into compliance with current standards. Alternatives investigated for the EA include closure, relocation, and/or tunneling of public roads, shifting or shortening the runway, installing Engineered Material Arresting Systems (EMAS), and establishing declared distances. Attached is an aerial photo of the airport and a cost summary table of the alternatives for your reference.

In brief, the alternatives involving roadway closures, relocations, and tunneling, as well as shifting of the runway all result in high costs and wetland impacts. The alternatives that shorten the runway or establish declared distances do not meet the purpose and need of the project which includes maintaining the existing runway length for current users. The installation of EMAS would also result in high construction costs as well as high ongoing maintenance costs for the Airport.

Keeping in mind that solutions for both ends of the runway needed to be considered, the alternatives have been found to have costs that exceed the maximum feasible RSA improvement cost derived for Runway 10/28 at Waukesha from Figure 4 of *FAA Order 5200.9, Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems.* Following the calculation outlined in the Order, the maximum feasible RSA improvement cost for this runway would be $6.03 million. In addition to high costs, wetland impacts resulting from several alternatives are not expected to be easily mitigated.

It is for these reasons that we request that the existing waivers for the substandard RSAs and OFAs on each end of Runway 10/28 be continued indefinitely.

If you would like additional detailed information on any of the alternatives, please let us know. Thank you for your consideration. I look forward to your reply.

Sincerely,

Mr. Daniel M. Finley
Waukesha County Executive

Enclosures

cc: Airport Commission ?

DRAFT

Federal Aviation Administration

To: Andy Platz
Company:
Phone:
Fax:

From: Sandy DeRothey
Title:

Date: 6-9-05
Pages w/cover: 2

Minneapolis Airports District Office
6020 28th Avenue S., Room 102
Minneapolis, MN 55450-2706
T (612) 713-4350
F (612) 713-4364
E

Facsimile

Here is the letter to Waukesha on the RSA Can you forward to Keith I don't have his fax.

The letter was dated Feb 17, 2005 but I must have forgotten to date it.

U.S. Department of Transportation

Federal Aviation Administration

Airports District Office
6020 28th Avenue South, Room 102
Minneapolis, Minnesota 55450

Feb 17, 2005

Daniel M. Finley
Waukesha County Executive
1320 Pewaukee Road
Room 320
Waukesha, WI 53188

Dear Mr. Finley:

Thank you for your letter of December 10, 2004 regarding the waivers for substandard runway safety areas (RSA) at the Waukesha County Airport (Crites Field), Waukesha, Wisconsin.

Paragraph 305(c) of Advisory Circular 150/5300-13 change 7 states:

> "Substandards RSAs.
> RSA standards cannot be modified or waived like other airport design standards. MiThe dimensional standards remain in effect regardless of the presence of natural or man-made objects or surface conditions that might create a hazard to aircraft that leave the runway surface."

This paragraph then goes on to state:

> "A continuous evaluation of all practicable alternatives for improving each sub-standard RSA is required until it meets all standards for grade, compaction, and object frangibility."

I trust that this letter adequately addresses your concerns. If you or your staff needs further assistance, please contact me at, (612) 713-4363.

Sincerely,

Sandra E. DePottey

Sandra E. DePottey
Program Manager
Minneapolis Airports District Office

Appendix C. User Survey, Feedback and FAA Concurrence on Maintaining Existing Runway Length

Greg Stern

From: Gary.D.Wilson@faa.gov
Sent: Thursday, January 30, 2014 2:38 PM
To: Greg Stern
Cc: Al.Richardson@faa.gov; Trimble, Andrew - DOT (Andrew.Trimble@dot.wi.gov); Stanich, Kurt (KStanich@waukeshacounty.gov); Laura Morland
Subject: Re: Waukesha RSA Project - Justification for Maintaining Existing Runway Length
Attachments: UES User Survey Responses.xlsx; UES 2011 vs 2013 Jet Data.xlsx

Greg -

Based on the data provided, the FAA concurs with the existing runway length at Waukesha.

If you have any questions, feel free to give me a call.

Thanks.

Gary Wilson
Program Manager
FAA Chicago Airports District Office 614
2300 E. Devon Ave
Des Plaines IL 60018
Office: (847) 294-7631
Fax: (847) 294-7046
Gary.d.wilson@faa.gov

From: Greg Stern <greg.stern@meadhunt.com>
AGL-CHI-ADO, Chicago, IL
To: Gary D Wilson/AGL/FAA@FAA,
Cc: "Stanich, Kurt (KStanich@waukeshacounty.gov)" <KStanich@waukeshacounty.gov>, "Trimble, Andrew - DOT (Andrew.Trimble@dot.wi.gov)" <Andrew.Trimble@dot.wi.gov>, Al Richardson/AGL/FAA@FAA, Laura Morland <laura.morland@meadhunt.com>
Date: 01/28/2014 02:29 PM
Subject: Waukesha RSA Project - Justification for Maintaining Existing Runway Length

Hi Gary:

At today's conference call on the Waukesha RSA project, we went over the User Survey responses that have been received thus far (attached).

In combination with the overall 2013 fleet mix data that was presented at the previous Jan. 14th meeting (also attached), we are hoping that sufficient data has been gathered to justify maintaining the existing runway length at UES.

Al Richardson had mentioned that we should coordinate with you on this, and that you may also want to receive concurrence from the Region.

Can you give me a call at your earliest convenience to discuss this in more detail?

Thank you,

Greg Stern, P.E. | Civil Engineer
Mead & Hunt, Inc | M & H Architecture, Inc | 6501 Watts Rd. | Madison, WI
53719
Main: 608-273-6380 | Mobile: 608-712-2486 greg.stern@meadhunt.com | www.meadhunt.com

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Waukesha County Airport Survey

AIRPORT USER SURVEY: Waukesha County Airport – Crites Field
Runway 10/28 Safety Area Improvement Project

The Waukesha County Airport, in cooperation with the Wisconsin Bureau of Aeronautics and the Federal Aviation Administration, are evaluating alternatives to bring the safety areas for primary Runway 10/28 into conformance with federal standards. Some of the alternatives being analyzed would maintain the existing 5,848' of useable length of pavement for this runway, while other options would involve a reduction in the runway length available for either takeoffs, landings, or some combination thereof.

So that we may accurately assess and document the needs of our users, we request that you (or a qualified representative from your corporation) please complete the following questionnaire.
Your valued input will assist greatly in generating the justification needed in the selection of a preferred alternative for this project. Information from the completed surveys will be compiled in a summary and individual responses will not be reported in any manner. Thank you in advance for your time and efforts.

When completed, please return this survey by January 10th, 2014 via one of the following methods:

MAIL
Waukesha County Airport
Attn: Kurt Stanich, Manager
2525 Aviation Drive
Waukesha, WI 53188

E-MAIL
kstanich@waukeshacounty.gov

Questions concerning this survey can be directed to: *Kurt Stanich at 262-653-4158*

1. What specific aircraft make(s) and model(s) do you (or your corporation) currently use in conducting operations at Waukesha County Airport (UES)? Please also list any additional models ("future") that you (or your corporation) may be considering for use at this airport within the next five years.

Aircraft Model	Current or Future	N-Number

2. How many estimated annual operations do you currently perform at this airport, and how many would you expect to perform within the next five years if the runway length remains unchanged?

   Note: *An 'operation' can be either a takeoff or a landing (i.e. arriving at an airport and later departing equals two operations even though it was only one visit).*

Aircraft Model	**Number of Operations**				
	2014	**2015**	**2016**	**2017**	**2018**
Estimated Yearly Totals:					

3. Please provide the expected destination and/or length of flight and takeoff weight by aircraft model:

Aircraft Model	**Destination / Length of Flight**	**Takeoff Weight** (lbs.)

4. What are the Accelerate/Stop distance requirements of your aircraft from Waukesha County Airport (UES) with 90% useful load on a 90° (F) day?

Aircraft Model	**Accelerate / Stop Distance** (feet)

5. What are the landing distance requirements of your aircraft at Waukesha County Airport (UES) during the typical winter weather months, or periods of wet and slippery conditions?

Aircraft Model	**Landing Distance** (feet)

6. What runway length does your insurance company require for takeoff and landing operations?

Aircraft Model	**Insurance Requirements Takeoff** (feet)	**Insurance Requirements Landing** (feet)

Related Comments:

7. Do you have a company policy that specifies a minimum runway length for takeoffs and/or landing length? If so, what are the minimum lengths required?

Aircraft Model	**Company Policy Requirements Takeoff** (feet)	**Company Policy Requirements Landing** (feet)

Related Comments:

8. What runway length would be ideal for your needs? Please be specific for each model of aircraft, and for both landing and takeoff operations.

Aircraft Model	**Ideal Length for Takeoffs** (feet)	**Ideal Length for Landings** (feet)

Related Comments:

9. Are you currently operating with less than the desired amount of payload or fuel (takeoff weight) in order to use the 5,848-ft long Runway 10/28 at Waukesha County Airport (UES)? Please be specific for each model of aircraft.

Aircraft Model	**Less Than Desired Operation?**			**Explanation**
	Yes	No	Cannot Currently Use	
	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Related Comments:

10. Could the operations of your aircraft to/from the Waukesha County Airport accommodate a 500' reduction in available landing length, provided the length for takeoff remained unchanged? Please explain.

11. Please list any other information or comments that you feel would benefit the airport?

12. Please provide your contact information:

    Name:
    Title:
    Company:
    Company Address:

    Phone:
    E-mail:

    Thank you very much for your time and input.

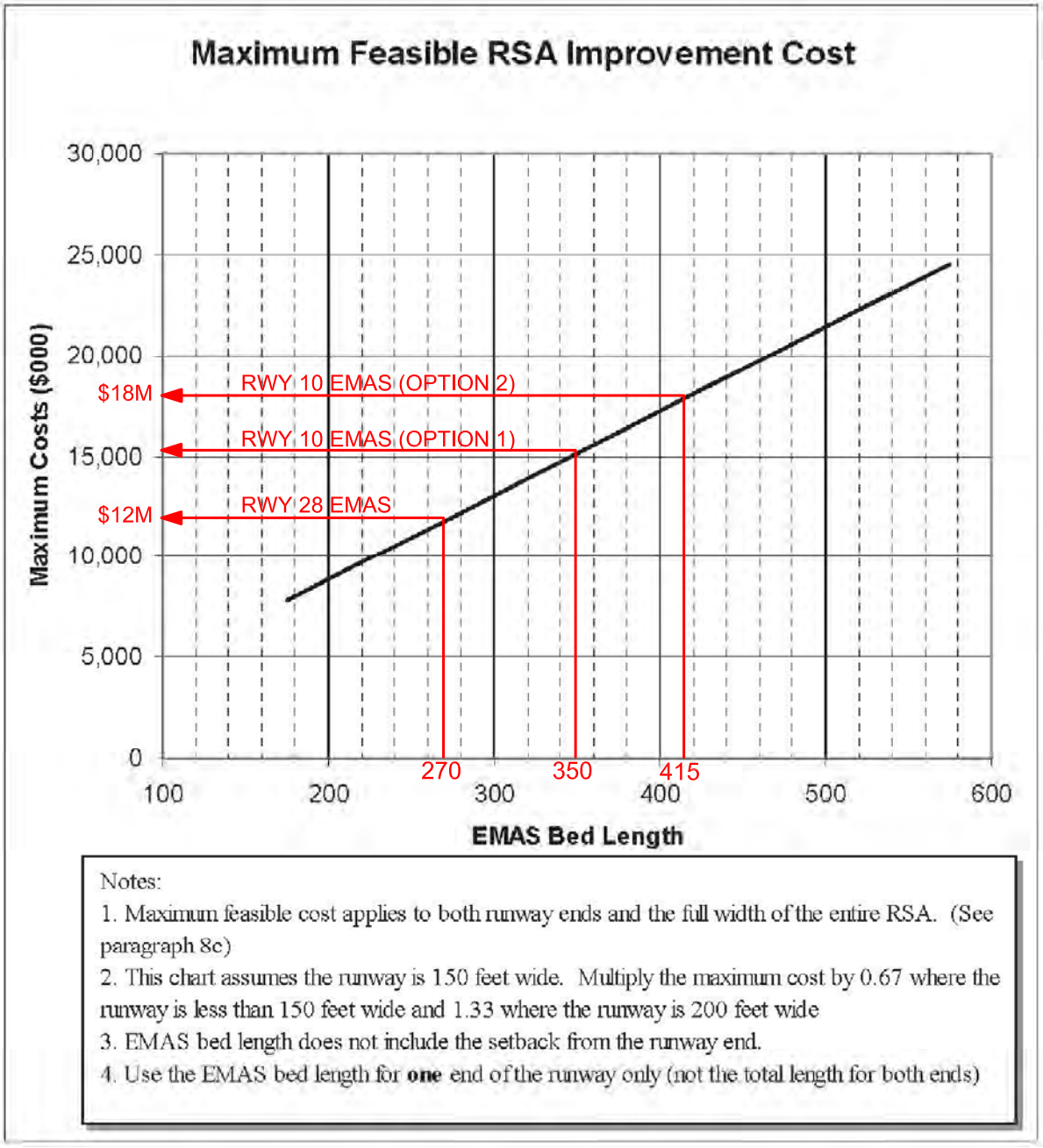
Summary of User Survey Responses on Required Runway Length

Waukesha County Airport

Company	Aircraft	N-Number	Estimated Annual Operations					Destination and/or Length of Flight	Takeoff Weight (lbs.)	ASDA	LDA	Insurance Requirements:		Company Policy		Ideal Length		Are You Payload Restricted under the existing runway lengths?	Could Your Operations Accommodate a 500' reduction in landing length available?	Additional Information or Comments
			2014	2015	2016	2017	2018					Takeoffs	Landings	Takeoffs	Landings	Takeoffs	Landings			
AO Smith	CE-560XL	N138HW	125	125	125	125	125	East Coast, Mid South, (1.8 hours)	20,000	4,000	5,500	4,500	4,500	4,500	4,500	5,500	5,500	Not Limited	May be a factor during winter months, but doubtful	
AvJet Corp.	Embraer 135BJ	N189DR	72	72	72	72	72	Midway Chicago	36,000	4,600	5,800			5,000	5,000	6,000	6,000	Not Limited	No. During winter we need every inch available	A broader runway would be nice.
Bradley Corp.	Cessna Citation 650	N422BC	120	130	140	140	140	Scottsdale (1,400 miles)	21,500	5,792	5,848+	5,000	5,000	5,000	5,000	6,500	6,000	Unable to depart at Gross Weight above 86 degrees	Absolutely not. We have to multiply landing distance by 2.6 with wet or contaminated runway.	
Briggs & Stratton	Citation Excel	N767BS	145	150	150	155	155	Key West, FL; Naples, FL	20,000	4,659	4,400			4,500	4,500	5,000	4,500	Not Limited	Yes, conditional on breaking action for winter operations	Winter snow removal and runway conditions would limit our operations if 500' were to be removed from available landing distance.
Dynamic International	Lear 31A	N895DM	100	100				(1 hour)	17,700	5,670	6,080+					6,500	7,500	When runway is snow covered, wet or icy	Have to offload fuel, etc. may need to load at Milwaukee (MKE)	Cut down trees at approach end of Rwy 28
Fabco	British Aerospace 4100	N602JF	600+	600+	600+	600+	600+	KHEF - 3.5 hrs	24,000	5,800	4,200	by analysis	by analysis	5,000	5,000	6,500	6,000	Weight restricted above 80 degrees	No not all year. Would have to restrict fuel loads in summer	Need better clearway east of departue end of Rwy 10
Fabco	Cessna Citation CIII	N50QN	600	600	600	600	600	KSUS - 1.0 hr	22,000	5,100	3,600	Far 25	Far 25	5,000	5,000	6,000	5,800	Weight restricted above 78 degrees	No not all year. Would have to restrict fuel loads in summer	Need better clearway east of departue end of Rwy 10
Quad Graphics	Gulfstream G-IVSP	N44QG	175	190	205	225	240	Worldwide Destinations	70,000	6,000+	5,800	5,000	5,000	5,000	5,000	7,000	7,000	Runway length has not limited us in the last 2 years. However, a significant reduction in available runway length could have a major impact.	This would put us very close to our minimum runway length for both aircraft. Which means anytime the braking action is reduced due to snow or icy we have to divert to another destination or carrly less fuel on departure. This could become a serious operational problem.	Better snow removal
Quad Graphics	Bombradier Challenger 300	N44QG	175	190	205	225	240	Western Hemisphere	35,000	5,000+	5,500	5,000	5,000	5,000	5,000	6,000	6,000			Better snow removal

Appendix D. Maximum Feasible Construction Cost & Correspondence with Zodiac Aerospace

Figure 4. Maximum Feasible Cost for RSA Improvement



Notes:
1. Maximum feasible cost applies to both runway ends and the full width of the entire RSA. (See paragraph 8c)
2. This chart assumes the runway is 150 feet wide. Multiply the maximum cost by 0.67 where the runway is less than 150 feet wide and 1.33 where the runway is 200 feet wide
3. EMAS bed length does not include the setback from the runway end.
4. Use the EMAS bed length for **one** end of the runway only (not the total length for both ends)

ADDITIONAL NOTES:

1. EMAS ARRESTING BED LENGTHS OBTAINED FROM MANUFACTURER, ZODIAC AEROSPACE (MARCH 2014)
2. RUNWAY 10/28 IS CURRENTLY 100' WIDE, WITH ALP SHOWING PLANS FOR WIDENING TO 150' WIDE.
3. MFC RANGES FROM $12M TO $18M WITHOUT AN ADJUSMENT FOR RUNWAY WIDTH.
4. MFC RANGES FROM $9M TO $12M WHEN ADJUSTED FOR THE EXISTING 100' RUNWAY WIDTH.
5. $12M MFC USED AS THE INITIAL SCREENING THRESHOLD FOR ALTERANTIVES

Greg Stern

From: Michael.Hall@zodiacaerospace.com
Sent: Friday, March 07, 2014 8:22 AM
To: Greg Stern
Cc: Andrea.Manning@zodiacaerospace.com; Laura Morland
Subject: RE: EMAS RSA Grades UES

Follow Up Flag: Follow up
Flag Status: Completed

Greg, some dimensions for you. Note these are rounded for ease of discussion.

RW10 Departure End (0.00% RSA slope):
600ft RSA (Standard 70kt EMAS) is approximately $2.9M **- 270' long by 110' wide EMAS arrestor bed plus 330' setback**

RW28 Departure End:
Option 1: 600ft RSA with -2.33% RSA slope (Standard 70kt EMAS) is approx. $3.7M A 600ft RSA will allow for greater performance with a smaller size EMAS bed setback further from threshold. - **350' long by 110' wide EMAS arrestor bed plus 250' setback**
Option 2: 450ft RSA with -0.60% slope (Non-Standard 60+ kt EMAS) is approx. $4.3M Within an RSA of 450ft and using a minimum setback of 35ft, the EMAS bed is larger but provides a slightly lower performance for some aircraft. - **415' long by 110' wide EMAS arrestor bed plus 35' setback**

To estimate the dimensions of the pavement, the beds would actually be few feet wider than 110'. I believe we discussed 15' or 16' of pavement beyond each side of the bed. If you estimated the width of the paving to be about 145' total, that would allow for sufficient pavement to drive along side the bed. Beyond the back end of the bed, if you aren't going to have room for a perimeter service road, then it's best to keep paving beyond the end to a minimum (no more than 5') to discourage anyone from thinking they should/could drive around the back of the bed and risk getting too close.

ZODIAC ARRESTING SYSTEMS
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Michael.Hall@zodiacaerospace.com
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http://www.esco.zodiacaerospace.com

From: Greg Stern <greg.stern@meadhunt.com>
To: "Andrea.Manning@zodiacaerospace.com" <Andrea.Manning@zodiacaerospace.com>
Cc: Laura Morland <laura.morland@meadhunt.com>, '"Michael.Hall@zodiacaerospace.com"' <Michael.Hall@zodiacaerospace.com>
Date: 03/06/2014 02:14 PM
Subject: RE: EMAS RSA Grades UES

Thank you for those responses to our questions.

One additional question: What are the EMAS bed lengths for each runway end scenario? I am trying to redevelop the Maximum Feasible Cost based on the Guidance within 5200.9

Thanks,

Greg Stern, P.E. | Civil Engineer
Mead & Hunt, Inc | M & H Architecture, Inc | 6501 Watts Rd. | Madison, WI 53719
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greg.stern@meadhunt.com | www.meadhunt.com

From: Andrea.Manning@zodiacaerospace.com [mailto:Andrea.Manning@zodiacaerospace.com]
Sent: Monday, March 03, 2014 12:30 PM
To: Greg Stern
Cc: Laura Morland; 'Michael.Hall@zodiacaerospace.com'
Subject: RE: EMAS RSA Grades UES

Dear Greg,

Here are our responses to your questions. Please let me know if further clarification is needed.

1. Can you confirm that a 10-year replacement is still what should be used in determining that life-cycle cost?
Yes, 10 years is the replacement period as defined in FAA Order 5200.9.

2. Would all the costs you provided below be part of the 10-year replacement?
Assuming no other changes in airport design or fleet mix, the design cost would not need to be included again. The costs for the replacement bed would be approximately the same with some adjustment for fuel, material costs that may occur over the 10 year time period.

3. I am assuming site preparation would include grading, base course and asphalt. Can you give me an idea of what thicknesses of each are preferred? Anything else to consider in the site prep costs?

Site prep would including grading, paving, pavement marking on and off the EMAS, and any other work outside of the EMAS block installation itself.

The support pavement should be shoulder strength, whatever is appropriate for the airport. ESCO does not design the pavement. We do recommend that a non-woven geotextile with very low permittivity be included at the base of excavation/top of embankment under the pavement section to provide a protective layer to keep water from the bottom of the EMAS blocks, as well as underdrain if appropriate to promote drainage from the pavement section. Also recommend prime and tack coats throughout the pavement section, but for planning purposes are not significant costs.

Michael does not recall if the Waukesha beds would be in the 100-year floodplain (he does not believe they are), but in those cases we would recommend a concrete pavement section as opposed to asphalt. The blocks are light enough that they will float, and though they are adhered to the pavement with a special AC-20 mix, concrete provides more mass resistance to uplift in a flood condition than would asphalt .

FAA also requires all pavement between the end of the runway and start of the EMAS bed to be grooved.

Another cost to the site work would be a monolithically poured reinforced concrete anchor beam at the front of the bed. During bed installation, a debris deflector is installed at the front of the bed and attached to this anchor beam. In this case, approx. 113' long, 31" x 33".

4. Can you give me an idea of what labor costs normally run?
The labor costs will depend on the local prevailing wage rates, working hours available per day, night vs day work, but for estimating purposes the installation of an EMAS should be between 2-3 weeks (assuming 6hrs/day of actual work, 1 hr before and after for mobilization/demob). If the beds would be installed concurrently, this would change a little. It also

would need to be adjusted depending on which bed designs are selected. For a single installation we typically have: 1 foreman, 1 truck driver, 4 forklift drivers, 4 laborers, and 6 caulkers/tapers. We do provide a detailed specification for the EMAS installation to include in bid packages once the EMAS design is finalized.

Greg, please let me know if you have other questions.

Best Regards,

Andrea

ZODIAC ARRESTING SYSTEMS AMERICA
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http://www.zodiacaerospace.com

Please consider the environment before printing this e-mail.

From: Greg Stern <greg.stern@meadhunt.com>
To: "Andrea.Manning@zodiacaerospace.com" <Andrea.Manning@zodiacaerospace.com>
Cc: Laura Morland <laura.morland@meadhunt.com>, "'Michael.Hall@zodiacaerospace.com'" <Michael.Hall@zodiacaerospace.com>
Date: 02/26/2014 05:36 PM
Subject: RE: EMAS RSA Grades UES

Andrea / Michael:

Thank you for providing the EMAS cost estimate information. We were able to share and discuss it briefly at our meeting with FAA and Airport yesterday. I have a couple of follow up questions that would greatly assist me when completing the life-cycle cost analysis:

1. Can you confirm that a 10-year replacement is still what should be used in determining that life-cycle cost?
2. Would all the costs you provided below be part of the 10-year replacement?
3. I am assuming site preparation would include grading, base course and asphalt. Can you give me an idea of what thicknesses of each are preferred? Anything else to consider in the site prep costs?
4. Can you give me an idea of what labor costs normally run?

I can talk with the Airport manager about a site visit meeting. It might be good to wait until things warm up a bit.

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From: Andrea.Manning@zodiacaerospace.com [mailto:Andrea.Manning@zodiacaerospace.com]

Sent: Monday, February 24, 2014 4:31 PM
To: Greg Stern
Cc: Laura Morland; 'Michael.Hall@zodiacaerospace.com'
Subject: RE: EMAS RSA Grades UES

Dear Greg,

I have put together a very preliminary estimate for EMAS at UES for planning purposes with your EA.. Once a formal design is completed, I would be able to provide a more detailed formal proposal. Please do not hesitate to contact me if you have any questions about this estimate.

If possible, Michael and I would like to make a visit to UES to review the site and answer any additional questions. Please let me know if and when this might be possible.

EMAS Design (2 beds): $210,000.00

RW10 Departure End (0.00% RSA slope):
600ft RSA (Standard 70kt EMAS) is approximately $2.9M

RW28 Departure End:
Option 1: 600ft RSA with -2.33% RSA slope (Standard 70kt EMAS) is approx. $3.7M A 600ft RSA will allow for greater performance with a smaller size EMAS bed setback further from threshold.
Option 2: 450ft RSA with -0.60% slope (Non-Standard 60+ kt EMAS) is approx. $4.3M Within an RSA of 450ft and using a minimum setback of 35ft, the EMAS bed is larger but provides a slightly lower performance for some aircraft.

EMAS pricing includes all blocks, installation materials, site supervision during installation, and shipping to the airport. It does not include site preparation or EMAS installation labor.

Best Regards,

Andrea

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Andrea.Manning@zodiacaerospace.com
http://www.zodiacaerospace.com

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From: Greg Stern <greg.stern@meadhunt.com>
To: '"Michael.Hall@zodiacaerospace.com"' <Michael.Hall@zodiacaerospace.com>
Cc: Laura Morland <laura.morland@meadhunt.com>, "Andrea.Manning@zodiacaerospace.com" <Andrea.Manning@zodiacaerospace.com>
Date: 02/24/2014 03:19 PM
Subject: RE: EMAS RSA Grades UES

Hi Michael / Andrea:

Just checking to see if you anticipate having any information on EMAS at UES for us yet today?

As we discussed earlier, it's not a big deal either way, but we have a meeting with FAA tomorrow morning, or I would add it to the agenda if so.

Please let me know if we can provide you with any additional information or answer any questions.

Thanks for your help on this,

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From: Greg Stern
Sent: Tuesday, February 18, 2014 12:06 PM
To: 'Michael.Hall@zodiacaerospace.com'
Cc: Laura Morland; Andrea.Manning@zodiacaerospace.com
Subject: RE: EMAS RSA Grades UES

Hello Michael. The scenario you describe below is very similar to the grading we developed for the declared distance alternative shown in the ALP.

To get 450' of full width safety area off the approach end of Runway 10, without a retaining wall, I estimate that the grade would have to be about -0.6% to maintain 4:1 slopes and stay within the existing security fencing.

I would be interested in knowing if this non-standard EMAS installation would work.

Thanks,

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From: Michael.Hall@zodiacaerospace.com [mailto:Michael.Hall@zodiacaerospace.com]
Sent: Monday, February 17, 2014 7:50 AM
To: Greg Stern
Cc: Laura Morland; Andrea.Manning@zodiacaerospace.com
Subject: Re: EMAS RSA Grades UES

Greg,

What is your sense about a scenario for the 28 DEP end where Silvernail Road did not get moved and the back of the EMAS was at 450' from the end of the runway to correspond with the currently available full-width RSA and OFA? If so, what would you estimate the RSA grade to be at that length? Could it be level or close to?

We would have to run the model at 450' to see what kind of performance we could get at that distance, but it may provide a helpful comparison to the EMAS at 600'.

We've had several installations where an EMAS was provided and the RSA and OFA had a corner clipped, but I'm trying to find one where we actually had 600'. Most that I've come across so far had more significant impediments than a road that limited the length to less than 600'. The EMAS was usually placed as far back as possible, granted in this case that the angle of Silvernail takes a pretty good chunk out of the full width RSA and OFA as it currently sits.

I've forwarded this to Andrea who will be able to get you the pricing for the alternatives once the modeling is

complete. Hopefully we can get you some of the information you are looking for by next Monday in advance of your meeting, but not knowing Andrea's workload this week I won't speak for her.

Let me know if you can this morning if you'd like us to run the model using 450' as well and what the RSA grade would be.

I'll be in Denver the rest of the week but will check e-mails when able.

Thanks,
Michael

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ZODIAC AEROSAFETY

Michael A. Hall, PE, CM, LEED® AP
Principal Airport Civil Engineer

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From: Greg Stern <greg.stern@meadhunt.com>
To: "Michael.Hall@zodiacaerospace.com" <Michael.Hall@zodiacaerospace.com>
Cc: Laura Morland <laura.morland@meadhunt.com>
Date: 02/14/2014 06:11 PM
Subject: EMAS RSA Grades UES

Michael:

Runway 10 RSA Slope

For the west (Rwy 10) end, that northwest corner is the constricting point. Under a no retaining wall scenario, and using a 4:1 catch slope, I estimate the following slopes at various EMAS distances from the 10 threshold:

- With back of EMAS 600’ from exist. Runway 10 threshold, the longitudinal slope would need to be 2.33%
- With back of EMAS 575’ from exist. Runway 10 threshold, the longitudinal slope would need to be 1.38%
- With back of EMAS 550’ from exist. Runway 10 threshold, the longitudinal slope would need to be 0.53%

Of course, if we install a retaining wall, we can pretty much make the slope what we want it to be and still get the back of EMAS to be at the desired 600’ from the Rwy 10 threshold. There does appear to be enough room to get a retaining wall in there.

Runway 28 RSA Slope

As we discussed, the RSA slope on the east (Rwy 28) end can just be 0% to keep things as high as possible.

Impact to Runway 10 Threshold & Takeoffs from and Landings to Runway 28

You were going to look into whether we could maintain the Runway 10 threshold in its existing location if we were to install the

EMAS as shown on the Alternative 9 option. Also, you were going to make sure we would not lose takeoff or landing length from/to Runway 28 under this same scenario. We understand that the FAA would have the final call, but whatever history of similar installation conditions you can provide is much appreciated.

Lastly, we have our next meeting with the FAA on Tuesday, February 25th, and if you can have any information by the previous Monday we can present to them then. Useful items of information:

- History of successful installations and maintenance operations at similar-sized, similar climate, GA Airports. How are other airports like Waukesha making it work?
- Initial Cost, and anticipated replacement cost. How often does it have to be replaced?
- Size and dimension of bed, blocks, etc.
- Arresting speeds, and related design information
- Kinds of annual maintenance that can be expected. Are there any eligible funding sources that have been utilized for EMAS maintenance that you can point out?
- Information on snow removal operations.
- Any other useful information that might make the Airport more comfortable with its installation.

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Appendix E. Minutes of Coordination Meetings

- **November 25th, 2013**
- **February 19th, 2014**
- **March 12th, 2014 – follow up April 7th, 2014**

Draft Minutes: Agency & DOT Coordination Meeting

Project name: Waukesha County Airport (UES) Runway Safety Area Improvement Project
Wis-DOT Project ID: 0767-40-20

Client: Wisconsin Bureau of Aeronautics on behalf of the Waukesha County Airport

Mead & Hunt, Inc. Project Manager: Greg Stern (608-273-6380)

Date: November 25, 2013 – 11:00 a.m. (start pushed back due to weather conditions)

Attendees	Representing	E-mail
Kurt Stanich	Waukesha County Airport	kstanich@waukeshacounty.gov
Gary Evans	Waukesha County Highway Dept.	gevans@waukeshacounty.gov
Jerry Kelly	Wisconsin BOA	jerry.kelly@dot.wi.gov
Christopher Egger	Wisconsin BOA	christopher.egger@dot.wi.gov
Joe Gallamore	Wisconsin DOT - SE Freeways	joe.gallamore@dot.wi.gov
Andy Trimble	Wisconsin BOA	andrew.trimble@dot.wi.gov
Marie Kopka	US Army Corps of Engineers	marie.h.kopka@usace.army.mil
Craig Webster	Wisconsin DNR	craig.webster@wisconsin.gov
Karla Leithoff	Wisconsin DOT – SE Region	karla.leithoff@dot.wi.gov
Ray Dalman	Atlantic Aviation – FBO	ray.dalman@atlanticaviation.com
Perry Rossa	Mead & Hunt	perry.rossa@meadhunt.com
Erica King	Mead & Hunt	erica.king@meadhunt.com
Greg Stern	Mead & Hunt	greg.stern@meadhunt.com

The attached report represents this writer's interpretation of items discussed during the meeting. Any corrections or additional information should be brought to our attention for clarification.

Items discussed were as follows:

1. Introductions & Project Background

Due to weather conditions, the meeting was pushed back an hour to start at 11:00 a.m. Jerry Kelly asked if Amy Hanson from the FAA would be available by phone. Greg Stern explained that she had a conflicting meeting and would not be able to attend but Amy asked that a record of the meeting minutes be provided. A round of introductions started the meeting and Greg Stern gave a brief background on the project:

- The runway safety areas (RSAs) on the sides and off both ends of Runway 10-28 are not in compliance with FAA standards. The standard RSA size for Runway 10/28 is 500' wide, centered on the runway and should extend 1,000' beyond the end of the useable pavement. The RSA should be drained, smoothly graded, free from objects, and capable of supporting the weight of an aircraft in the event of an overrun or undershoot. Silvernail Road extends into the west (Runway 10) end safety area, and CTH J extends into the east (Runway 28) end safety area. The sides of Runway 10/28 have non-standard safety areas resulting from ditch lines, improper grading and the presence of abandoned taxiway pavements that are too close to the runway.

- This project started in 2004 and a range of alternatives have been developed and evaluated including tunneling, closure and relocation of the roadways, runway shifts, the installation of EMAS (engineered material arresting system) pads, and the incorporation of 'declared distances' which essentially identifies useable lengths of the runway that have varying stopping/starting points depending on the direction of the operation and whether the aircraft is taking off or landing.
- It was explained that this is a safety project, and is not capacity driven. The goal is to find a solution that brings the runway safety areas into compliance with FAA standards while maintaining useable runway lengths. The existing length of Runway 10/28 is 5,848 feet.
- Early alternatives were developed that identified reductions in the landing length, but maintained the existing 5,848' for takeoff. The thought was that the takeoff length was more critical as the aircraft generally are full of fuel or at their heaviest, are starting from a complete stop and need the longer length to develop speed and lift. However, it has since been pointed out that wet and slippery conditions (particularly in the winter months) also play a large factor into the length requirements for landings on the runway. It was further explained that the project will be investigating and updating what the runway length requirements are (for both takeoffs and landings) based on the type of aircraft utilizing the Airport, their stage lengths, payload, and other factors. This runway length analysis will be completed in cooperation with the FAA.
- The draft preliminary Environmental Assessment (EA) for this project was developed in April 2013. That document identifies a preferred alternative that involves installing pavement on both ends of the runway and incorporating declared distances (see attached exhibit – Alternative 10). This alternative was identified over the installation of EMAS on both ends of the Runway 10/28 based on life-cycle cost and other factors.
- The FAA, in their review of the April 2013 draft preliminary EA document, did not feel that sufficient information had been presented to dismiss the alternative for relocating Silvernail Road to the west (see attached exhibits – Alternative 11). While this relocation involves greater impact to wetlands and ADID wetlands, it does isolate the solution to one runway end and maintains existing runway length for both takeoff and landing operations. The FAA had asked that this alternative be looked at in more detail, and that both the primary and secondary impacts to the wetlands and ADID wetlands be evaluated. The FAA had also noted that the traffic impact analyses and much of the supporting data referenced in the April 2013 draft preliminary EA were developed in 2004, and were now almost ten years old.
- The intent of this meeting was to again familiarize the environmental agencies and the WisDOT with the project and its status, to introduce the alternative for relocating Silvernail road to the west (Alternative 11), to identify initial thoughts and feedback, and to gain consensus for how the secondary impacts to wetlands affected under Alternative 11 would be evaluated.

2. WisDOT's potential I-94 improvements

Prior to the meeting, Craig Webster (Wisconsin DNR) had asked that the WisDOT be contacted and invited to the meeting. Craig wanted to find out if the DOT had any plans for frontage roads or other improvements along Interstate I-94 that might conflict with the concept of shifting Silvernail Road to the west. Joe Gallamore (WisDOT Project Development Section SE Region Freeways) was in attendance at the meeting and provided the following information:

- Joe mentioned an upcoming rehabilitation project on Interstate I-94 that would start at nearby Highway 16 and extend westward to the county line. Joe said that the rehab work would be done in preparation for the next mega corridor improvement through I-94, but the DOT does not know yet when this section of the interstate (near the Waukesha Airport) would be completed.
- While nothing is currently planned, Joe mentioned that the SE freeways study is just starting and includes the I-94 corridor. Joe noted that there is no way for eastbound traffic on I-94 to go north on nearby Highway 16. Also, southbound traffic on STH 16 has no way to go westbound on I-94. Joe mentioned that the DOT could consider implementing interchange improvements with flyover

ramps (possibly at multiple levels) to accommodate these traffic movements in the future. These ramp and interchange improvements would likely impact wetlands within the same area of the conceptual westerly shift of Silvernail Road.

- Joe additionally noted that tight interchange spacing on I-94 from Highway T to Highway F and beyond will have the DOT considering a CD (collector/distributor) road system to improve the safety of these multiple access points onto the interstate. This section of I-94 could be widened from 6 lanes to 8, with a roadway section that could be as wide as 150' out from the centerline of the roadway in the future.
- Joe noted that these potential interchange/ramp improvements would probably not impact the conceptual westerly shift in Silvernail Road, but did note that the widened and lengthened ramp lanes would push closer to the approach light system for Runway 10 and would likely have an impact to the area businesses. Joe also wanted to point out that the flyover lanes and interchange improvements would likely require more elevated roadways and structures and asked about the vertical airspace clearances associated with the approach surface to Runway 10. It seemed to Joe that things would be getting tight.
- Greg Stern (Mead & Hunt) explained that there was a 50:1 vertical slope associated with the approach to Runway 10, and that existing roadway lighting on the Highway T overpass currently has obstruction lights on top of many of those fixtures. In looking at the Airport Layout Plan (ALP) for Waukesha, it appeared that there was roughly 38' of clearance currently, and that the proposed westerly shift of the runway could lower this clearance to about 20' to 26' or so in the worst locations. Greg explained that the FAA likes to maintain at least 17' of clearance between the runway approach surface and an interstate roadway. It was discussed that cut-off street lighting fixtures at closer spacing could be implemented with the potential interchange improvements, but the general consensus was that things would be getting tight both vertically and horizontally, and these conceptual improvements for both airport and interstate would need to be closely coordinated.
- Joe was asked to provide an estimate for when these potential DOT improvements would be implemented. Joe said that he had no idea, but that if things started today it would be a six-year process.
- Andy Trimble (Wisconsin BOA) asked if there was sufficient numbers of traffic movements currently in operation to support the potential interstate improvements discussed, and Joe mentioned that this was not known yet.
- Perry Rossa (Mead & Hunt) noted that the wetland, property, and primary environmental corridor impacts associated with the DOT's potential interstate improvements would need to be considered and brought into the discussion of cumulative impacts within the preliminary EA document.

3. Silvernail Road – Area Drainage / Flooding

The drainage conditions surrounding Silvernail Road and the effects its relocation could have were brought up at various times during the meeting:

- The group discussed drainage and flooding complaints that frequently occur to the north of Silvernail Road and Interstate I-94. A good deal of water comes from the Airport and flows under these roadways and towards the Fox River. There are likely backwaters resulting from undersized drainage structures that exist under these roadways. It was explained that Silvernail Road had been previously realigned as part of an earlier runway extension in 1989 and a history of aerial photographs were viewed to show the changes that have occurred in this area over the years.
- Perry Rossa mentioned that new precipitation atlases have been released and approved by NOAA reflecting average annual rainfall increases of 5" to 7". Karla Leithoff (WisDOT) noted that torrential rain events have become more frequent and are the critical factor. As a group it was

discussed that a relocation of Silvernail Road would need to include a look at the hydrology of the area and the role that storm water management would play in the design.

- It was noted that several locations in the wetland contained excavated or dredged areas with standing water still present in October. Marie Kopka (Army Corps of Engineers) asked if these wetlands were mapped as (or characteristics of) a tributary or aquatic resource. Need to ID as appropriate. Marie stated that if the project were to impact the tributary that we would need to evaluate those impacts as well. Is this area floodplain? No.
- Jerry Kelly (WisDOT) asked if we are dealing with a navigable waterway. In looking at the dark locations of the aerial photo, Craig Webster felt that these wetland areas probably would be considered navigable, but explained that it would not change the impact evaluation much.

4. Silvernail Road – Traffic, Use, Conceptual Roundabout and extension of Aviation Drive

- The use and importance of Silvernail Road was brought up. Gary Evans (Waukesha County Highway Department) explained that Silvernail Road has average daily traffic volumes of roughly 5,000 to 6,000 cars. Gary explained that many people use Silvernail as a short cut, and that its overall use is significant.
- Greg Stern explained that a traffic study had been completed in 2004 that evaluated the effects of a potential closure of Silvernail Road. Greg noted that this traffic study was being updated to reflect current traffic volumes and conditions. **(Action Item)**
- Greg Stern gave a brief overview of the early geometric design work that had been done thus far for relocating Silvernail Road, and identified the property impacts associated with both a curve and roundabout option. Greg explained that a roundabout option would more easily accommodate an extension of the Airport access roadway (Aviation Drive) to Grandview Boulevard, but noted that a roadway extension was not needed as part of the RSA project.
- Craig Webster identified the numerous businesses that exist north of the Airport and along both sides of Silvernail Road: Skipper Buds, ABC Signs, Peterbilt semis, etc.
- With semi-trucks making regular use of Silvernail Road, Andy Trimble asked whether a roundabout option would make sense. Gary Evans stated that a roundabout option would make sense and that it could be designed with a large enough radius and ride-able curb in the center to accommodate the turning movements of WB-67 trucks. Gary felt that the particular roundabout being considered should be designed for a traffic capacity of about 16,000 ADT. Gary explained that Silvernail Road was owned by the City of Waukesha, that it was no longer a County road, and emphasized that they (City) would need to be brought into the discussion.
- Once the preliminary vertical and horizontal designs of the conceptual roadway relocations are complete, Mead & Hunt is scoped to hold another meeting with both the City and County of Waukesha to present these concepts and to obtain further feedback and comment. Gary Evans mentioned other concerns with access and proximity to the existing business frontage roads, line of sight, and crest vertical curves that he would like to further examine as these relocation alternatives are further developed and fine-tuned. It will be necessary to find out if the City of Waukesha has any “complete street” plans that might include future bike paths or other improvements along Silvernail Road. **(Action Item)**
- Craig Webster (WisDNR) asked about the possibility of extending Aviation Drive to Grandview and asked if this had been considered to determine what effect this might have on traffic needing to get around the Airport. Craig was indicating that a closure of Silvernail Road might be more feasible if this route were in place. Kurt Stanich noted that wetland impacts would also be associated with an extension of Aviation Drive. Craig Webster felt that the wetlands near Aviation Drive would be less of an impact (overall) compared to the wetlands west of Silvernail Road. Craig asked that the City of Waukesha be approached about this idea, and asked that the DNR be invited to the next meeting with the City and County. **(Action Item)**
- The group discussed other factors associated with a closure of Silvernail Road: the fact that it

serves as a distress route between Highways T and J in the event of an accident on I-94 (although not a posted alternate route), the emergency response time to businesses located along Silvernail from the existing Fire Station on Northview, and the improvement costs that would be needed to the intersections along Northview and Aviation Drive to accommodate the additional traffic. It was discussed that these points would also be brought up in the next meeting with the City, and that public involvement and coordination was needed with the businesses and land owners along Silvernail Road on these contemplated actions. It was also discussed that the fire station and City planners should also be approached for their comments on response times resulting from a conceptual closure of Silvernail.

- Andy Trimble voiced concern about whether the FAA would grant a land release for a future extension of Aviation Drive through the Airport property, whether it be to the conceptual roundabout or another connection point on Grandview. Greg Stern explained that an extension of Aviation Drive to Grandview had been identified on the Airport's Layout Plan for some time. Andy asked that Al Richardson (FAA – Chicago ADO) be contacted to discuss what FAA's position would be on this before it was carried forward to the City and others. It was agreed that this would be discussed at the next bi-weekly conference call with the FAA on Tuesday, December 3rd **(Action Item)**.

5. Use and Operation of Waukesha County Airport

The agencies and DOT had questions about the use and operation of the Airport. Kurt Stanich (Airport Manager) provided the following information:

- The critical aircraft at Waukesha County Airport are the corporate business jets.
- The Airport is the third busiest in the state, with roughly 50,000 annual operations. Overall operations at the Airport peaked at around 90,000 operations in the mid to late 90s, and while overall numbers are down, the volume of jet traffic has steadily increased over this same time to its highest numbers.
- Waukesha Airport serves large businesses such as Quad Graphics, GE Medical and Flight for Life. The airport accommodates time sensitive operations for organ transplants, etc.
- Ray Dalman with Atlantic Aviation (the Airport's fixed base operator) noted that it is now common to see business jets with gross weights in excess of 100,000 pounds. He cited aircraft such as the G650 that make regular itinerant operations to/from Waukesha.
- The Airport is currently working with the FAA to develop a survey of the users of the Airport and to update the required runway lengths for both takeoffs and landings that is reflective of the current aircraft types and operations.

6. Initial Questions / Feedback from WisDNR, Army Corps of Engineers, WisDOT

- Marie Kopka and Karla Leithoff requested that an exhibit be developed illustrating the extent of the primary and secondary environmental corridors as well as the ADID and non-ADID wetlands through this area. Greg Stern was able to pull up the exhibits that had been previously developed with the draft preliminary EA, and explained that these exhibits would be improved to more clearly show the difference between primary and secondary corridors as well as ADID and non-ADID wetlands. **(Action Item)**
- Marie and Karla were also interested in knowing how the acreages of wetland impacts associated with the previous alternatives compared to the conceptual Silvernail Road relocation. It was explained that the declared distance w/pavement alternative (Alt 10) had 3.46 acres of impact on the west side, the EMAS alternative (Alt 9) had 3.27 acres of impact on the west side, and that the Silvernail Road relocation (Alt 11) was not finalized, but was estimated at about 6 acres of overall wetland impact on the west side. It was also explained that the wetland impacts associated with Alternatives 9 and 10 were predominately in-field and drainage way wetlands with

no ADID wetland impacts.

- Marie and Karla asked that future wetland impacts and comparison matrices separate out the ADID wetland impacts from the non-ADID wetland impacts. **(Action Item)**
- Marie asked if the Airport and the WisBOA wanted the agencies to review the draft EA and provide comment. Greg Stern explained that it was a little early for that yet. The primary goal of today's meeting was to bring them up to speed on the status of the project and the alternative for relocating Silvernail Road that was being further analyzed. The other goal of today's meeting was to obtain feedback on the secondary/cumulative effects so that Mead & Hunt can provide a complete analysis.
- Craig Webster stated that the DNR could not comment or support any alternative until the need to keep Silvernail Road open had been more fully flushed out, coordinated with the City of Waukesha and analyzed. Craig mentioned that the DNR is concerned about the shifted Silvernail Road pre-empting long term DOT plans for I-94. Liked the idea of keeping the area open to accommodate the future interstate plans.
- As far as secondary effects were concerned, Craig asked that we pay particular attention to the storm water management that would go along with a shifted Silvernail Road. **(Action Item)** Craig mentioned that he would like to be invited to the upcoming meetings and conversations with the City of Waukesha on this conceptual alternative.
- Karla Leithoff asked Jerry Kelly about the possibility of doing on-site mitigation for amphibian habitat loss, potentially adjacent to existing. Jerry felt that it could be done provided that the dry component was met (i.e. if cattails and reed canary grass) like what is predominately there currently. There was some discussion about the difference between mitigation and compensation.
- Marie Kopka asked that we obtain the background data from SEWRPC regarding the ADID classified wetlands and use that information in the functional assessment. **(Action Item)**
- There was a discussion of possible bank sites including the East Troy site. There is also a bank site being developed as part of mitigation efforts for the Waukesha by-pass project that may have some additional area available. Marie Kopka asked that we put in a sentence or two about whether those bank sites would be suitable for ADID wetland mitigation. The East Troy site might have primary environmental corridor attributes/characteristics that are currently being evaluated and this should also be included in our discussion / analysis as well. **(Action Item)**

7. Summary of Action Items from the Meeting:

- Mead & Hunt will finalize the preliminary design for the conceptual Silvernail Road relocation alternatives and will set up a meeting with the City and County of Waukesha to discuss them in more detail. As Silvernail Road is owned by the City, it will be necessary to involve them in these future discussions and obtain their comments and by-in on these alternatives. The Wisconsin DNR (and all others in attendance) will be invited to attend this meeting.
- In advance of the meeting with the City and County of Waukesha, Mead & Hunt will contact Al Richardson with the FAA to find out if they would have any issue with a land release to accommodate an extension of Aviation Drive to the conceptual roundabout or other point along Grandview Boulevard. This discussion will likely occur at an upcoming call with FAA on December 3rd.
- Mead & Hunt will update the 2004 traffic study to reflect current traffic data and will re-look at the effects of both a relocation and closure of Silvernail Road.
- At the meeting with the City and County of Waukesha, the closure of Silvernail Road alternative will also be discussed. Pending no land release issues identified with the FAA, the idea of extending Aviation Drive to Grandview as an alternate route to replace a closure of Silvernail will be also be further investigated and discussed as well as emergency response times and other potential impacts to land owners and businesses.

- Mead & Hunt will improve the exhibits within the preliminary EA to more clearly identify primary from secondary environmental corridors and to more clearly label and illustrate ADID wetlands from non-ADID wetlands. Comparison matrices that identify the differences in acreage impacts will also differentiate between ADID and non-ADID impacts.
- For secondary impact analysis of the wetlands, Mead & Hunt will include the storm water management requirements that will need to be met.
- Mead & Hunt will obtain the background data from SEWRPC concerning the ADID classified wetlands and include that information in the functional assessment of these wetlands.
- Mead & Hunt will include a discussion about the suitability of the East Troy and Waukesha by-pass bank sites for use in mitigation of the ADID wetlands, and will also include what primary environmental corridor attributes/characteristics might existing within these sites as well.
- Mead & Hunt will finalize the secondary effects analysis of the wetlands based on the comments received.

8. Additional Next Steps

- The Airport, Wis-BOA, Mead & Hunt and the FAA Chicago ADO will be working to survey the users of the Airport and identifying the runway length requirements for both take-off and landings that reflect the current aircraft and number of operations at the Airport.
- The Airport, Wis-BOA, Mead & Hunt and the FAA will be working to adequately address comments provided on the draft preliminary EA and build consensus internally on the preferred alternative. Once the draft preliminary EA comments have been adequately addressed, the document would then be provided to the agencies for review and further comment.

Respectfully submitted,

MEAD & HUNT, Inc.
Greg Stern
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608-712-2486 (cell)

cc: To all attendees

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Laura Morland, Mead & Hunt	laura.morland@meadhunt.com

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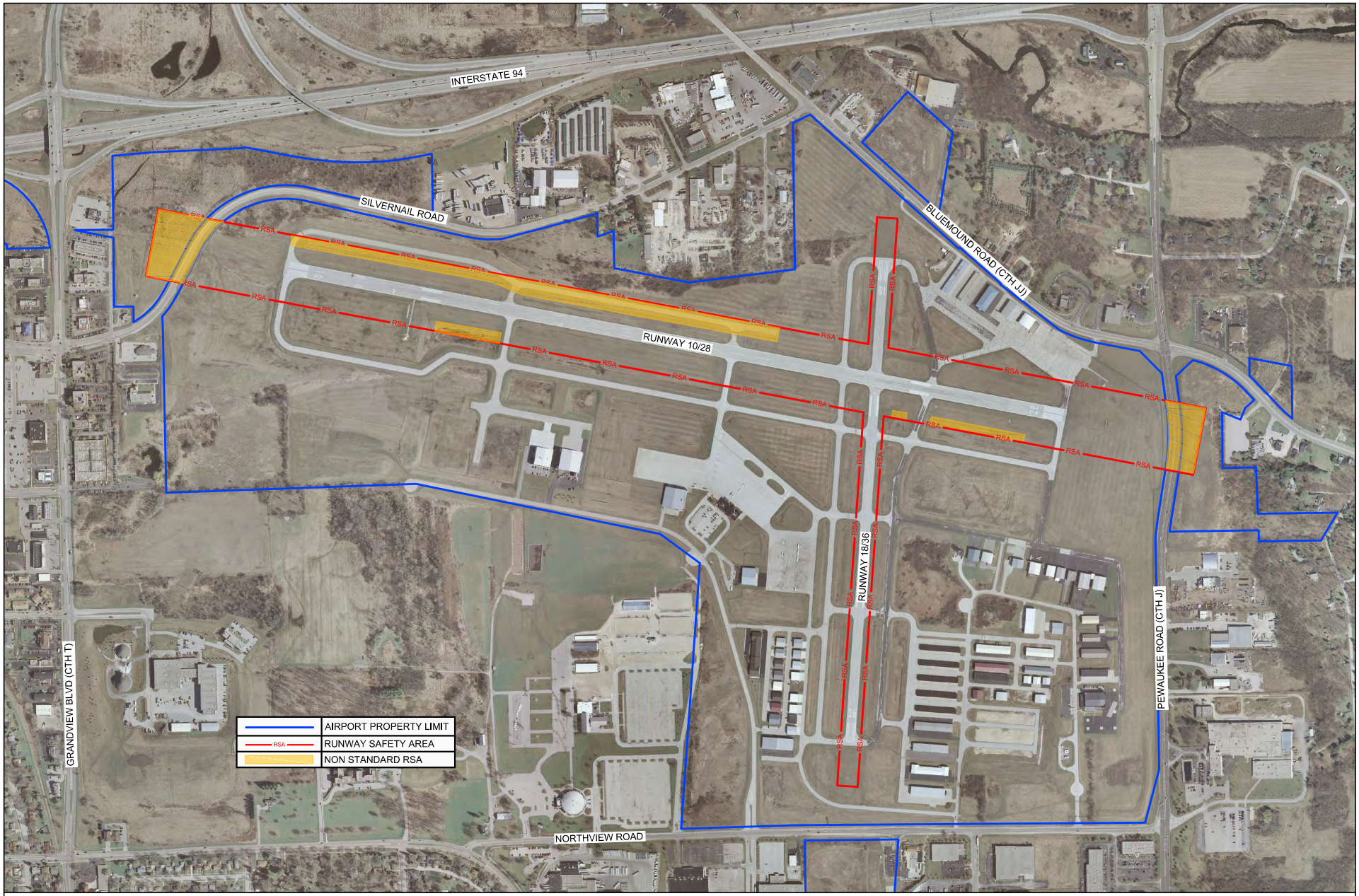


FIGURE 3-2
NO ACTION

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Orthophotograph - 2010 NAIP, Waukesha County

WAUKESHA COUNTY AIRPORT CRITES FIELD

AIRPORT PROPERTY LIMIT
RUNWAY SAFETY AREA
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT - RWY
WETLAND IMPACT - ROAD

INTERSTATE I-94

EXISTING RPZ

PROPOSED RPZ

CTH T - GRANDVIEW BLVD

SILVERNAIL ROAD

600'

430'

340' EXTENSION

RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 6,678' (PROPOSED)

TAXIWAY A

1,000'

RWY 28 TORA = 6,338'

RWY 28 TODA = 6,338'

0 250 500

RWY 10 TODA = 6,188'

RWY 10 TORA = 6,188'

RWY 10 ASDA = 5,848'

RWY 10 LDA = 5,418'

1,000'

BLUEMOUND ROAD

TAXIWAY G

EXIST. & PROP. RPZ

490' EXTENSION

TAXIWAY A

490'

660'

RWY 28 LDA = 5,358'

RWY 28 ASDA = 5,848'

RUNWAY 18-36

CTH J - PEWAUKEE ROAD

0 250 500

WAUKESHA COUNTY AIRPORT
CROSBY FIELD

FIGURE 3-20

ALTERNATIVE 10 - PREFERRED ALTERNATE

WETLAND IMPACTS THIS ALTERNATIVE: **3.64 ACRES**

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AIRPORT PROPERTY LIMIT
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WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT - RWY
WETLAND IMPACT - ROAD

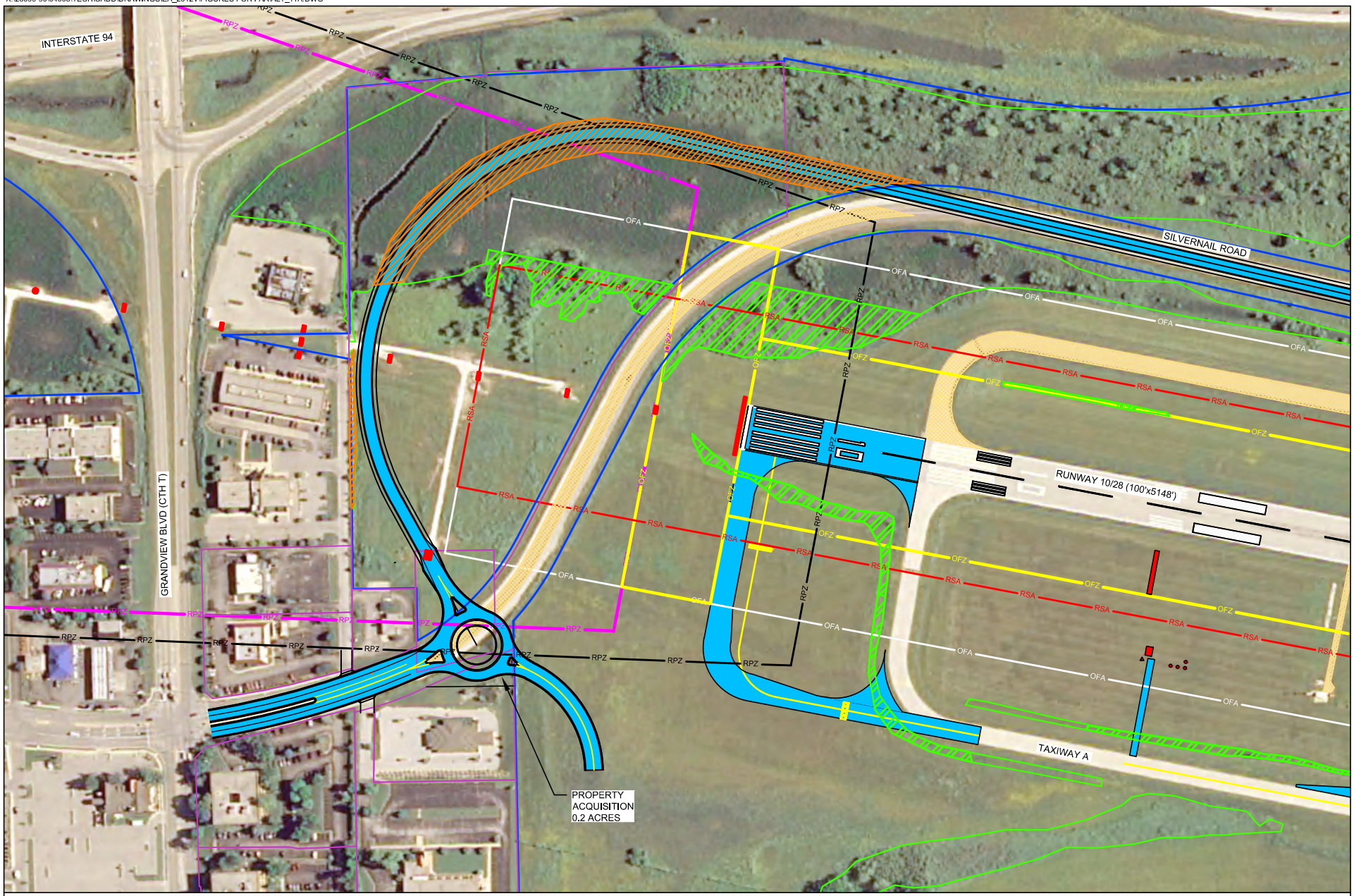
RWY 10 TODA = 6,248'
RWY 10 TORA = 6,248'
RWY 10 ASDA = 5,848'
RWY 10 LDA = 5,848'
1,000'
600'
INTERSTATE I-94
BLUEMOUND ROAD
EXIST. & PROP. RPZ
PROPOSED RPZ
EXISTING RPZ
POSSIBLE PROPERTY REQUIREMENTS AT SHIFTED MALSR LIGHTS
SHIFTED MALSR ROAD AND ADDITIONAL WETLAND IMPACTS
SILVERNAIL ROAD
PROPOSED SILVERNAIL ROAD
EXISTING SILVERNAIL ROAD
400' EXTENSION
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 6,248' (PROPOSED)
TAXIWAY A
SHIFTED GLIDESLOPE, PAPI AND AWOS
CTH T - GRANDVIEW BLVD
CTH J - PEWAUKEE ROAD
RUNWAY 18-36
RWY 28 LDA = 5,848'
RWY 28 ASDA = 5,848'
RWY 28 TORA = 6,248'
RWY 28 TODA = 6,248'
0 250 500

FIGURE 3-21
ALTERNATIVE 11 - PREFERRED ALTERNATE

WETLAND IMPACTS THIS ALTERNATIVE: **6.0 + ACRES**

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Orthophotograph - 2010 NAIP, Waukesha County

ALTERNATIVE 11A - SILVERNAIL ROUNDABOUT

WAUKESHA COUNTY AIRPORT CRITES FIELD

Draft Minutes: Conceptual Silvernail Road Modifications - Coordination Meeting with Waukesha (City and County)

Project name: Waukesha County Airport (UES) Runway Safety Area Improvement Project
Wis-DOT Project ID: 0767-40-20

Client: Wisconsin Bureau of Aeronautics on behalf of the Waukesha County Airport

Mead & Hunt, Inc. Project Manager: Greg Stern (608-273-6380)

Date: February 19th, 2014 – 1:00 p.m.

Attendees	Representing	E-mail
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The attached report represents this writer's interpretation of items discussed during the meeting. Any corrections or additional information should be brought to our attention for clarification.

Items discussed were as follows:

1. Welcome and Introductions

2. Explanation of Runway Safety Areas (RSAs): ends and sides

Mead & Hunt provided an exhibit showing the required RSAs for Runway 10/28. A brief discussion on the history of the RSAs and current status ensued. Gary Evans explained that as the design of CTH J neared completion in 1992, efforts were made to incorporate FAA RSA design standards to the Runway 28 (east) end. Silvernail Road was relocated in 1988-1989 to accommodate the runway extension west. City and County commented on the flooding issues with Silvernail Road. There is a 24 inch culvert at a low point – which has caused the road to be flooded and closed at least 3-4 times.

3. Brief Overview of Alternatives Analyzed

Greg explained that a number of alternatives have been analyzed, including tunnels, roadway

closures, and realignments and modifications to both the surrounding roadway and runway pavement itself.

With need to maintain runway length, three alternatives remain, 9, 11 and 12.

Alt 9. EMAS on both ends, no road relocation/closures. Silvernail remains in a corner of the northern Object Free Area and a 90-150 foot loss in Landing Distance Available results on the west end.

Alt 11. Relocate Silvernail, Extend Runway 10 by 400 feet. The entire fix is confined to the west end. There is no EMAS. Silvernail is either relocated or closed.

Alt 12. This is a hybrid of Alts 9 and 10. It includes EMAS on the east end, and relocated or closed Silvernail on the west end. There are no changes to Runway Protection Zones (RPZs).

4. Overview of EMAS

Greg explained what EMAS is and how it is constructed. Showed several pictures of its installation and arresting properties.

FAA has guidance on the use of Engineered Material Arresting System (EMAS). The airport has concerns, as other general aviation airports do, related to its maintenance and life cycle costs. It can be damaged if driven over. Special snow removal equipment is needed. The Airport is concerned about how replacement will be funded if damaged by contractors or an incident.

5. Overview of User Survey Results – need to maintain runway length

A current survey of the users of the airport was completed in January 2014. The users identified the need to maintain landing length as well as takeoff length, citing the frequency of wet and slippery conditions of the runway in the winter months. The FAA has concurred with the need to maintain the existing runway length in all directions.

6. Comments / Discussion on Closure or Realignment of Silvernail Road

The City asked for clarification of what a closure to Silvernail includes. Mead & Hunt explained it would include cul-de-sacs on either side of the runway safety area to maintain local access to businesses on Silvernail. The City is looking at redevelopment of the area north of Silvernail which is currently served by a private access road. The City said there are currently 200 vehicles/hour at the peak hour going eastbound at Grandview. If Silvernail Road was closed and these cul-de sacs were implemented, the question was raised – how many vehicles would be turning around at these cul-de sacs? The City and County representatives also expressed other concerns with a closure of Silvernail Road as it currently serves as an important Alternate Route for traffic on Interstate I-94, particularly for westbound traffic (all right turns).

At a previous meeting, the WisDNR had asked that an extension of Aviation Drive to Grandview Boulevard also be investigated in combination with a Silvernail Road closure. Greg Stern presented this alternative for comment. The County saw an issue with this option as well, again citing Silvernail as the best alternative route to I-94. Having to divert I-94 traffic all the way south of the Airport to Northview Road would greatly reduce the effectiveness as an alternate route given the distance from the interstate and number of stoplights, turns, etc. Gary Evans stated that it would be one thing to have Aviation Drive function as one of two alternate routes to I-94, but something entirely different if it were the only alternative route. Gary mentioned that an extended Aviation Drive was never really intended for the volume of through-traffic that would result if Silvernail Road were closed. Gary further

stated that there would be profound impacts with closing Silvernail Road. Traffic to and from the businesses on Silvernail would increase volumes onto CTH J and Northview. Gary noted that the County was recently awarded FHWA funds to implement safety improvements at the intersection of Silvernail Road with Bluemound Road – an indication of the volume of traffic circulating through this area and the importance the Federal Highway Administration sees for investing in this route. Gary mentioned that a closure of Silvernail Road would cause the County to re-evaluate the need for those planned safety improvements.

Regarding the Aviation Drive extension, the County's plan shows Woodburn Road being extended to Aviation Drive. If Aviation were to be extended to Silvernail as currently shown in the alternatives, the County's plan would need to be modified. Mention of Potter's cemetery was made – Gary thought some research had been done on its boundary. Gary and Mike both expressed concerns (City and County) with Aviation Drive being considered as a replacement to Silvernail. Its traffic counts need to be verified, but are thought to be roughly 6000.

Greg Stern also mentioned the emergency response time concerns with closing Silvernail. There is a fire station located at the northeast corner of Grandview Boulevard and Northview Road, and Silvernail Road is the most direct route to the businesses located north of the Airport. If Silvernail were closed, emergency response would need to be circulated around the Airport's east side via Northview, Pewaukee, and Bluemound roads and requiring left turns.

Mike said that Silvernail's speed limit west of Grandview Blvd is 25 mph, and is 35 mph east of this intersection. He questioned the design speeds with the new alignment – as public typically drives over the design speed limit.

The City proposed an alternative realignment for Silvernail that shifts the round-a-bout west so that the private access road to the businesses east of Grandview Boulevard would be combined / encompassed within the new Silvernail (see attached sketch provided by City at meeting). There was some discussion on whether the businesses would be amenable to this. It was speculated that those businesses may welcome the City or County taking over ownership and maintenance of this access roadway. It was also speculated that the proposed alignment of Silvernail could increase the visibility and overall access to these businesses, although their signage is currently setup to be focused at Grandview to the west. The City thought they could work with the businesses on signage. Craig Webster asked if a shifted round-a-bout would fit. Scott said that the grades may be an issue, particularly to the south access. In subsequent correspondence, the City of Waukesha also noted the steepness of the roadways going south from the proposed round-a-bout. The City stated that because Silvernail Road is utilized as an alternate route to I-94, and the presence of semi-trucking businesses north of the Airport, the round-a-bout would need to be designed to appropriately accommodate larger semi-truck traffic and turning movements. The City asked that the need for alternate route signage also be investigated and coordinated with the WisDOT. Mead & Hunt will explore the grades, truck turning movements associated with the round-a-bout, and needed alternate route signage as part of continued conceptual design development. It was discussed that each individual business appeared to own a portion of the existing access road. If Silvernail were to be realigned to the location identified by the City, it would require land acquisition from a number of business parcels, although they may be very willing to sell if the road is substantially improved and owned and maintained by the City.

Bill Mohr noted that by shifting the round-a-bout to the west as shown on the City's sketch, that lane storage length would be reduced when compared to the Mead & Hunt conceptual plan. The possibility of constructing a round-a-bout at the intersection of Grandview and Silvernail was mentioned, but was

quickly dismissed. Mike Grulke said that a round-a-bout at Grandview and Silvernail is less likely than a signal improvement.

Mike asked how the wetlands east of Silvernail would be addressed in the project, wondering if they would be removed due to potential for attracting wildlife. He raised the possibility of widening Silvernail Road to 3 lanes further east – with a center left turn lane. A wider Silvernail Road would require additional wetland impacts if this width were maintained further to the east/north. Mead & Hunt responded that there was no proposal to fill more wetlands than required by the road and related RSA improvements (i.e. nothing for wildlife attractants). Mike also mentioned that a new water line had recently been installed along Silvernail Road. If Silvernail Road were to be realigned, the water main (and other adjacent utilities in its ROW) would also need to be relocated.

From this discussion it was concluded that:

1. Both the City and County are opposed to a Silvernail closure.

2. The realignment of Silvernail shown in the Mead & Hunt alternative is ok, but City/County asked that a subset alternative be developed which combines the private access and Silvernail road with a westerly shifted round-a-bout and the incorporation of a center left turn lane.

3. If Silvernail Road can be realigned to better service/benefit the local businesses, the City would see this design approach as being more favorable than the other alternatives discussed.

4. DNR – they are committed to working with WisDOT. Craig Webster asked if these alternatives are consistent with future airport plans. Kurt said the Airport is currently constrained and doesn't see additional runway length happening. The Airport likes Alt 11 as it provides useable pavement all the time. With EMAS it is only useable during an overrun. Airport wants to maintain what is being used. Regarding runway length, the question of cargo was raised. Airport doesn't see cargo such as Fed Ex, UPS coming to Waukesha with General Mitchell having these operations. Future improvements likely to be primarily more hangars.

   In earlier discussions, it had been mentioned that the FAA is giving greater scrutiny over land use controls within RPZs. Craig Webster mentioned that the DNR will want to know that the FAA will be in agreement with the preferred alternative selected. It was discussed that both an EMAS installation (Alternatives 9 and 12) and a modified RPZ (Alternatives 9 and 11) would require coordination and concurrence with the FAA beforehand.

5. FBO – this is a safety project. Increased pavement means more safety. It's not so much the take-off requirements that are an issue, but the contamination with ice, etc. There have been some incidents at Waukesha where aircraft have gone off runway. The extension of pavement is preferred over EMAS from FBO/user perspective.

6. WisDOT – The alternatives proposed are consistent with future WisDOT I-94 plans in this area. There are no definite plans at this time for improvement to the two (2) I-94 interchanges in the vicinity of Waukesha County Airport.

7. Action Items / Next Steps from the Meeting:

- Mead & Hunt will obtain EMAS info from vendor and will evaluate feasibility and life cycle costs against the non-EMAS alternatives using FAA guidance. If EMAS appears preferred from this

analysis, then questions regarding funding for replacement and repair will need to get answered along with review of an EMAS alternative by the FAA. FAA prefers installation of a traditional RSA where possible. With the traditional RSA alternative (Alt 11) there is a change in the Runway Protection Zone (shifts 400' west). This will also need to be addressed with the FAA, as it is placing increased focus on compatible land use within these RPZs.

- Mead & Hunt will investigate the feasibility of realigning Silvernail Road further west as shown on the attached City's sketch. This alternative will be investigated to determine the extent of additional property acquisition and whether the round-a-bout will work in terms of grades/elevations to the access points to the south. The need for widening Silvernail Road to three lanes further to the east/north of the adjacent businesses would also be investigated along with quantifying any additional wetland impacts. Mead & Hunt will submit this design to the City of Waukesha for conceptual review, comment, and conditional approval. Mead & Hunt will also continue to involve Gary Evans and others in attendance in determining the final overall impacts associated with this realignment.

- *Note: Since the time of the meeting, Mead & Hunt has investigated the airspace (Part 77) clearances over the realigned Silvernail Road alternatives. The FAA requires a min. 15' of clearance over roadways. Based on this analysis, it would be necessary to realign Silvernail Road further west as shown on the City's concept in order to provide at least 15' of clearance between the Runway 10 Part 77 (50:1) Airspace and the roadway – if Runway 10 were shifted by 400' west as shown in Alternative 11. See attached airspace clearance drawings over Silvernail Road under existing conditions as well as the two realignment alternative conditions.*

Respectfully submitted,

MEAD & HUNT, Inc.
Greg Stern
608-273-6380 (office)
608-712-2486 (cell)

cc: To all attendees

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Gary Wilson, FAA Chicago ADO	gary.wilson@faa.gov
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Erica King, Mead & Hunt	erica.king@meadhunt.com

Greg Stern

From: Michael Grulke <mgrulke@ci.waukesha.wi.us>
Sent: Wednesday, February 19, 2014 10:30 AM
To: Greg Stern
Subject: Another Silvernail Realignment Alternative to consider
Attachments: Silvernail at Airport Realign.pdf

Greg,

I did not have a chance to talk with Paul Day or Fred Abadi about this alternative. See the attached concept. Not done to "real" standards. But something to look at and consider as an alternative.

From a traffic engineering perspective, I think it creates a safe "turn" with the roundabout and creates a safer, more user friendly roadway to access those businesses.
The commercial businesses shown are struggling and would be good to provide better transportation for them.

Not sure how the superelevation would match back in at the tangent. I think this Alt may provide less wetland impact.

I will attend the meeting at 1:00 on the City's behalf.

Michael F. Grulke, PE, PTOE
City of Waukesha
Engineering Division - Traffic
130 Delafield Street
Waukesha, Wisconsin, 53188
(262)-524-3590
mgrulke@ci.waukesha.wi.us


SILVERHAIL RD
N GRANDVIEW BLVD

N GRANDVIEW BLVD



NO.	DATE	REVISION	INITIAL

MEAD & HUNT
ENGINEER
ARCHITECT
SCIENTIST
PLANNER

WAUKESHA COUNTY AIRPORT
WAUKESHA CRITES FIELD

DATE $DATE$

DESIGNED
DRAWN
CHECKED

WAUKESHA COUNTY AIRPORT

SILVERNAIL ROAD
EXISTING CLEARANCES

S.A.P. PROJECT NO.

JOB NO.

DWG NO.
$FILEABBREV$

SHEET NO.
1 of 3

INTERSTATE 1-94

50:1 PART 77

PART 77 : 902.35
ROAD: 873.87
CLEARANCE: 28.48'

EXISTING SILVERNAIL RD

PART 77 : 908.82
ROAD: 879.17
CLEARANCE: 29.65'

PROP. RWY 10
ELEV. 895.82

EXIST. RWY 10
ELEV. 897.22

RUNWAY 10-28

GRANDVIEW BLVD.

EXISTING SILVERNAIL RD

TAXIWAY A

PART 77 : 900.43
ROAD: 898.00
CLEARANCE: 2.43'

50:1 PART 77

EXISTING SILVERNAIL RD

Runway 10 Silvernail Road Clearances

NO.	DATE	REVISION	INITIAL

MEAD & HUNT
ENGINEERS
ARCHITECTS
SCIENTISTS
PLANNERS

WAUKESHA COUNTY AIRPORT
CRITES FIELD

DATE 2/23/2014

DESIGNED
DRAWN
CHECKED

WAUKESHA COUNTY AIRPORT

SILVERNAIL ROAD
PROPOSED CLEARANCES

S.A.P. PROJECT NO.

JOB NO.

DWG NO.

SHEET NO.
2 of 3

INTERSTATE 1-94

50:1 PART 77

PART 77 : 903.17
ROAD: 873.87
CLEARANCE: 29.30'

EXISTING SILVERNAIL RD

PART 77 : 909.84
ROAD: 877.77
CLEARANCE: 32.07'

PROP. RWY 10
ELEV. 895.82

EXIST. RWY 10
ELEV. 897.22

RUNWAY 10-28

GRANDVIEW BLVD.

EXISTING SILVERNAIL RD

50:1 PART 77

PART 77 : 907.27
ROAD: 891.78
CLEARANCE: 15.49'

TAXIWAY A

EXISTING SILVERNAIL RD

Runway 10 Silvernail Road Clearances_F

NO.	DATE	REVISION	INITIAL

MEAD & HUNT
ENGINEER
ARCHITECT
SCIENTIST
PLANNER

WAUKESHA COUNTY AIRPORT
CRITES FIELD

DATE 2/23/2014

DESIGNED
DRAWN
CHECKED

WAUKESHA COUNTY AIRPORT

SILVERNAIL ROAD
PROPOSED CLEARANCES

S.A.P. PROJECT NO.

JOB NO.

DWG NO.

SHEET NO.
3 of 3



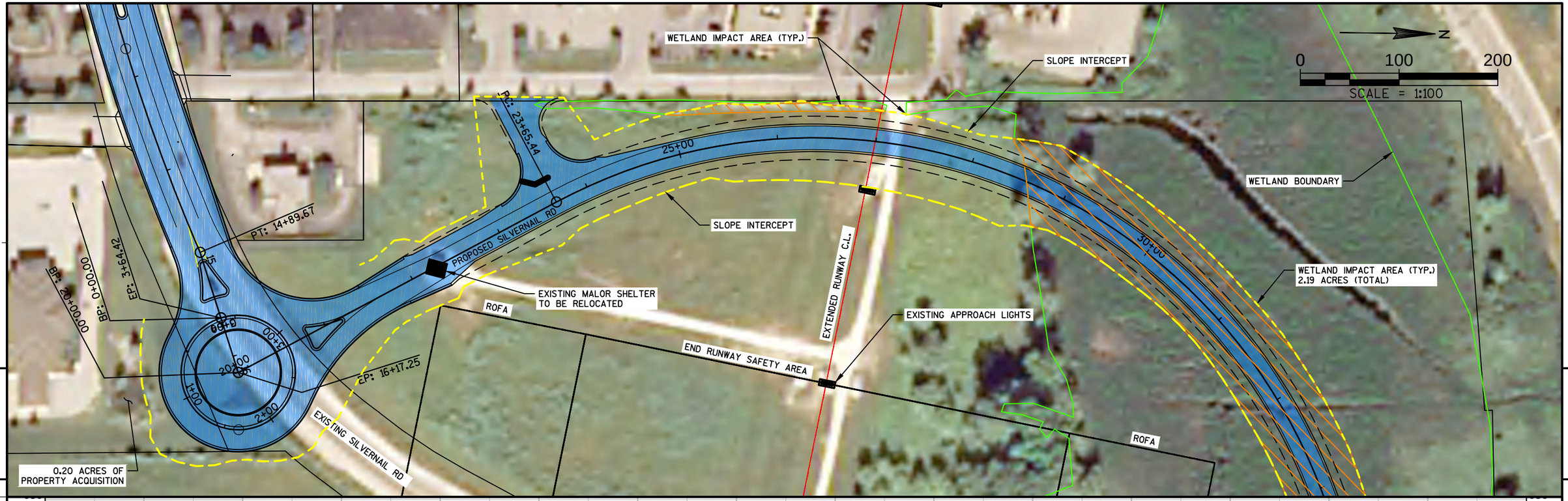
ATTENDANCE REGISTRATION SHEET
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA PROJECT
Airport Conference Room
February 19th, 2014 at 1:00 p.m.

PLEASE PRINT

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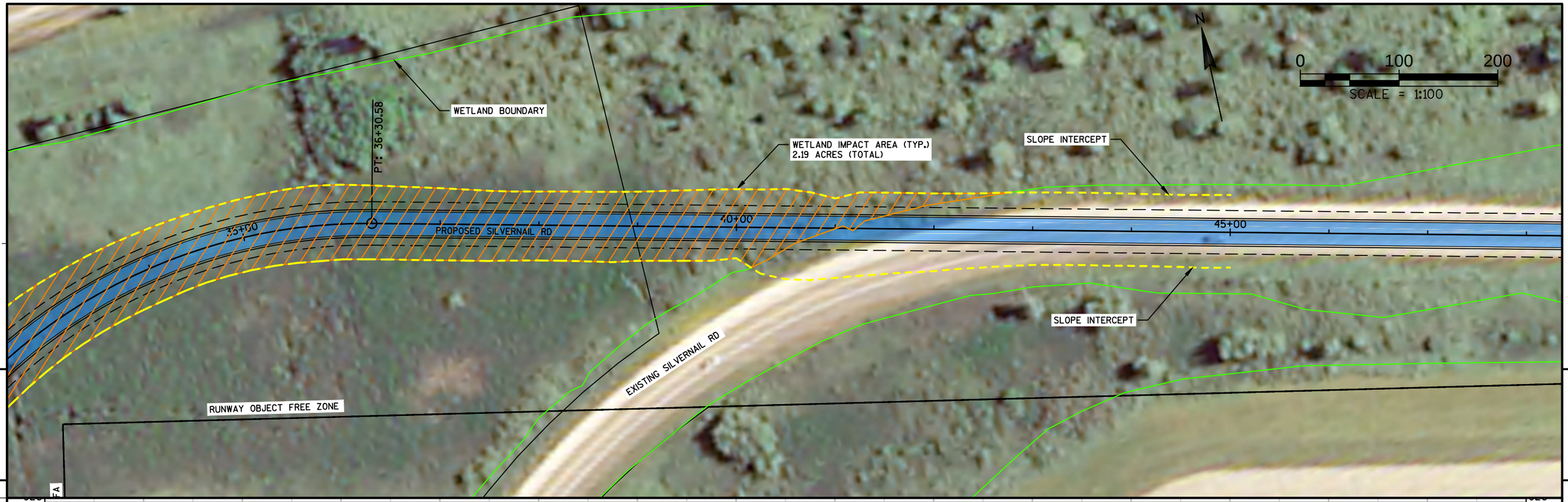
GARY EVANS Waukesha Hwy (County) gevans@waukeshacounty.gov

262-548-7746



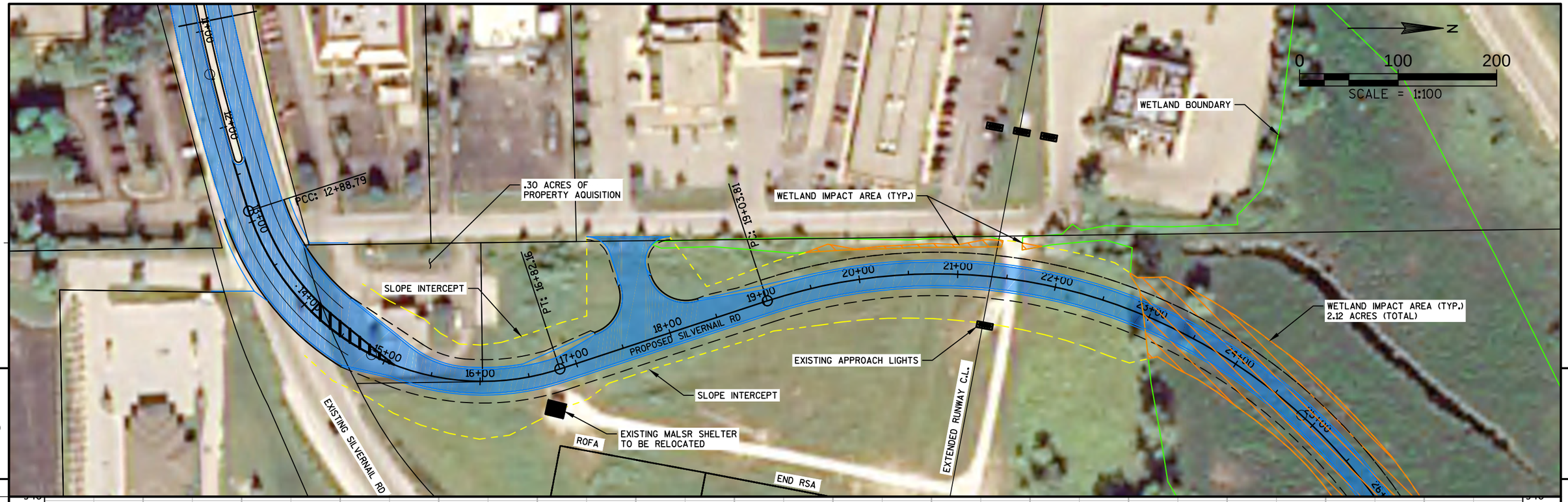
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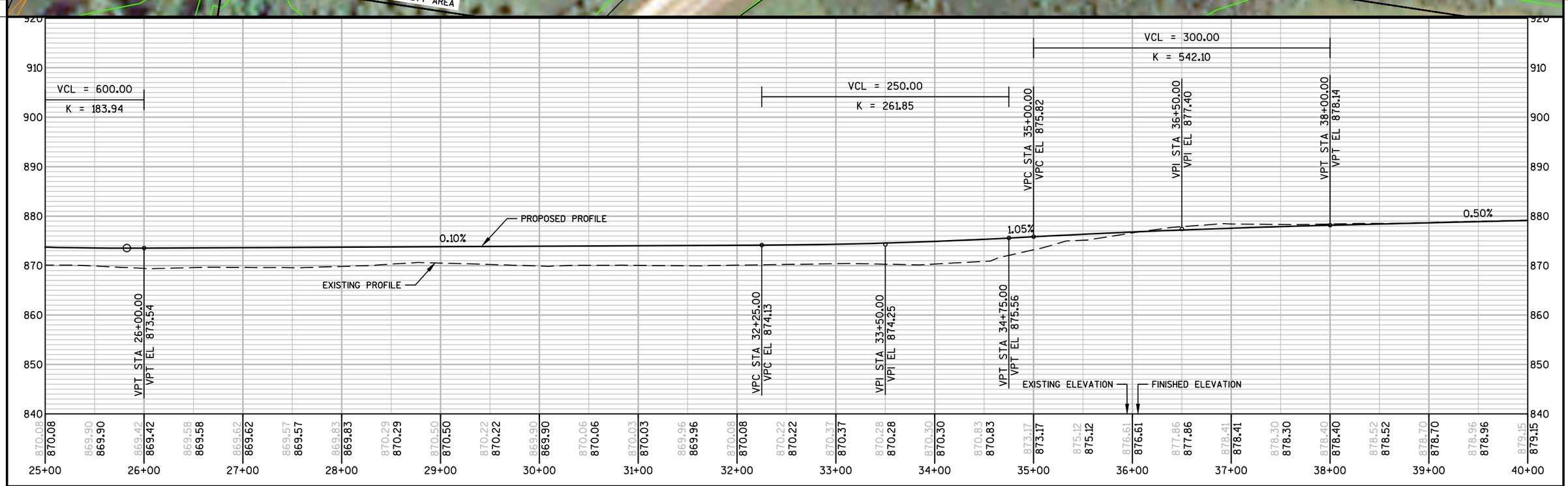
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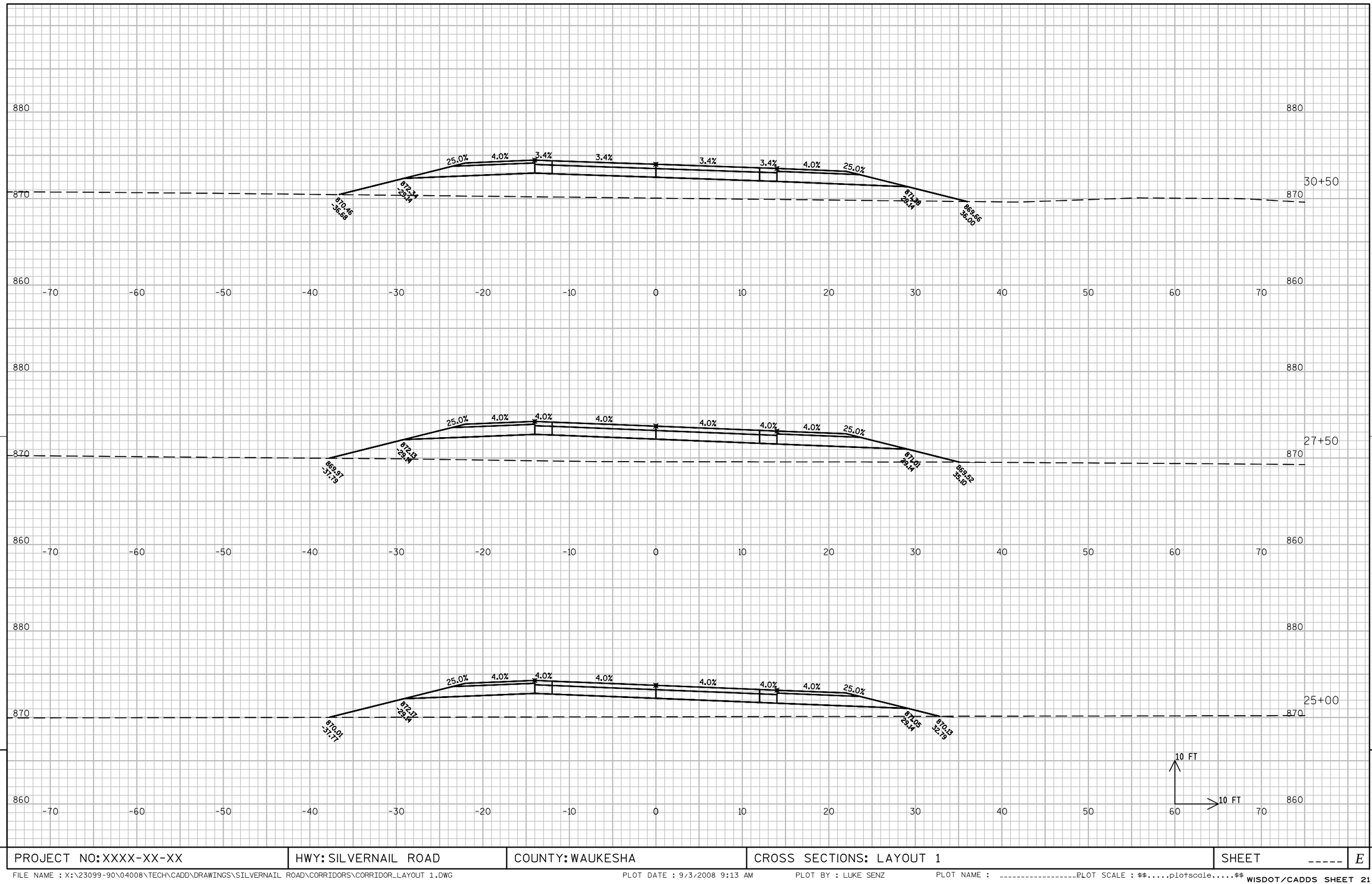
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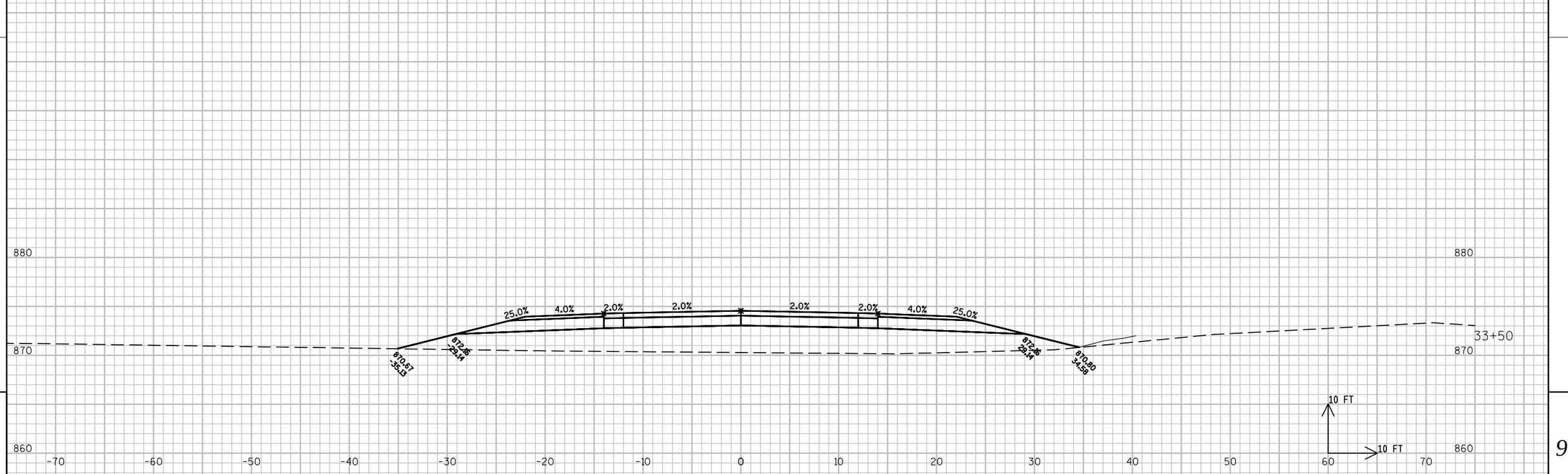


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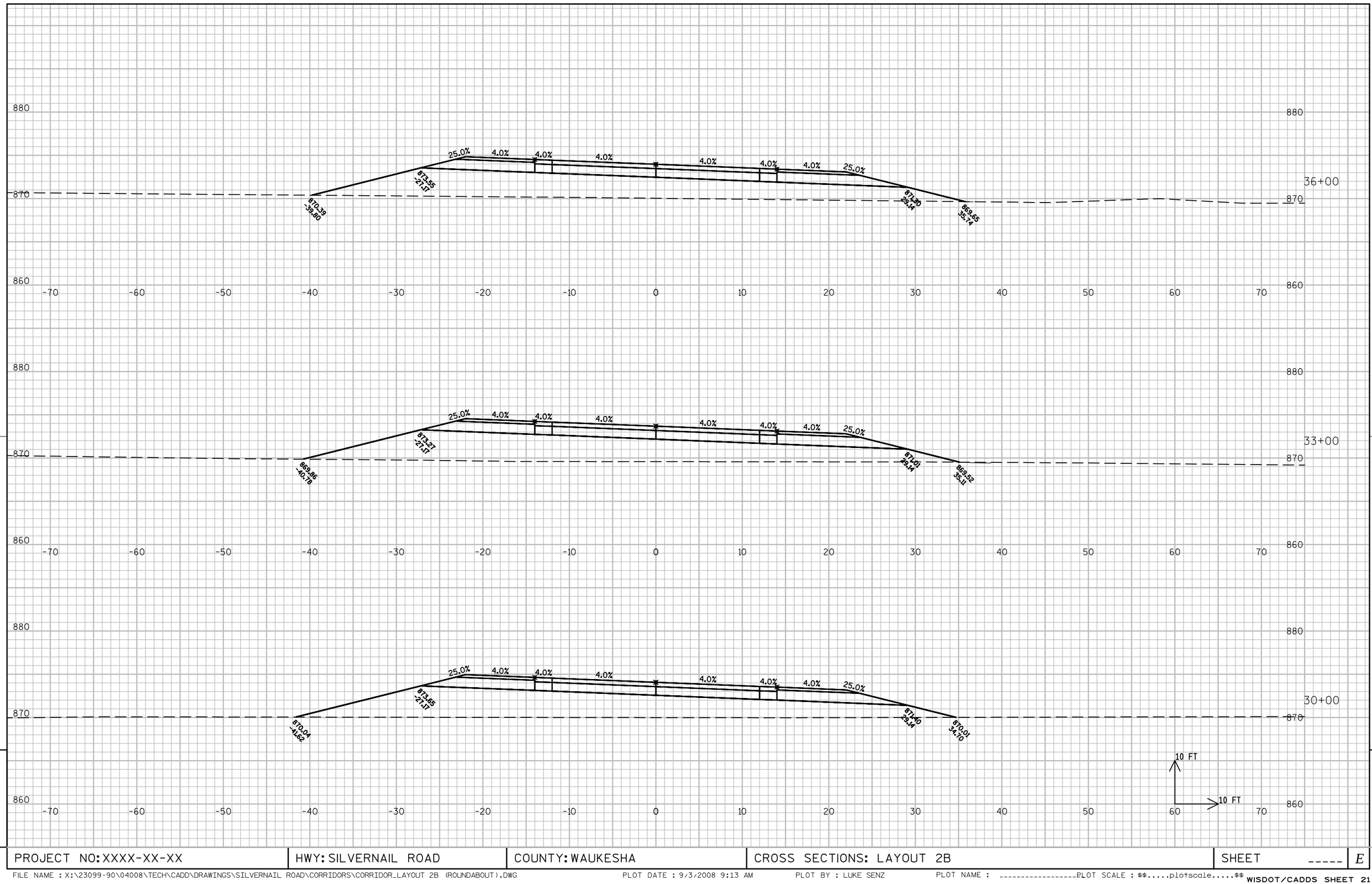
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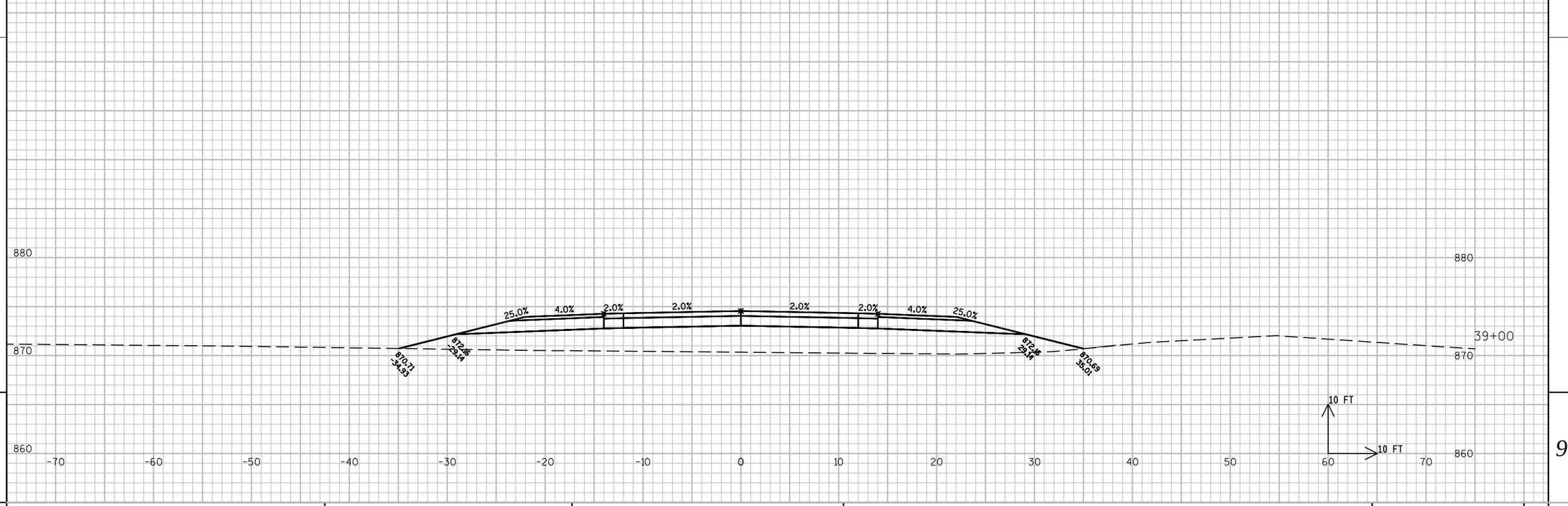
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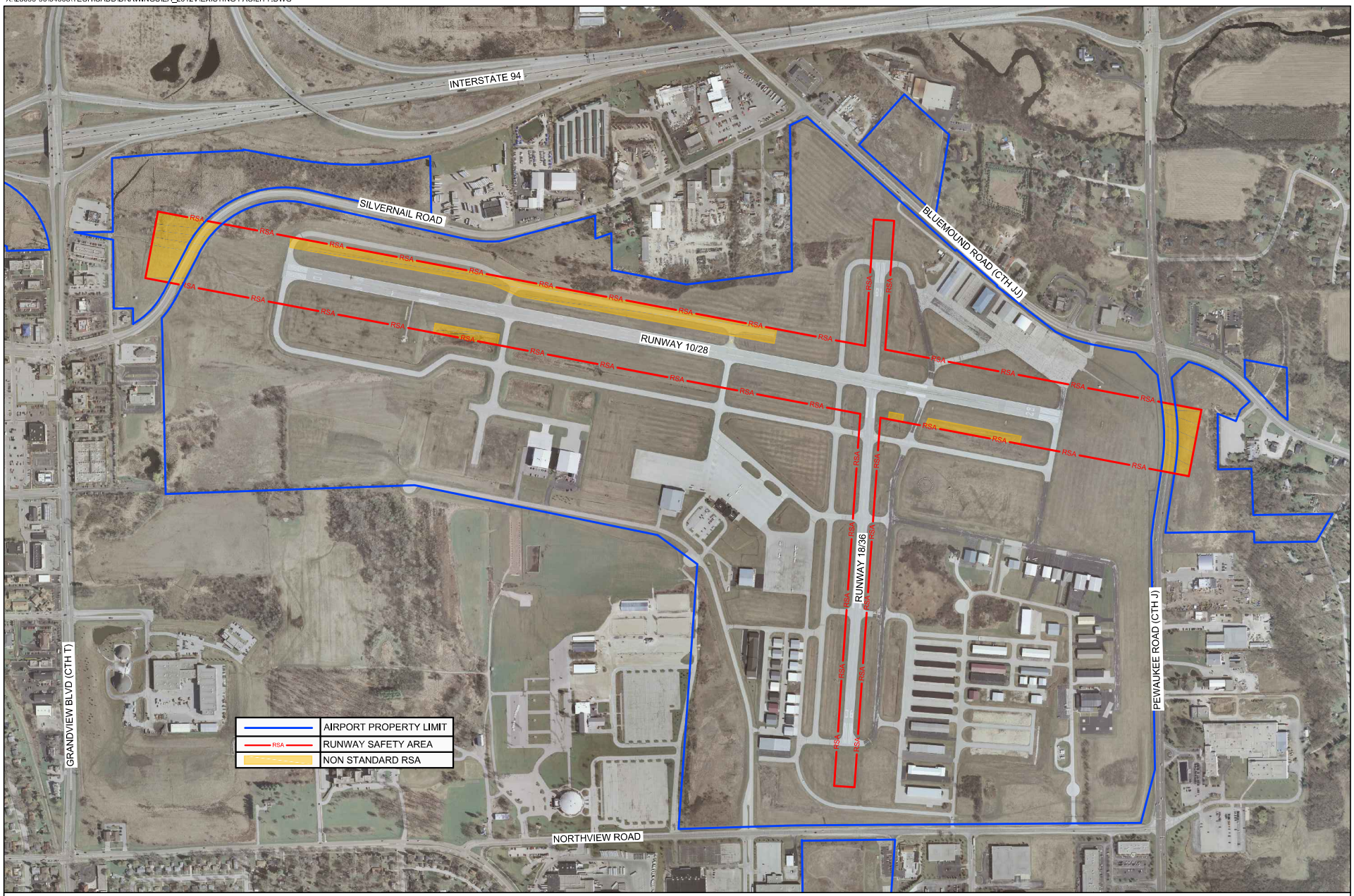


FIGURE 2-1
EXISTING FACILITY

N

0 500 1000

Orthophotograph - 2010 NAIP, Waukesha County

WAUKESHA COUNTY AIRPORT CRITES FIELD

Conceptual Silvernail Road Modifications Coordination Meeting with City of Waukesha

Project name: Waukesha County Airport (UES) Runway Safety Area Improvement Project
Wis-DOT Project ID: 0767-40-20

Client: Wisconsin Bureau of Aeronautics on behalf of the Waukesha County Airport

Mead & Hunt, Inc. Project Manager: Greg Stern (608-273-6380)

Date: March 12th, 2014 – 2:00 p.m.

Attendees	Representing	E-mail
Kurt Stanich	Waukesha County Airport	kstanich@waukeshacounty.gov
Mike Grulke	City of Waukesha	mgrulke@ci.waukesha.wi.us
Margaret Liedtke	City of Waukesha Engineering	mliedtke@ci.waukesha.wi.us
Doug Koehler	City of Waukesha Community Development	dkoehler@ci.waukesha.wi.us
Alex Damien	City of Waukesha	adamien@ci.waukesha.wi.us
Paul Day	City of Waukesha Engineering	pday@ci.waukesha.wi.us
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Mark Arnold	Wisconsin BOA	mark.arnold@dot.wi.gov
Scott Hasburgh	Mead & Hunt	scott.hasburgh@meadhunt.com
Greg Stern	Mead & Hunt	greg.stern@meadhunt.com

The attached report represents this writer's interpretation of items discussed during the meeting. Any corrections or additional information should be brought to our attention for clarification.

Items discussed were as follows:

1. **Welcome and Introductions**

   The purpose of this meeting was to provide more information to the City of Waukesha concerning the safety area improvements being evaluated for Runway 10/28. Mike Grulke (City of Waukesha Planning) was in attendance at a previous February 19th, 2014 coordination meeting at the Airport where it was explained that a realignment of Silvernail Road was being evaluated as one alternative for bringing the safety areas for Runway 10/28 into compliance with FAA standards.

   The City of Waukesha had requested this meeting to gain a better perspective on what was driving the runway safety area (RSA) project, to have an opportunity to ask questions, and to provide feedback on a Silvernail Road realignment.

   Mead & Hunt started the meeting with a PowerPoint presentation that explained the non-standard safety area conditions that exist off both ends of Runway 10-28. The presentation then summarized the alternatives that have been evaluated for bringing the safety areas into compliance, and then focused on the preliminary design efforts that had been completed for realigning Silvernail Road. Slides of the PowerPoint presentation are provided within the appendix of these minutes.

2. Explanation of Runway Safety Areas (RSAs): ends and sides

A runway safety area (RSA) is intended to provide a measure of safety in the event of an aircraft's excursion from the runway during overruns, undershoots or veer-offs. It should be a clear and graded surface off the ends and sides of the runway that is:

- Drained to prevent water accumulations
- Capable under dry conditions of supporting aircraft without causing structural damage
- Free of objects (such as roads, railroads, and creeks, etc.)

For Waukesha's Runway 10/28, the safety area is 500' wide, centered on the runway, and extends 1,000' beyond the useable pavement area. The Runway 10 (west) safety area extends into Silvernail Road by 486 feet. The Runway 28 (east) safety area extends into Pewaukee Road by 350 feet.

3. Brief Overview of Alternatives Analyzed

Greg explained that a number of alternatives have been analyzed including roadway tunnels, roadway closures, roadway realignments, and combinations of modifications to both the surrounding roadways and runway pavement itself.

It was discussed that a closure of Silvernail Road was determined to not be feasible given its use by the adjacent businesses, its function as an alternate route for the Interstate, emergency response from the fire station located at the intersection of Grandview Blvd. and Northview Road, and the overall accessibility and circulation it affords to the public in getting around the Airport. Doug Koehler confirmed that the businesses north of the Airport do utilize Silvernail Road for Interstate Access, particularly if traveling westbound from these businesses.

The users of the Airport had been surveyed to determine if the runway pavement could be shortened. Based on the aircraft type, stage length, insurance requirements and other factors, the survey determined that the existing runway length could not be reduced without substantial impact to the user's operations. The FAA reviewed the results of the survey and has concurred that the existing runway length needs to be maintained.

Also evaluated was the use of Engineered Material Arresting Systems (EMAS) which is a bed of cellular concrete placed off the ends of the runway that is designed to fail in the event of an overrun. An EMAS installation reduces the runway safety area length off the end of the runway from 1,000 feet to 600 feet. The FAA has guidance on the use of Engineered Material Arresting Systems (EMAS). The airport has concerns, as other general aviation airports do, related to its maintenance and life cycle costs. It can be damaged if driven over. Special snow removal equipment is needed. The Airport is concerned about how replacement will be funded if damaged by contractors or an incident.

With a need to maintain runway length for both takeoff and landings in both directions, options have been narrowed to three practicable and feasible alternatives: Alternatives 9, 11 and 12.

Alt 9. EMAS on both ends, no road relocation/closures. Silvernail remains in a corner of the northern Object Free Area and a 90-150 foot loss in Landing Distance Available results on the west end.

Alt 11. Relocate Silvernail, Extend Runway 10 by 400 feet. The entire fix is confined to the west end. There is no EMAS. Silvernail is either relocated or closed.

Alt 12. This is a hybrid of Alts 9 and 10. It includes EMAS on the east end, and relocated or closed Silvernail on the west end. There are no changes to Runway Protection Zones (RPZs).

The Airport has identified Alternative 11 as its preferred alternative. The FAA is currently evaluating this option and will be providing concurrence or other feedback soon.

4. Overview of Silvernail Road Relocation Alternatives

Scott Hasburgh gave an overview of the preliminary design options that have been developed for realigning Silvernail Road outside the Runway 10 safety area:

Silvernail Realignment Alternative 1: This option consisted of a series of two curves: a 40 mph curve around the north side of the Runway 10 RSA and a 30 mph curve that would sweep back into the existing Silvernail alignment just east of the intersection with Grandview. The overall roadway would be 40' wide consisting of 12-foot lanes and 8-foot gravel shoulders. This alternative matched the existing roadway section and maintained the existing private service drive to the businesses along the east side of Grandview. The option would require acquisition and relocation of one existing bank property.

Silvernail Realignment Alternative 2: This alternative incorporated a roundabout which helped minimize impact to adjacent property and provided the ability for future connection with Aviation Drive. This alternative provided some additional stage length for cars at the Grandview intersection. As part of further design development, it was determined that there would be insufficient airspace clearance over the roundabout in this location of Runway 10 were to be extended by 400 feet to the west.

Silvernail Realignment Alternative 3: This alternative was developed based on feedback received from the City of Waukesha and others at the February 19th, 2014 coordination meeting held at the Airport. This alternative combines the realigned Silvernail Road with the existing private service drive located along the east side of the businesses. The alternative attempts to shift the roundabout location further to the west. The alternative involves the use of an urban section with curb and gutter, sidewalks and setback distances from the existing properties that in accordance with current City standards. The urban section transitions to the existing rural section further to the north and east. This alternative accommodates bike traffic and includes a center lane for left turns. This alternative presents grade challenges with the existing drive connections to the south. This alternative would require acquisition of the existing private drive from the various owners and would likely involve substantial relocation or adjustment of the utilities that are located within and along the private drive.

Silvernail Realignment Alternative 4: This alternative refines Alternative 3. It provides more reasonable slopes to the drive/roadway access points to the south and avoids the need to acquire the existing private service road property and/or relocate the existing utilities along it. This alternative would require an existing bank property to be acquired and relocated, and would also require a corner of the existing property to the south to be acquired. Access to the two properties to the south would be provided from the east rather than how they are currently served from the west.

5. City Comments / Discussion on Silvernail Road Realignment

Margaret Liedtke asked that we look at the Airport vs. Interstate property line boundary to the north. Margaret thought that the right-of-way along the eastbound ramp is questionable and may not be a very well defined location.

The City asked if the costs of the RSA improvements have been evaluated. It was explained that the overall project has been estimated at around $12M. This is very close to the maximum feasible cost

the FAA defines for correcting the runway safety areas.

Mike Grulke asked if there would be a hydraulic analysis of the roadway and the overall drainage within this area. The City explained that drainage is a current problem and that Silvernail Road has been overtopped with flood waters that have required the roadway to be closed for varying periods of time. Mead & Hunt explained that the storm water would be modeled during the final design process, if this alternative was carried forward through the environmental process. There was additional discussion about the net increase in impervious area being relatively small as the existing north side taxiway is no longer used and will be removed as part of the project.

Paul Day asked about whether the Silvernail Road realignment would be able to accommodate bike traffic. Mead & Hunt explained that there is opportunity for it – 14' wide outside shared lane, or 4' to 5' of paved shoulder could be incorporated.

It was discussed that a water main and electrical service run along the existing Silvernail Road right-of-way. There was some discussion about a possible sanitary sewer also running along Silvernail, although this was not discovered during the topographic surveys that have been completed to date. The question was raised if these utilities could remain in place, within the resulting Airport property and have the runway safety area span over them. Mead & Hunt stated that it is not uncommon for utilities to run through an Airport, but in this case it would make more sense to relocate the existing utilities with the road to keep them more easily accessed and maintained and outside the safety critical areas for the runway.

Doug Koehler commented about the planned redevelopments occurring along Silvernail Road. Doug mentioned that the Peking House is planned to become a bank property. Denny's parking often spills over into the Peking House lot during busier periods and having this property become a bank may help the overall parking situation between these two adjacent businesses properties. Doug mentioned expansion plans at Skipper Bud's and Badger Utility. There is also redevelopment being considered within the old Century Fence property and/or east of the Century Fence property.

Doug felt that having Silvernail Road realigned over the existing business access road would create some advantages. Doug mentioned that is has been hard to get these businesses to coordinate on the maintenance of that roadway and that some things have fallen into disrepair. Doug felt that having Silvernail Road route closer to the businesses would increase their visibility and accessibility, particularly the Wood Canyon Restaurant.

Doug mentioned that the County is planning roadway safety improvements at the intersection of Highway JJ and Silvernail Road. Doug also mentioned that Hall Automotive has expansion plans for a car storage lot which are near this intersection and the approach for Runway 18.

The City asked about the timing of the project. It was explained that the goal was to complete the Environmental Assessment (EA) yet this summer 2014. Design of the project would be planned to occur during the Fall/Winter of 2014 into 2015. The goal would be to have some construction started in 2015, with a good portion of the work likely to spill over into 2016.

Greg Stern explained that the preferred Alternative 11 would affect the approach Runway Protection Zone (RPZ) off the west end of the runway. This action requires FAA approval and is currently being reviewed for concurrence or other feedback.

It was discussed that the conceptual proposal for realigning Silvernail Road could be brought to the

Board of Public Works and Common Council for formal City approval. However, through further discussion it was thought that it would be best to wait to gain concurrence from the FAA on the solution first (likely within the next 30 to 60 days). With the FAA, City and County staff all in concurrence on the solution, the next step would be to meet with the effected property owners first to work through their comments and concerns before bringing it up in a public meeting for approval.

6. Follow Up Meeting between the City and County of Waukesha (April 7th, 2014)

Following the March 12th, 2014 meeting, the City and County had a follow-up meeting on Monday April 7th, 2014 concerning the conceptual proposal to realign Silvernail Road.

From discussion at the April 7th meeting it was concluded that:

1. Both the City and County are opposed to a Silvernail Road closure.
2. The City and County agree on Alternative 11 as the preferred alternative.
3. The City will retain ownership of Silvernail Road after construction as long as it doesn't include a round-a-bout.
4. The following modifications would like to be worked into the curved design alternative:
   a. A sidewalk on the west side of the street.
   b. Considerations for bike traffic on the road.
   c. Two or three entrances to the business properties.
   d. A center turn lane should be incorporated into the design.
   e. Locations for signs and pavement markings relating to safety navigation on the new road.
   f. Improve transition from 4 to 2 lanes on the eastbound 25 mph curve.

7. Next Steps from the Meetings:

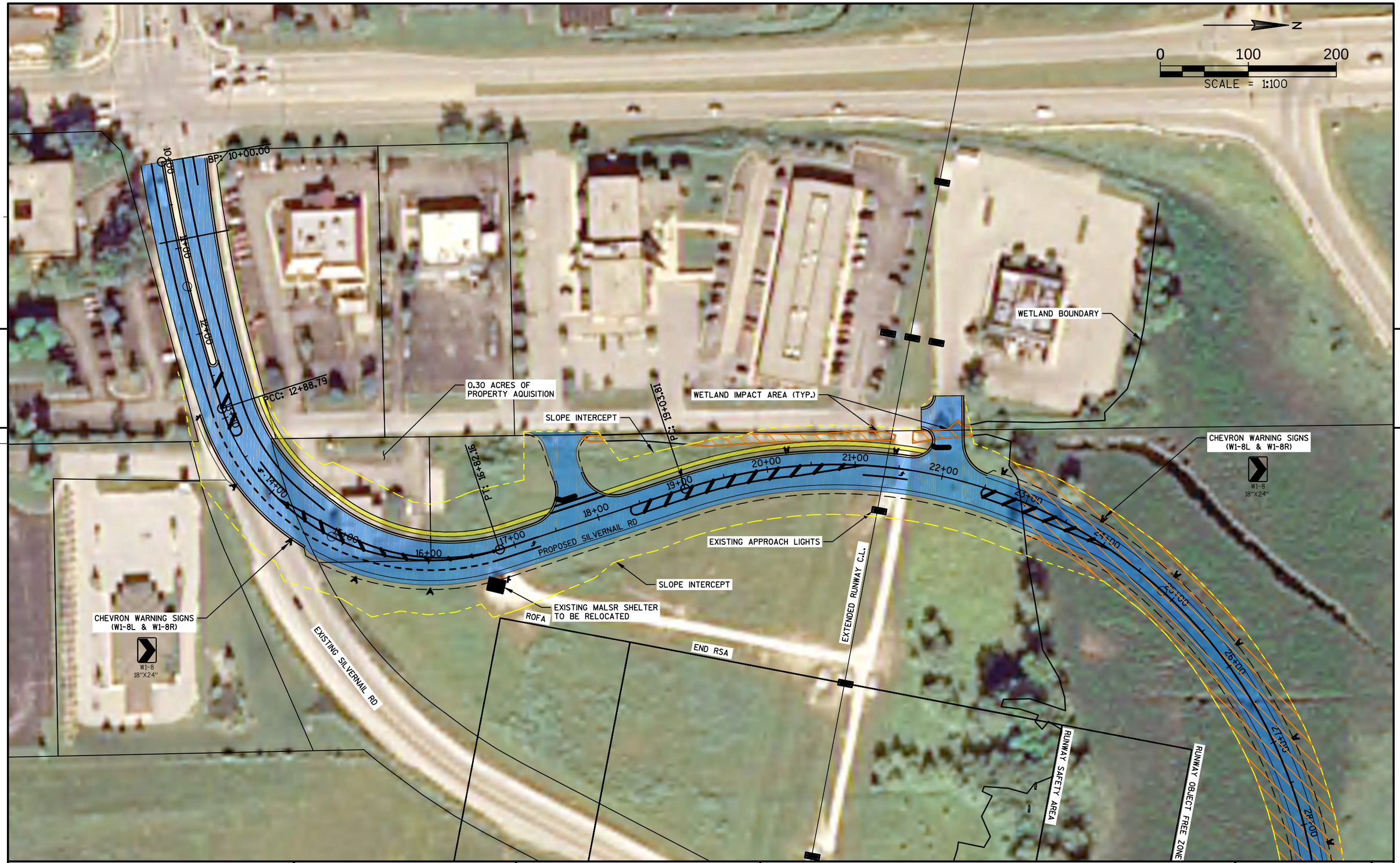
- Mead & Hunt has incorporated the comments received from the April 7th, 2014 meeting into a curved realignment alternative for the proposed Silvernail Road relocation. (See new exhibit attached as part of these minutes).
- Once the FAA has provided concurrence on the preferred Alternative 11, the Airport will work to set up meetings with the businesses located along Silvernail Road.

Respectfully submitted,

MEAD & HUNT, Inc.
Greg Stern
608-273-6380 (office)

cc: To all attendees

Amy Hanson, FAA Chicago ADO	amy.hanson@faa.gov
Al Richardson, FAA Chicago ADO	al.richardson@faa.gov
Gary Wilson, FAA Chicago ADO	gary.wilson@faa.gov
Matt Grenoble, Waukesha County Airport	mgrenoble@waukeshacounty.gov
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Karla Leithoff, Wisconsin DOT, Wetlands	karla.leithoff@dot.wi.gov
Perry Rossa, Mead & Hunt	perry.rossa@meadhunt.com
Laura Morland, Mead & Hunt	laura.morland@meadhunt.com
Erica King, Mead & Hunt	erica.king@meadhunt.com



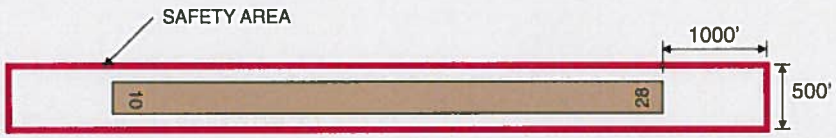
PROJECT NO: XXXX-XX-XX	HWY: XXX	COUNTY: XXX	PLAN	SHEET	E

Waukesha County Airport

Runway 10-28 Safety Area Improvement Project
Presentation to City of Waukesha
March 12th, 2014 – 2:00 p.m.

Mead&Hunt

What is a Runway Safety Area?

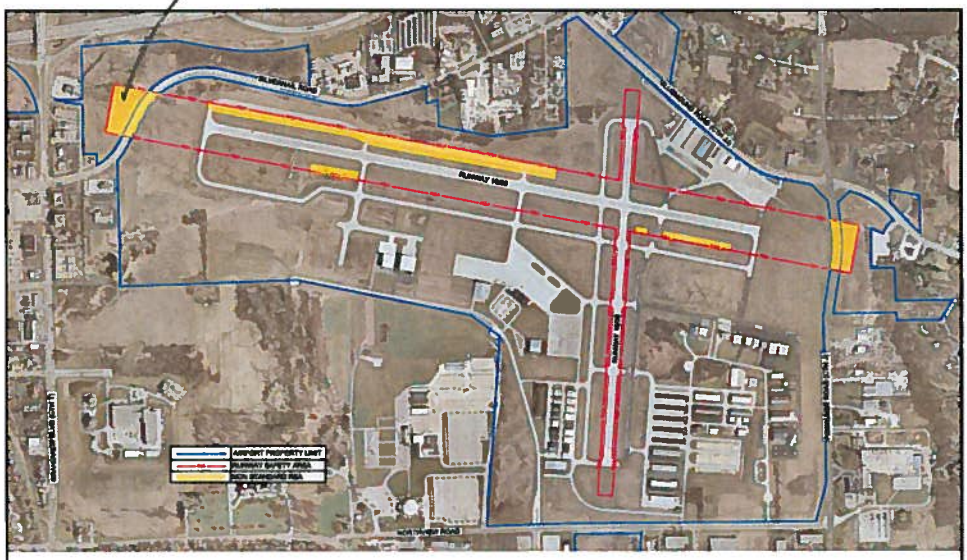


A Runway Safety Area is intended to provide a measure of safety in the event of an aircraft's excursion from the runway during overruns, undershoots and veer-offs. It should be a clear and graded surface at the end of a runway that is:

- Drained to prevent water accumulation
- Capable under dry conditions of supporting airport equipment, including occasional passage of aircraft without causing structural damage to the aircraft
- Free of objects (such as roads, railroads, and creeks)

Mead&Hunt

NOT STANDARD (ORANGE)



Existing Runway Safety Area (RSA) Conditions

- Runway 10 RSA Extends in Silvernail Road by 486'
- Runway 28 RSA Extends in Pewaukee Road by 350'

Mead & Hunt

GREEN PRESENTED

1. Traditional graded area:
   - Road Relocations
   - Road Closures
   - Tunneling Options
2. Relocation, shifting or realignment of the runway
   - Landlocked, prevents relocation or realignment options
   - Shifts results in large costs, impacts
3. Reduced runway length. Used when the existing length is in excess of existing or projected design aircraft operational needs.
4. A combination of relocation, shifting and grading, realignment or reduction
5. Engineered Materials Arresting Systems (EMAS)

Alternatives Analyzed

G.P.





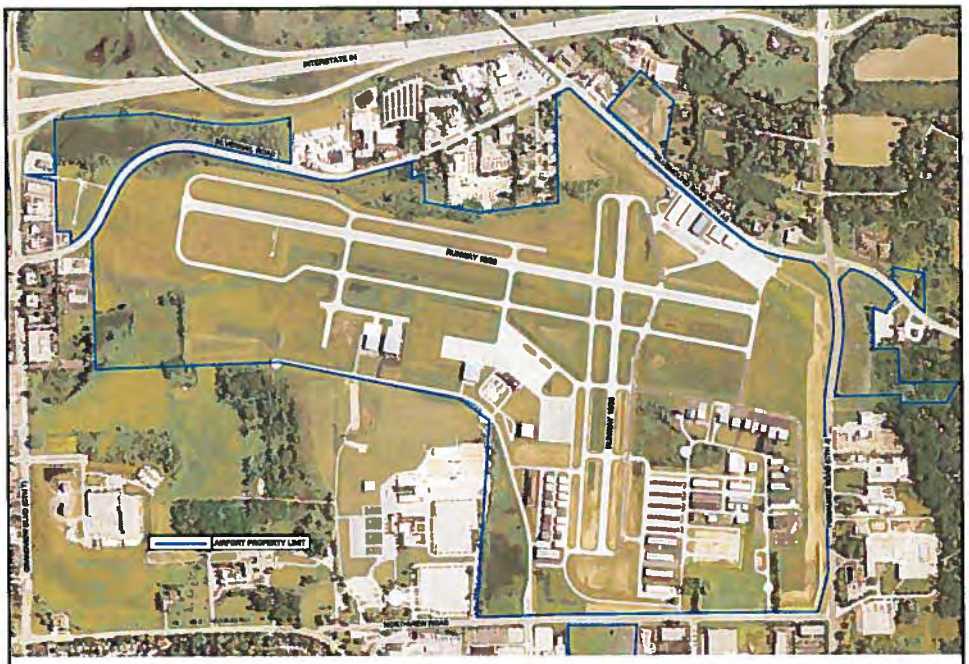


FAA Requires Cost of EMAS to be compared to traditional RSA alternatives within FAA Order 5200.9

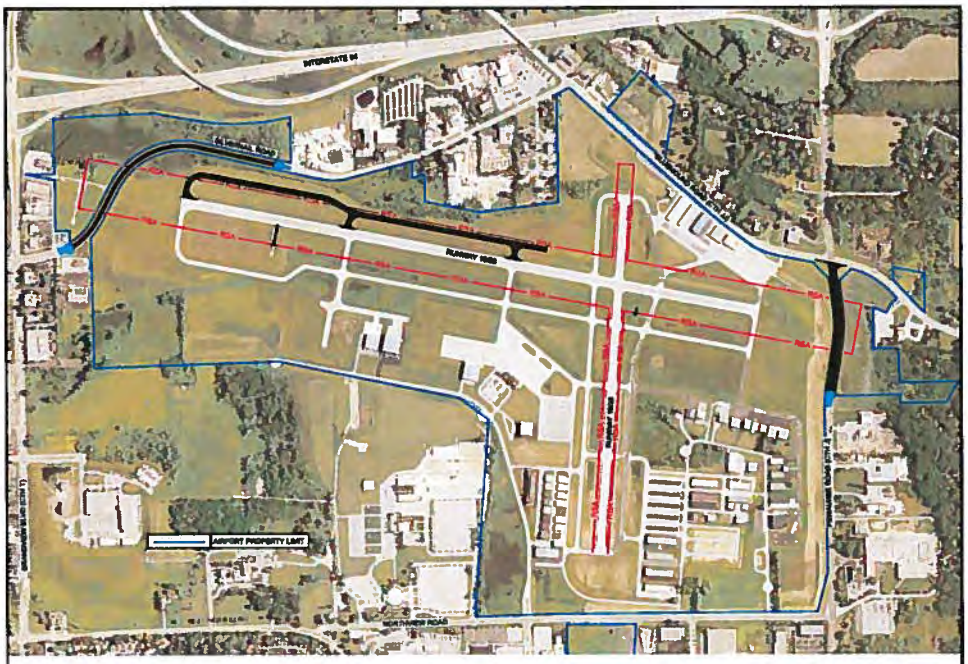
Engineered Material Arresting System (EMAS)

- Not many installations at General Aviation Airports
- Expensive, Maintenance Intensive and easily damaged
- Climate / Snow Removal Concerns
- Must be replaced every 10 years

Mead&Hunt

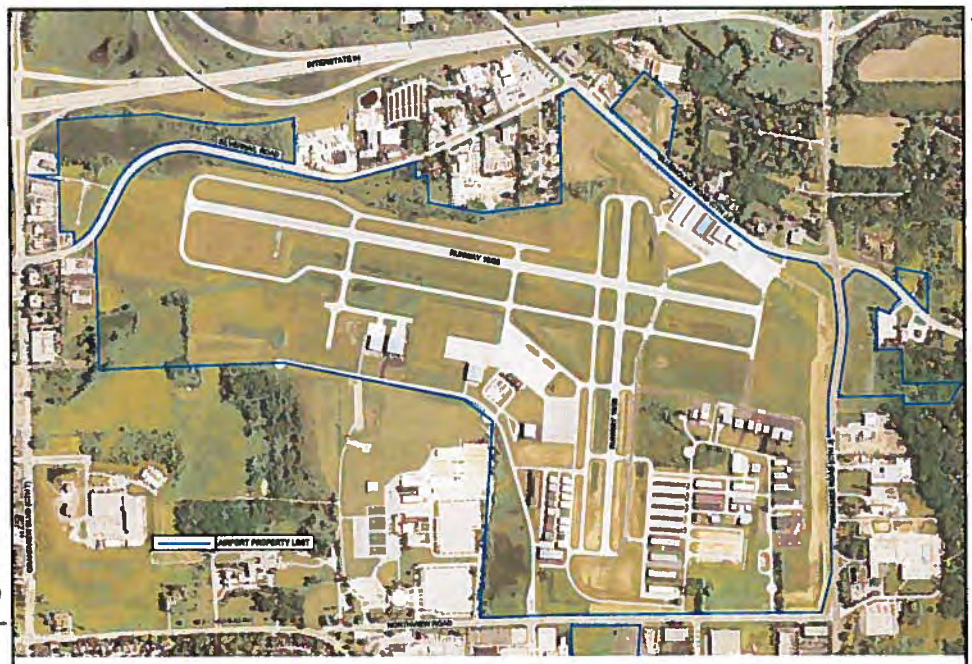


Roadway Closures



Roadway Closures

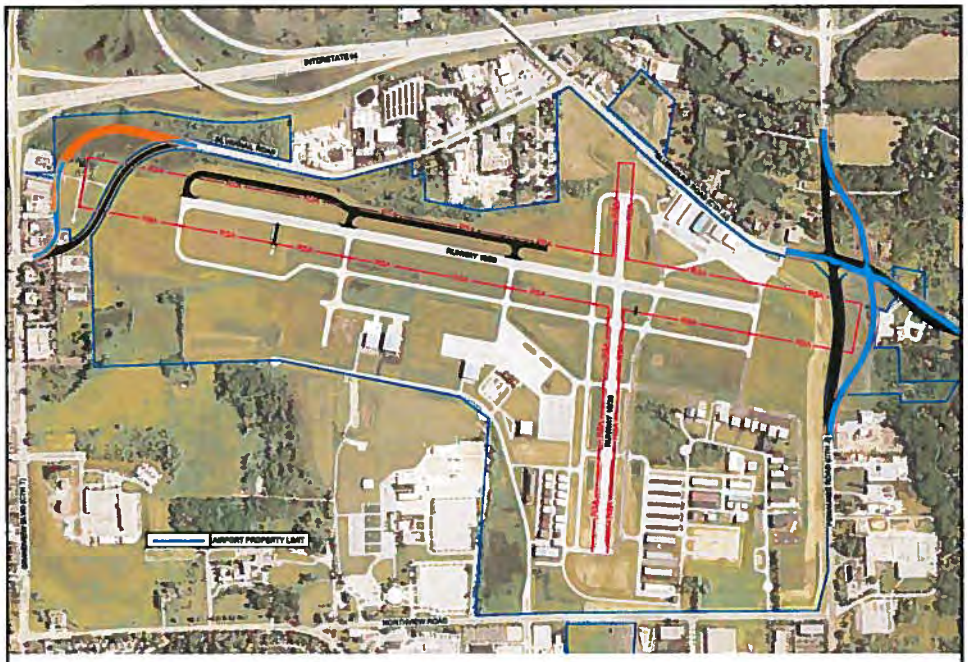
PEWAUKEE F.D.



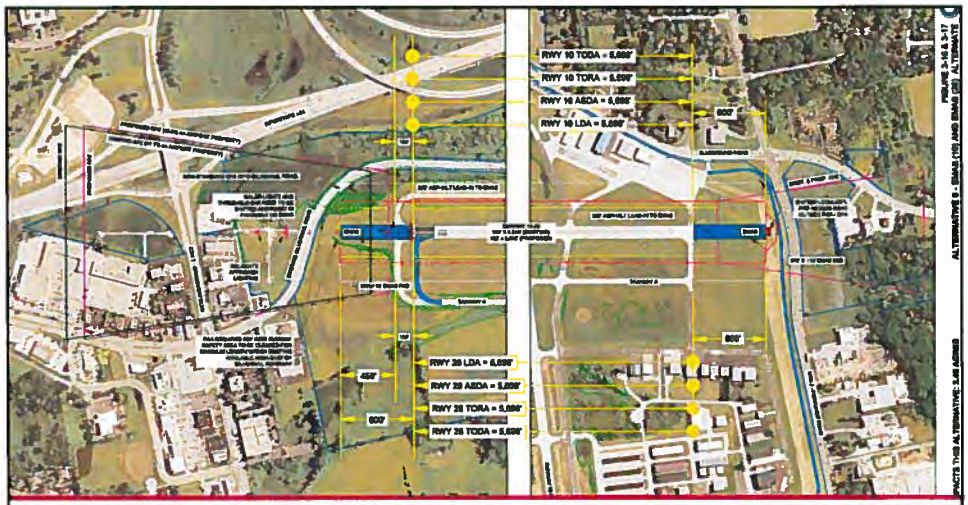
Roadway Re-Alignments

DOUG:
-BUSINESS USE S.R FOR IH ACCESS
-COMMERCIAL ACCESS

FIRE STATION

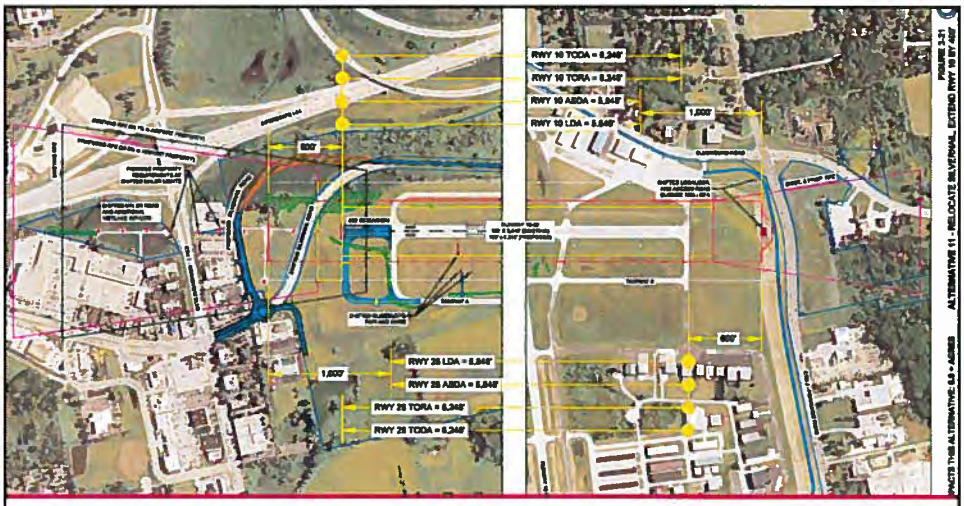


Roadway Re-Alignments



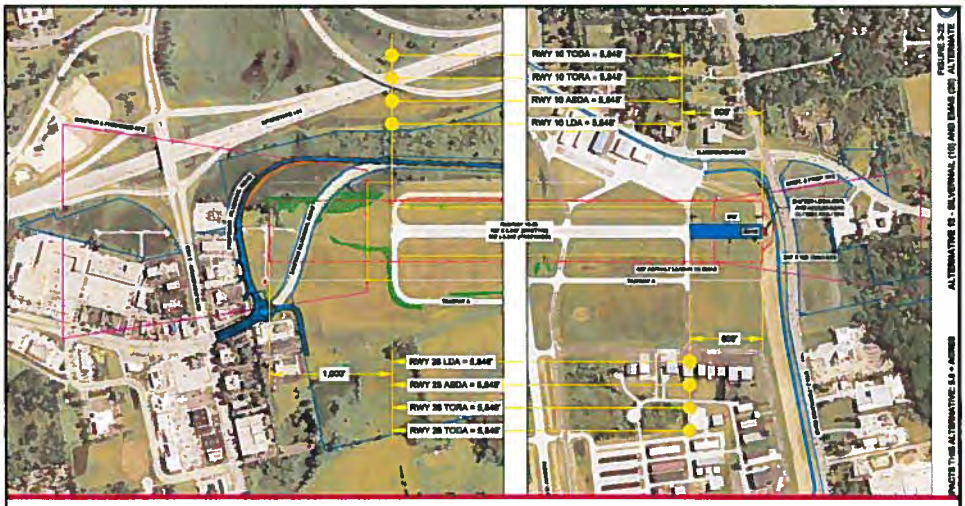
Alternative 9 – EMAS on both Runway ends

Mead&Hunt



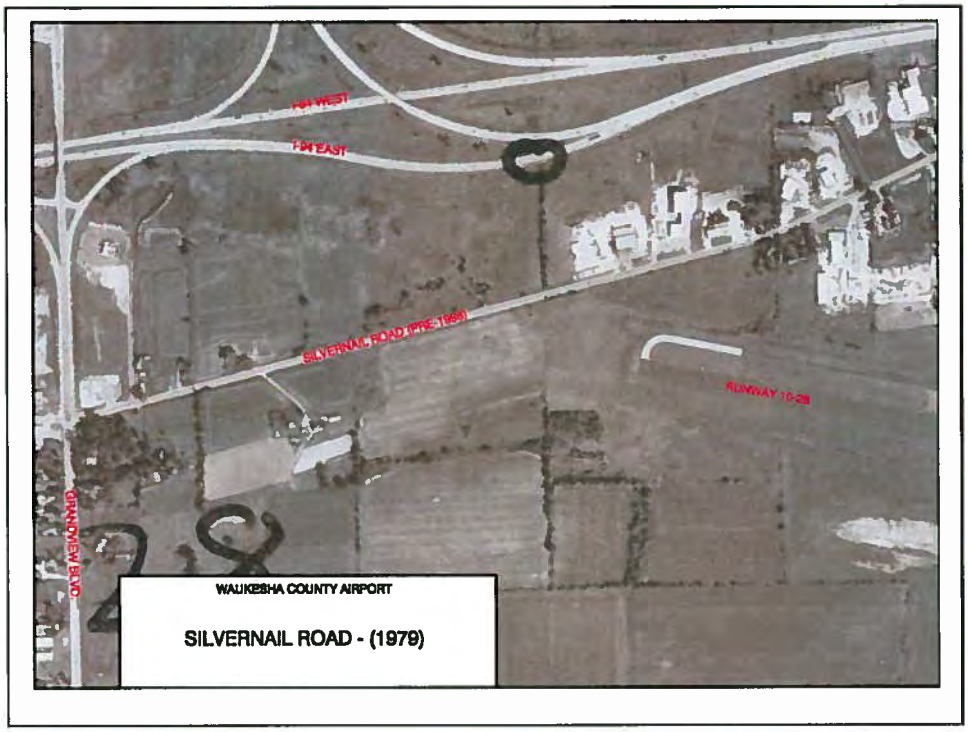
Alternative 11 – Relocate Silvernail, Extend Rwy 10

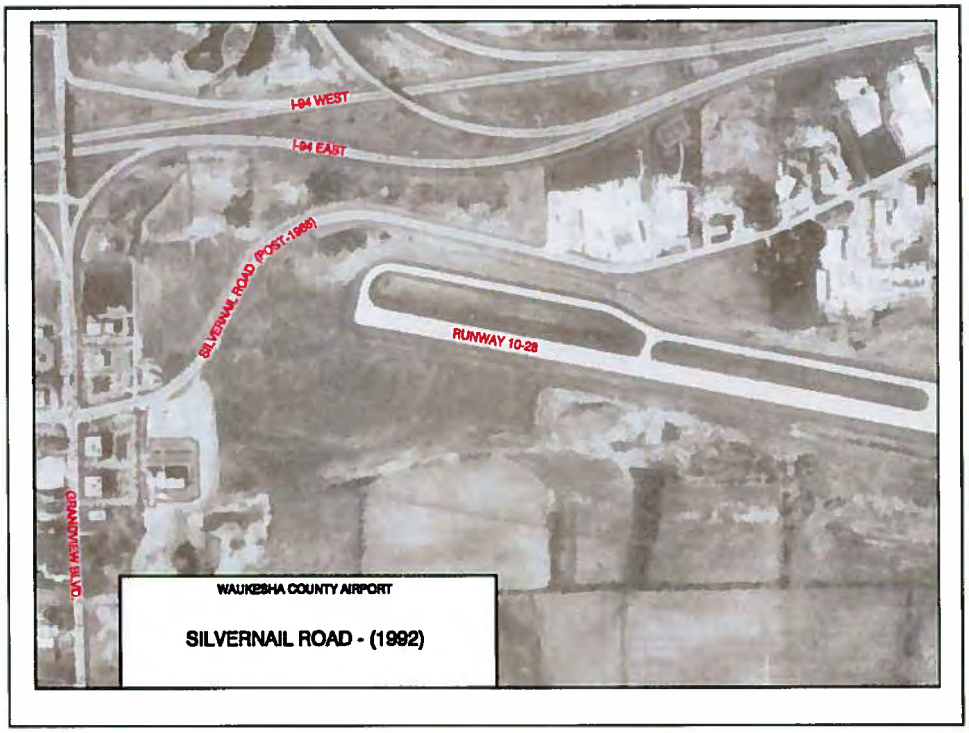
Mead&Hunt

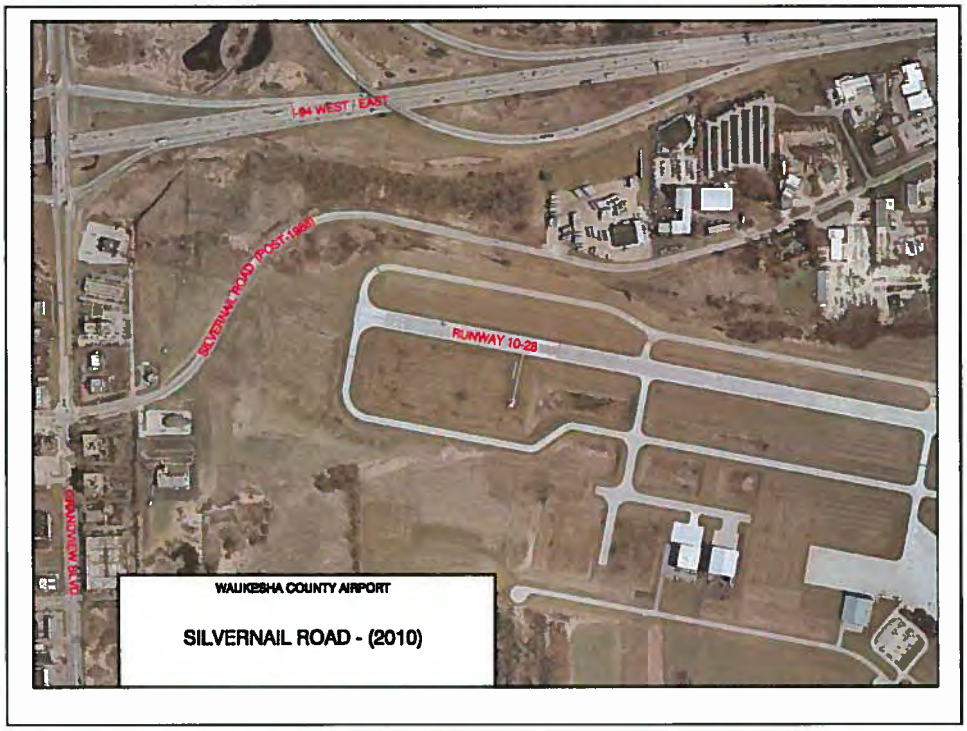


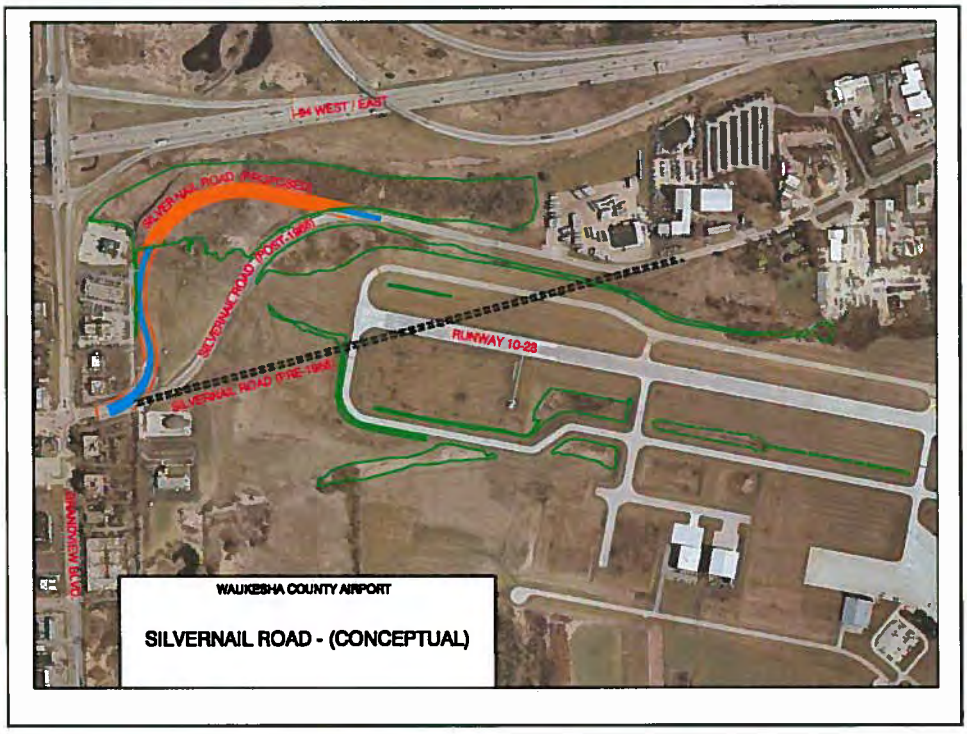
Alternative 12 – Relocate Silvernail, Rwy 28 EMAS

Mead&Hunt


I-94 WEST
I-94 EAST
SILVERNAIL ROAD (PRE-1988)
RUNWAY 10-28
GRANDVIEW BLVD.
WAUKESHA COUNTY AIRPORT
SILVERNAIL ROAD - (1979)

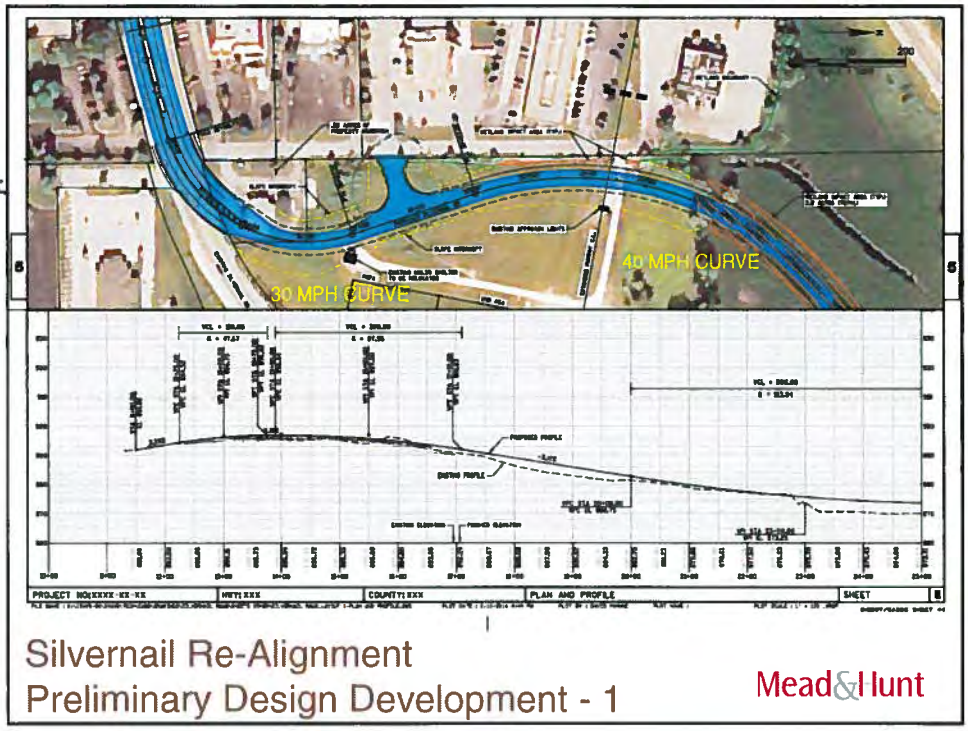

I-94 WEST
I-94 EAST
SILVERNAIL ROAD (POST-1988)
RUNWAY 10-28
GRANDVIEW BLVD.
WAUKESHA COUNTY AIRPORT
SILVERNAIL ROAD - (1992)


I-94 WEST / EAST
SILVERNAIL ROAD POST-1968
RUNWAY 10-28
CR. M AVENUE
WAUKESHA COUNTY AIRPORT
SILVERNAIL ROAD - (2010)


I-94 WEST / EAST
SILVERNAIL ROAD (PROPOSED)
SILVERNAIL ROAD POST-1968
SILVERNAIL ROAD (PRE-1968)
RUNWAY 10-28
WAUKESHA COUNTY AIRPORT
SILVERNAIL ROAD - (CONCEPTUAL)

LASALLE INN.

- MAINTAIN PRIVATE RD
- 12' LANE
  8' SHLD
  40' ROADWAY
  MOST SIMILAR TO EXISTING ALT



FILL @ WET

Silvernail Re-Alignment
Preliminary Design Development - 1

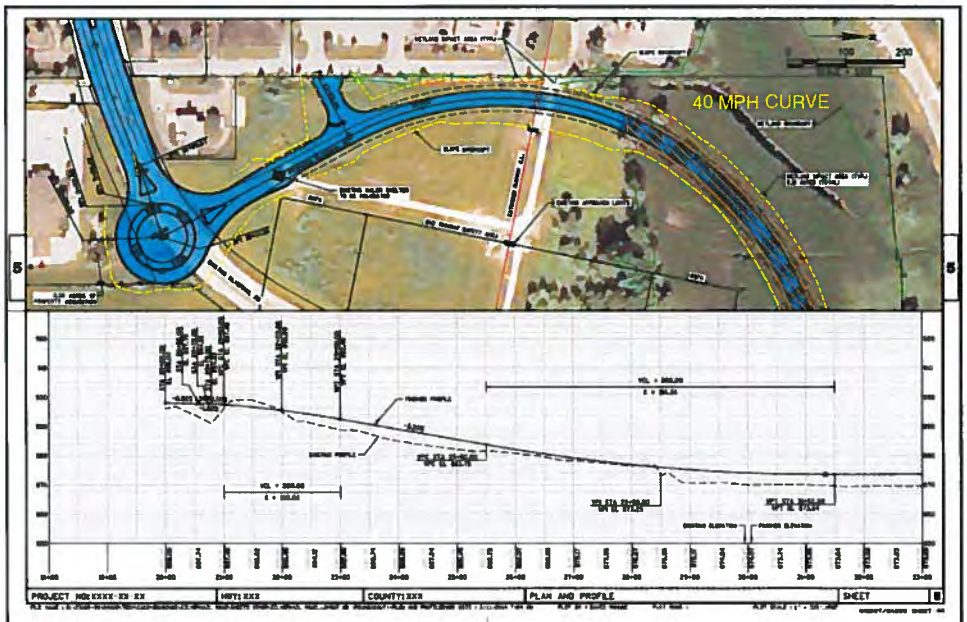
Mead&Hunt

40' ROADWAY

SIMILAR TO 1 ABOVE

RAB FUTURE EXPANSION TO SE.

ADDITIONAL CONNECTIONS



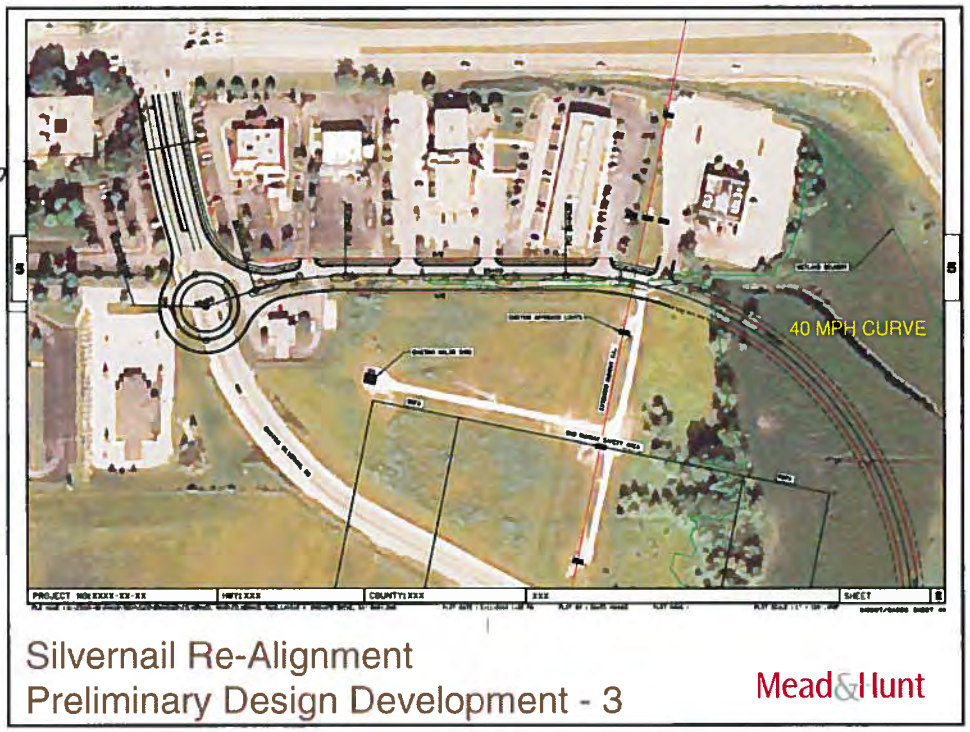
Silvernail Re-Alignment
Preliminary Design Development - 2

Mead&Hunt

SIMILAR TO CITY ALT FROM MIKE BUT W/ ADAPTED GEOMETRY

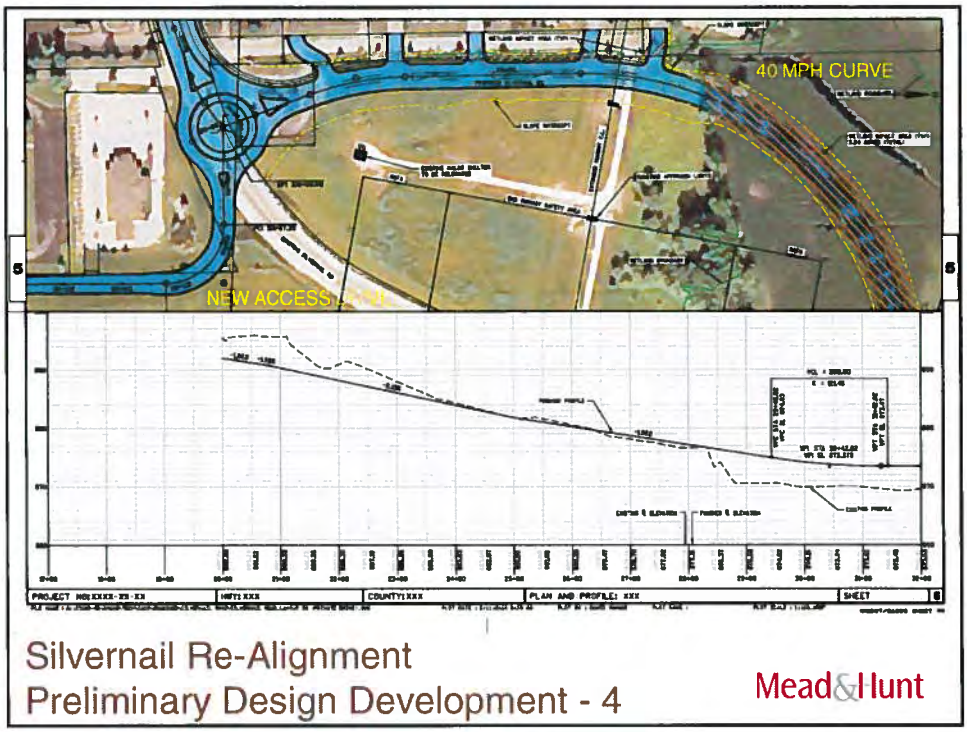
LARGER RAB

ACCESS

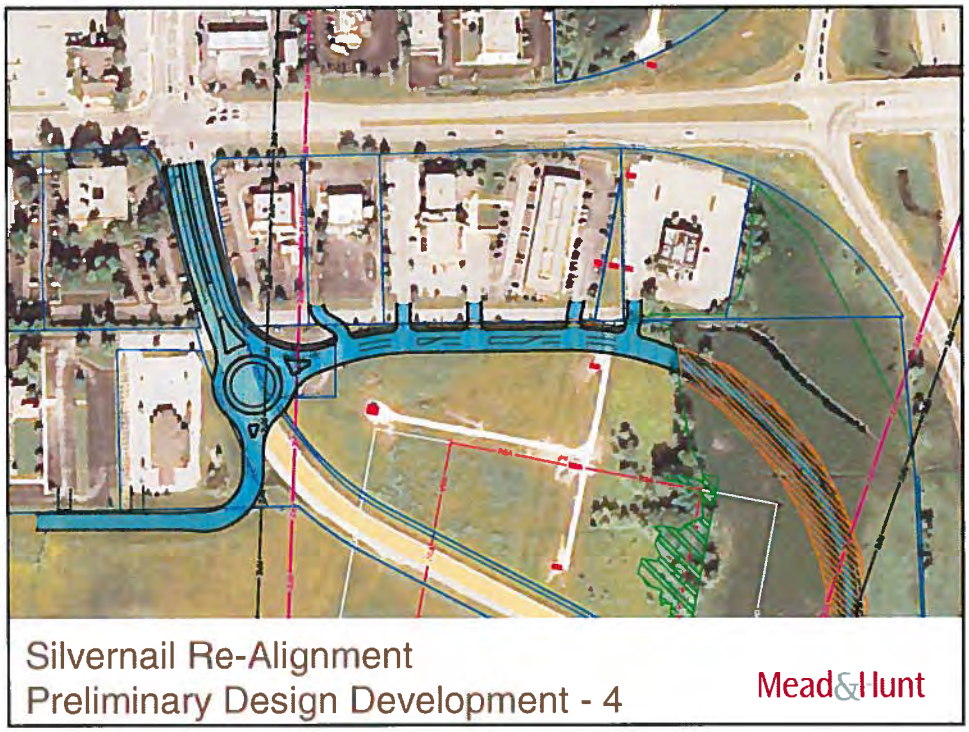


44' F-F

SHIFTED



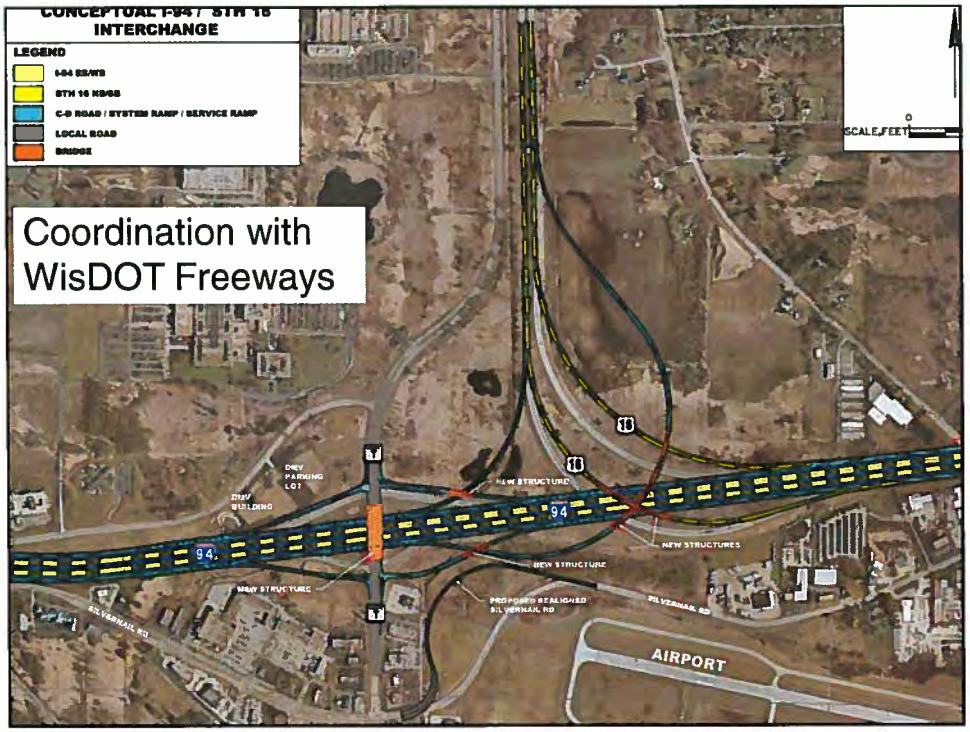
44' F-F



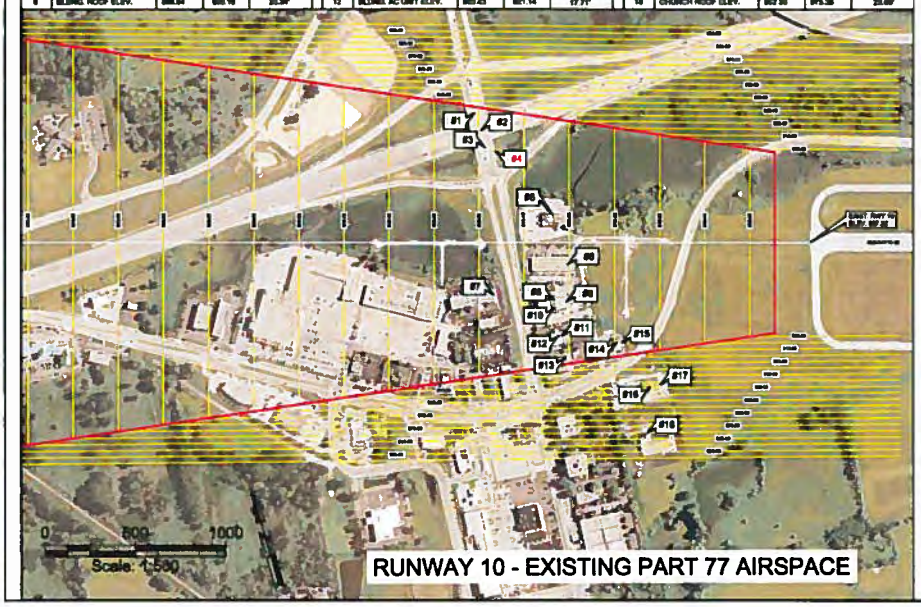
Silvernail Re-Alignment
Preliminary Design Development - 4

Mead & Hunt

RSA
OFA

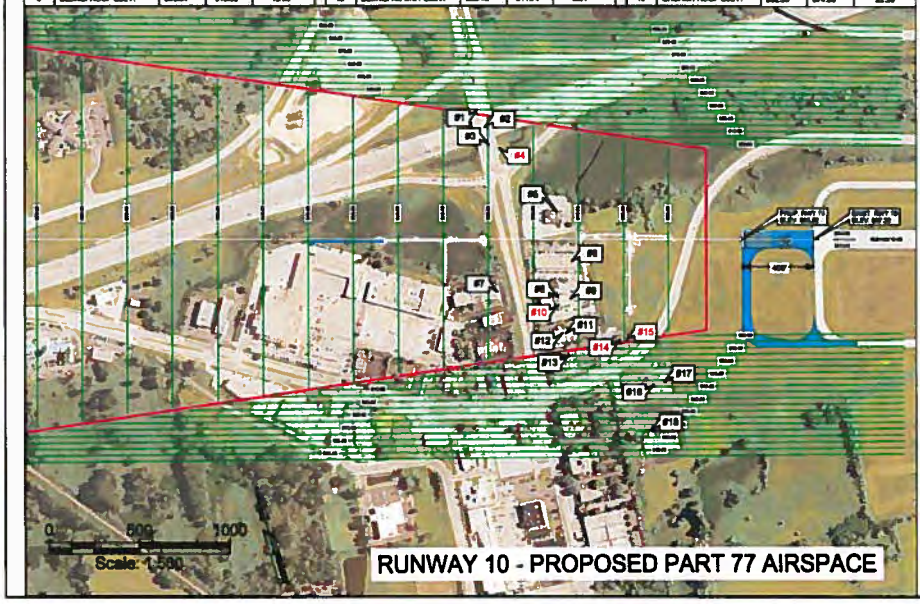


POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARANCE
1	OVERPASS ROAD ELEV.	897.86	930.47	32.60'
2	OVERPASS ROAD ELEV.	897.52	930.80	33.28'
3	OVERPASS ROAD ELEV.	898.41	930.27	31.86'
4	HIGHWAY CAMERA ELEV.	944.69	928.33	-16.42'
5	RESTAURANT ROOF ELEV.	899.33	921.74	22.41'
6	BLDNG. ROOF ELEV.	898.64	930.19	31.54'
7	HOTEL ROOF ELEV.	913.63	928.34	14.72'
8	BLDNG. ROOF ELEV.	911.83	921.91	10.08'
9	BLDNG. ROOF ELEV.	899.85	929.30	14.45'
10	BLDNG. AC UNIT ELEV.	913.34	921.66	8.32'
11	RESTAURANT ROOF ELEV.	899.96	930.82	10.86'
12	BLDNG. AC UNIT ELEV.	903.43	921.14	17.71'
13	RESTAURANT ROOF ELEV.	901.78	929.36	10.58'
14	BANK ROOF ELEV.	899.43	914.09	8.32'
15	BANK ROOF ELEV.	899.66	914.16	8.50'
16	BLDNG. ROOF ELEV.	927.96	938.94	10.98'
17	BLDNG. ROOF ELEV.	923.86	937.36	14.10'
18	CHURCH ROOF ELEV.	952.96	975.36	23.00'



RUNWAY 10 - EXISTING PART 77 AIRSPACE

POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARANCE
1	OVERPASS ROAD ELEV.	897.86	930.03	27.19'
2	OVERPASS ROAD ELEV.	897.52	930.40	32.88'
3	OVERPASS ROAD ELEV.	898.41	919.87	21.46'
4	HIGHWAY CAMERA ELEV.	944.69	919.79	-25.91'
5	RESTAURANT ROOF ELEV.	899.39	912.33	16.99'
6	BLDNG. ROOF ELEV.	898.64	910.69	13.99'
7	HOTEL ROOF ELEV.	913.63	918.84	5.42'
8	BLDNG. ROOF ELEV.	911.83	913.21	0.98'
9	BLDNG. ROOF ELEV.	899.85	918.95	5.98'
10	BLDNG. AC UNIT ELEV.	913.34	912.16	-1.28'
11	RESTAURANT ROOF ELEV.	899.96	911.42	10.46'
12	BLDNG. AC UNIT ELEV.	903.43	911.74	8.31'
13	RESTAURANT ROOF ELEV.	901.78	914.66	12.38'
14	BANK ROOF ELEV.	899.43	899.29	-0.14'
15	BANK ROOF ELEV.	899.66	894.76	-4.90'
16	BLDNG. ROOF ELEV.	927.96	899.01	10.99'
17	BLDNG. ROOF ELEV.	923.86	899.41	13.36'
18	CHURCH ROOF ELEV.	952.39	974.66	22.39'



RUNWAY 10 - PROPOSED PART 77 AIRSPACE



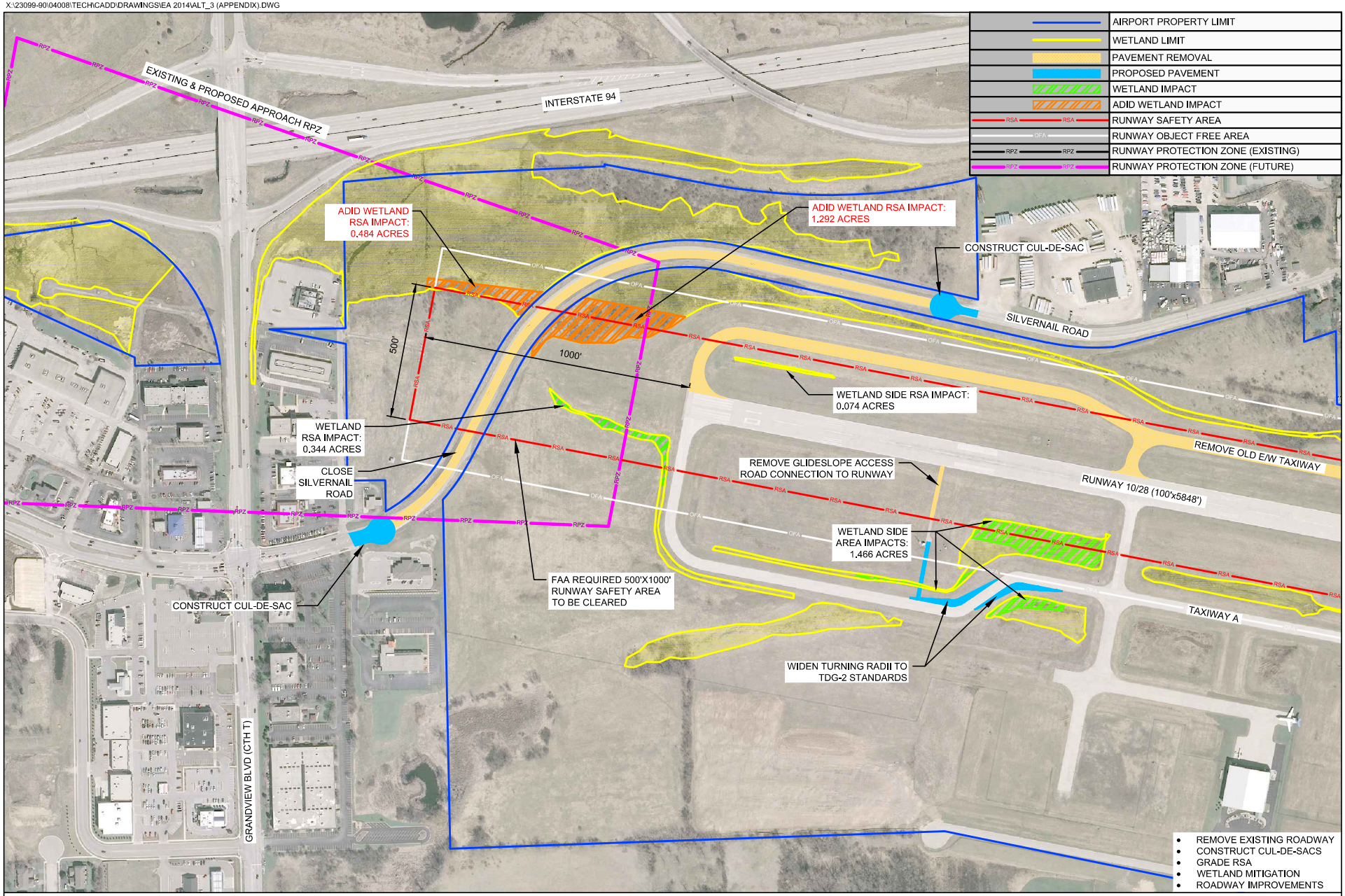
ATTENDANCE REGISTRATION SHEET
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA PROJECT
City of Waukesha
March 12th, 2014 at 2:00 p.m.

PLEASE PRINT

Name	Representing	Address	Email	Phone
SCOTT HASBURGH	MEAD & HUNT, INC.	6501 WATTS RD MADISON WI, 53719	scott.hasburgh@meadhunt.com	608-273-6580
GREG STERN	MEAD & HUNT	6501 WATTS RD MADISON, WI 53719	greg.stern@meadhunt.com	608-273-6380
ALEX DAMIEN	CITY OF WAUKESHA	130 DELAFIELD ST WAUKESHA WI 53188	ADAMIEN @ CI. WAUKESHA.WI.US	262-524-3907
MARK ARNOLD	WI BUREAU OF AERO		Mark.arnold@dot.wi.gov	608 267-5073
ANDY TRIMBLE	WISCONSIN BUREAU OF AERO	MADISON	ANDREW.TRIMBLE @DOT.WI.GOV	608-267-0454
DOUG KOEHLER	CITY OF WAUKESHA COMMUNITY DEVELOPMENT	201 DELAFIELD ST. 53188	DKOEHLER@CI.WAUKESHA.WI.US	262 524 3756
KURT STANICH	WAUKESHA COUNTY AIRPORT	2525 Aviation Dr. Waukesha, WI 53188	kstanich@waukeshacounty.gov	262-521-5250 work 262-424-6747 cell
Margaret Liedtke	City of Waukesha - Engineering	130 Delafield St. Waukesha WI 53188	mliedtke@ci.waukesha.wi.us	262-524-3589
Mike GRUlke				

Appendix F. Build Alternative Exhibits

3/17/2016 11:34:58 AM
X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\ALT_3 (APPENDIX).DWG



N

0 250 500

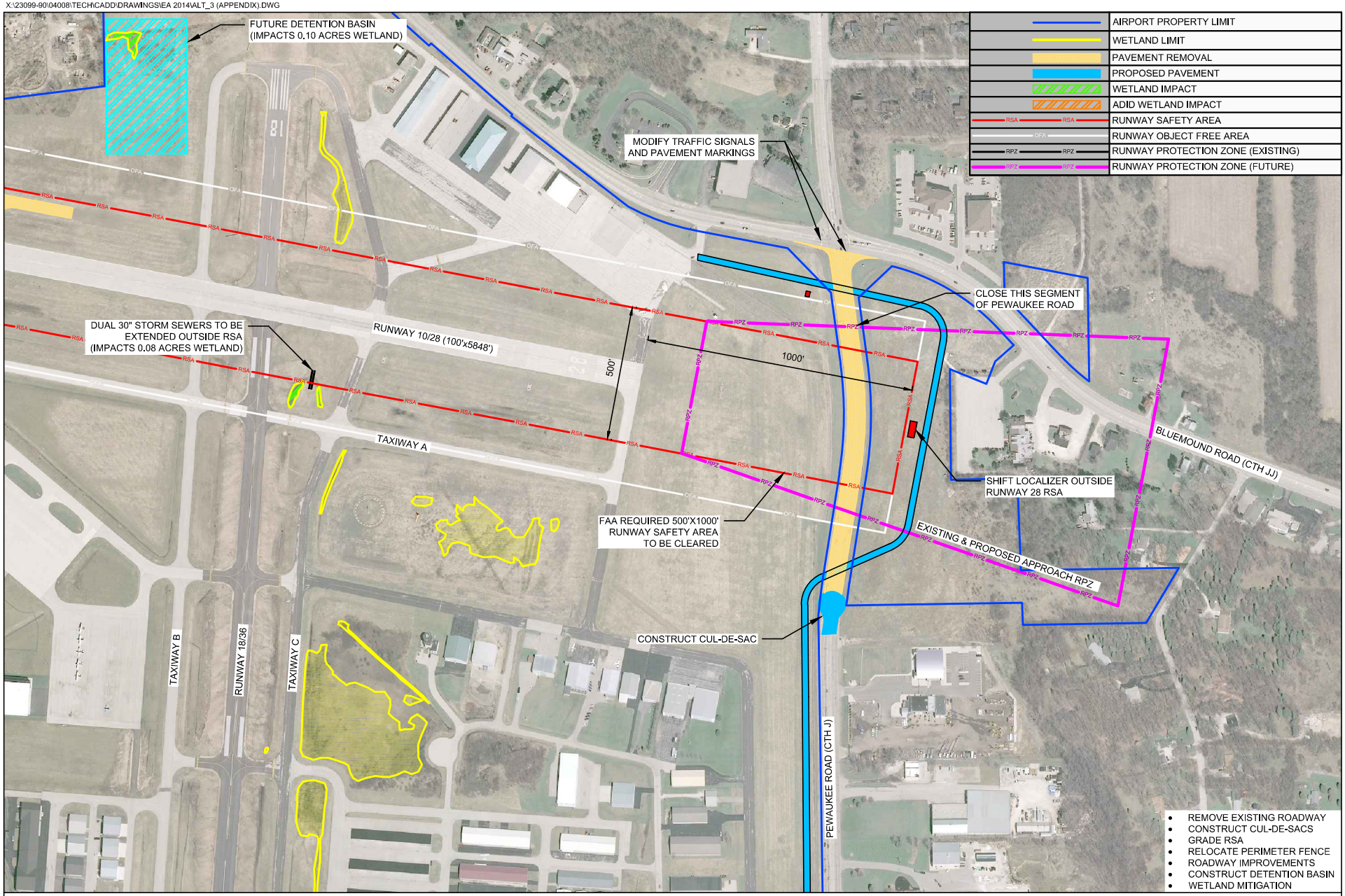
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	1.540 ACRES
TOTAL WETLAND IMPACTS:	**3.660 ACRES**

ALTERNATIVE W3 - CLOSE SILVERNAIL ROAD FOR RUNWAY 10 SAFETY AREA

WAUKESHA COUNTY AIRPORT CRITES FIELD

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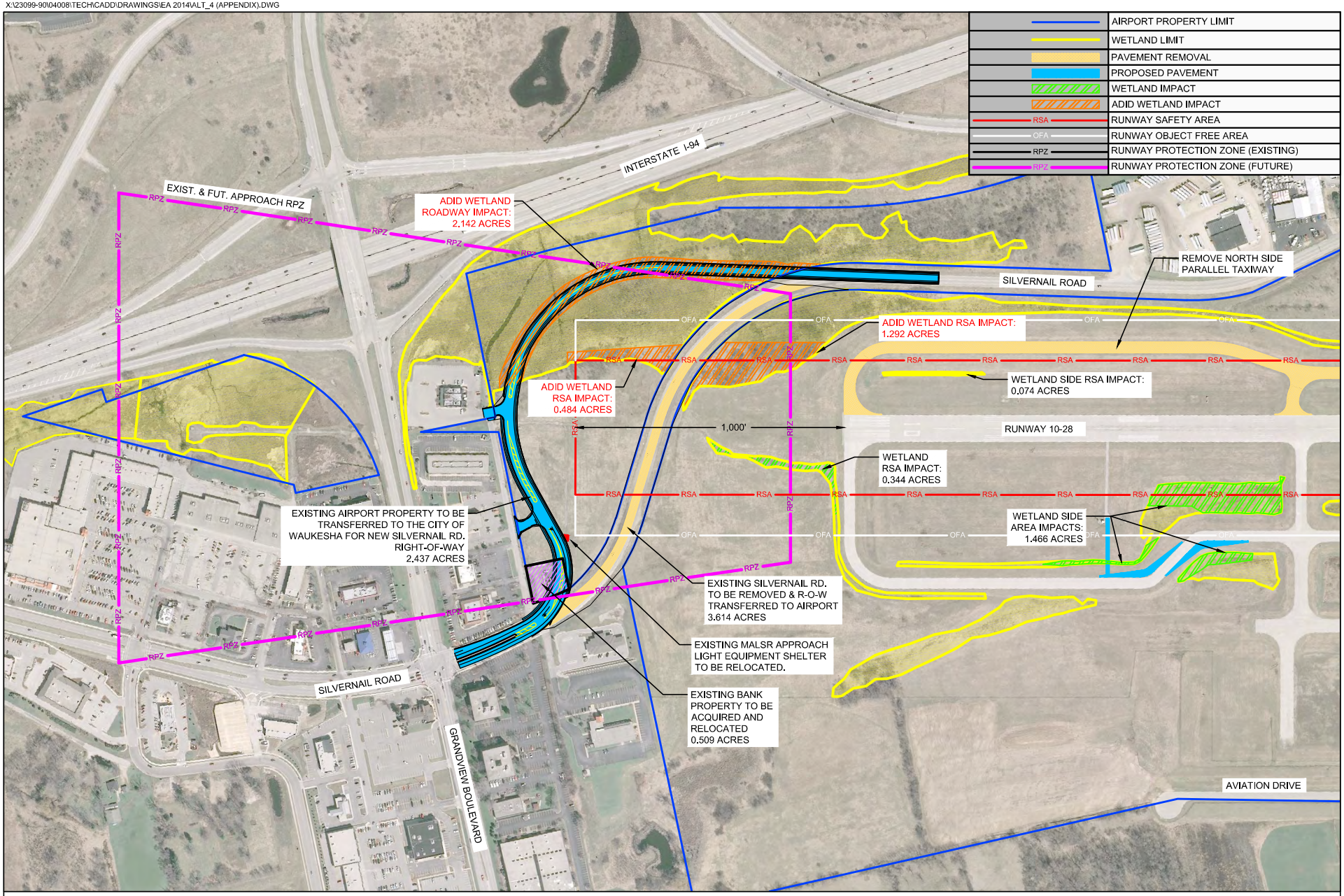
Orthophotograph - 2010 NAIP, Waukesha County

ALTERNATIVE E3 - CLOSE PEWAUKEE ROAD FOR RUNWAY 28 SAFETY AREA

WETLAND IMPACTS THIS ALTERNATIVE: **0.18 ACRES**

WAUKESHA COUNTY AIRPORT CRITES FIELD

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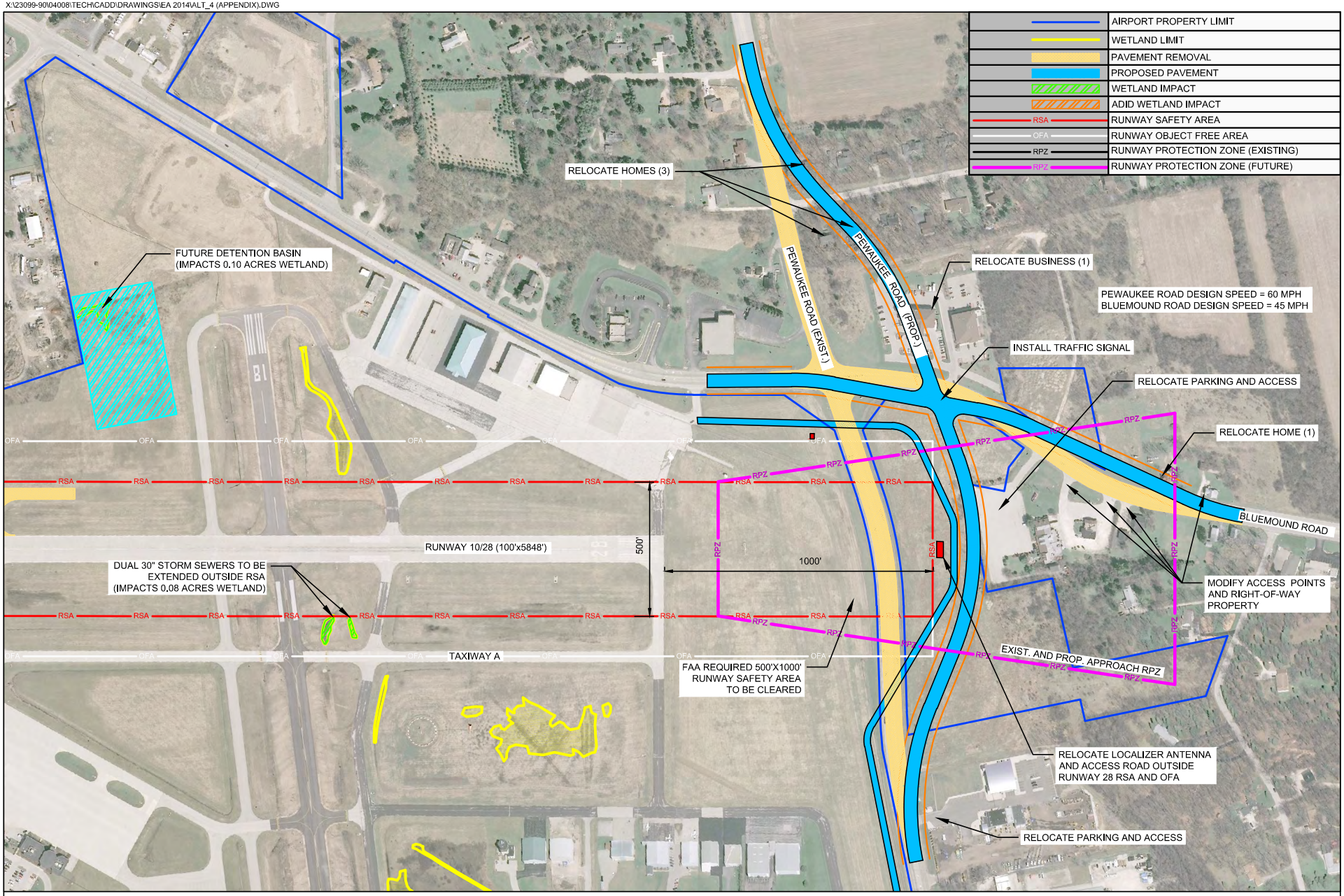
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**5.979 ACRES**

ALTERNATIVE W4 - REALIGN SILVERNAIL ROAD FOR RUNWAY 10 SAFETY AREA

WAUKESHA COUNTY AIRPORT CRITES FIELD

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ALTERNATIVE E4 - REALIGN PEWAUKEE ROAD FOR RUNWAY 28 SAFETY AREA

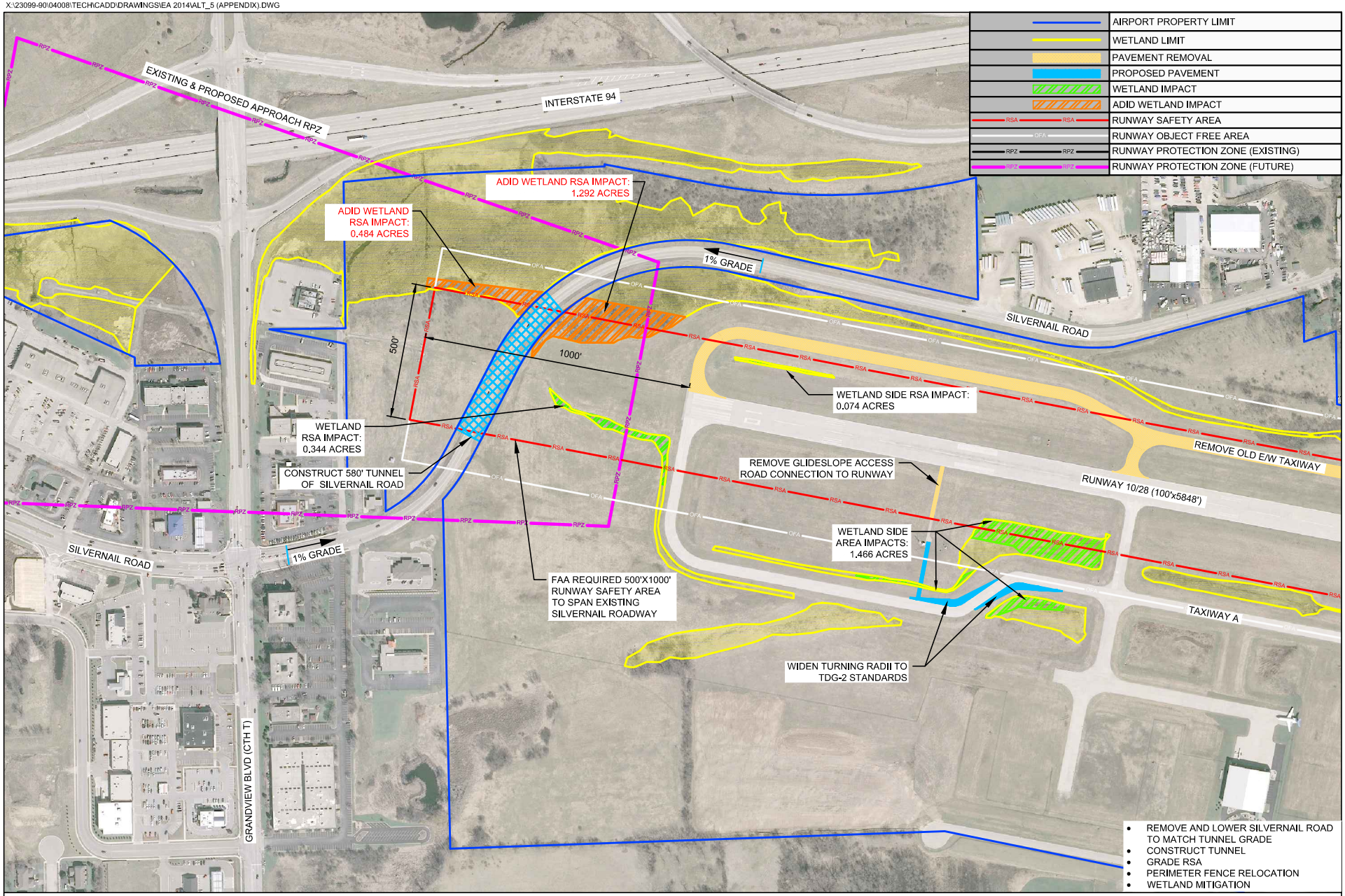
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Orthophotograph - 2010 NAIP, Waukesha County

WETLAND IMPACTS THIS ALTERNATIVE: **0.18 ACRES**

WAUKESHA COUNTY AIRPORT CRITES FIELD

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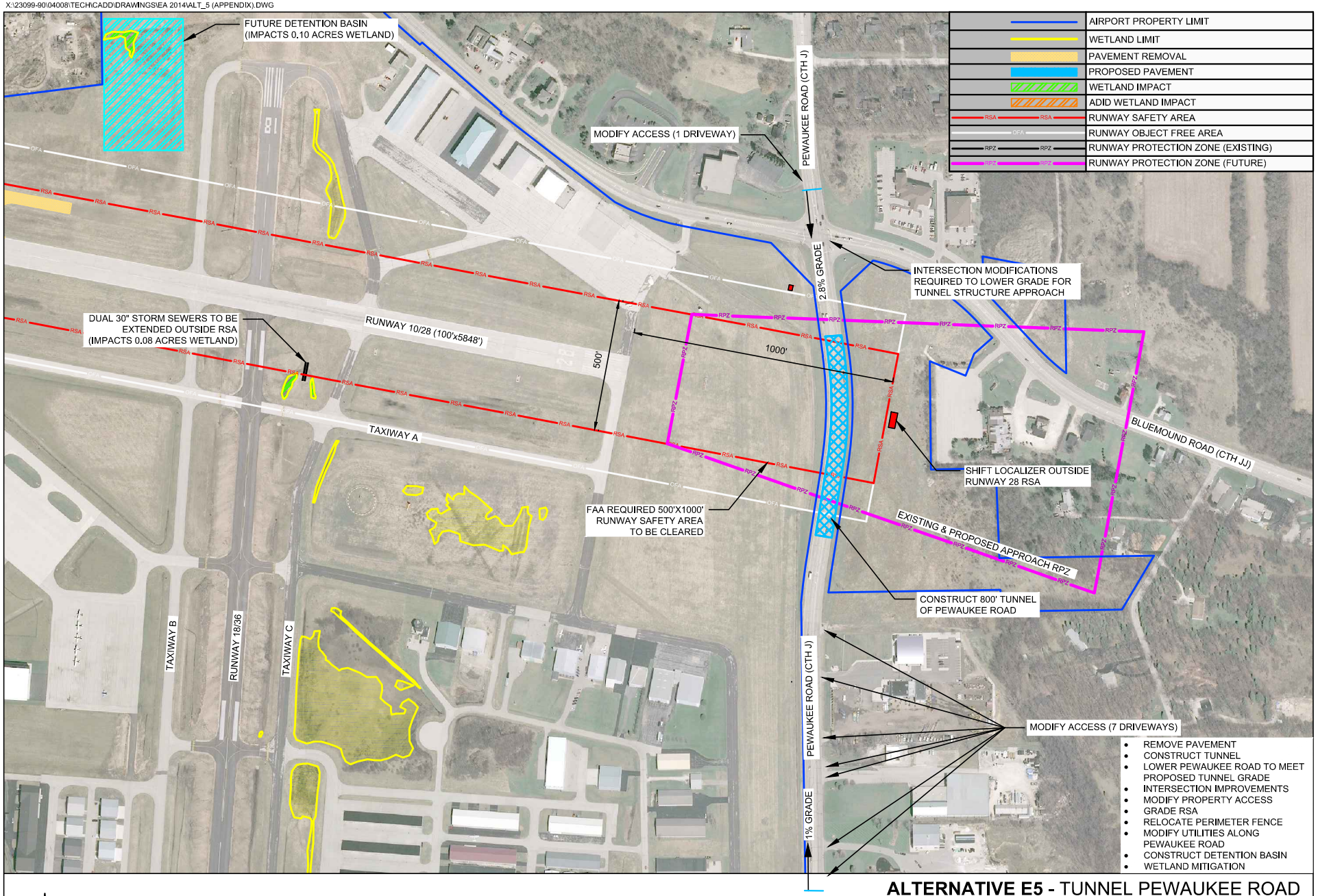
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	1.540 ACRES
TOTAL WETLAND IMPACTS:	**3.660 ACRES**

ALTERNATIVE W5 - TUNNEL SILVERNAIL ROAD FOR RUNWAY 10 SAFETY AREA

WAUKESHA COUNTY AIRPORT CRITES FIELD

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ALTERNATIVE E5 - TUNNEL PEWAUKEE ROAD FOR RUNWAY 28 SAFETY AREA

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Orthophotograph - 2010 NAIP, Waukesha County

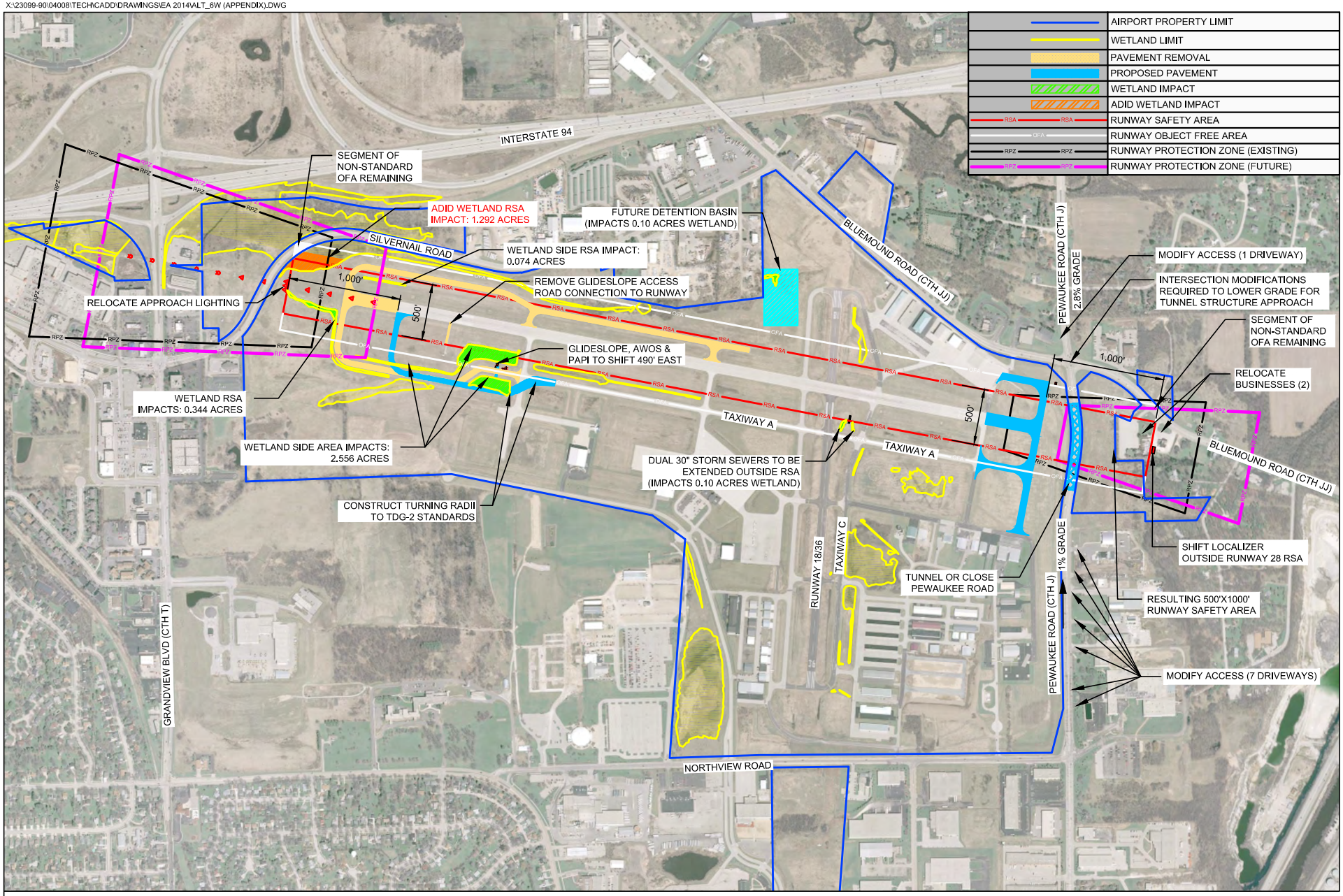
WETLAND IMPACTS THIS ALTERNATIVE: **0.18 ACRES**

WAUKESHA COUNTY AIRPORT CRITES FIELD

Tiered Analysis for Runway 10-28 Safety Areas Alternatives (Roadway Modifications)

Parameters		No Build Alternatives		Build Alternatives - Roadway Modifcations					
		No Action	Request Waiver	Alternative 3 (Close)		Alternative 4 (Re-Align)		Alternative 5 (Tunnel)	
				Runway 10 (West) End - W3	Runway 28 (East) End - E3	Runway 10 (West) End - W4	Runway 28 (East) End - E4	Runway 10 (West) End - W5	Runway 28 (East) End - E5
Tier Level 1									
Purpose and Need	Provides Compliant Runway Safety Areas?	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	Continue to Next Level?	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Tier Level 2		(Retained for Comparison)							
Project Criteria	Maintain Existing Useable Runway Lengths?	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
	Complies with Maximum Feasible Cost Oultined in FAA Order 5200.9?	NA	NA	Yes	No	Yes	No	No	No
	Continue to Next Level?	No	No	Yes	No	Yes	No	No	No
Tier Level 3									
Practicability and Feasibility	Construction Impacts - *Scope of Improvements*	None	None	Remove Silvernail Road within Runway Safety Area and construct cul-de-sacs. Geometric and traffic signal improvements required at 4 intersections	Remove Pewaukee Road within Runway Safety Area and construct cul-de-sacs. Geometric and traffic signal improvements required at Bluemound/Pewaukee,Northview/ Grandview, Grandview/Silvernail, Bluemound/Silvernail, Northview/Delafield, and Northview/Pewaukee Road intersections, expand Northview to four lanes.	Realign Silvernail Road to the west around Runway Safety Area.	Realign Pewaukee Road to the east around Runway Safety Area, realign intersection of Pewaukee Road and Bluemound Road, traffic signal improvements.	Construct 580' tunnel for Silvernail Road under Runway Safety Area; potential groundwater issues.	Construct 800' tunnel for Pewaukee Road under Runway Safety Area, adjust grades Pewaukee Road and of intersection with Bluemound Road.
	Required Property Acquisitions and/or Relocations	None	None	$1,500,000 for improvements at Northview/Grandview and Northview/Pewaukee intersections. Reduced emergency response routes. Eliminates alternate interstate by-pass route and commercial business access.	Property acquisition would be required at impacted intersections and roadways. Cost estimated at approx. $10 M.	Acquisition and relocation of 1 commercial bank property & various segments of other properties for approach light shift would be required at an estimated cost of $1,000,000. Transfer of land between Airport and City for new road R-O-W.	Acquisition of all or part of 7 properties would be required east of the airport. Relocation of 4 residential and 1 commercial. Cost estimated at approx. $9 M.	None required.	Property acquisition and/or modification of access along Pewaukee Road. Cost estimated at approx. $2.5 M
	Fish, Wildlife, and Plants	None	None	The removal of a portion of Silvernail Road could restore continuity between wetland areas on either side of the roadway. Habitat for Butler garter snake may be improved.	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with a realigned Silvernail Road and airside wetland impacts. The removal of existing fill within portions of Silvernail to be removed could restore continuity between wetland areas on either side of the existing roadway.	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with wetland impacts on either side of proposed tunnel and airside.	None
	Runway Protection Zone (RPZ)	None	None	None	None	None	None	None	None
	Part 77 Airspace	None	None	None	None	None	None	None	None
	Navigational Instruments	None	None	None	Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.	None	Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.	None	Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.
	Noise	None	None	This alternative would shift vehicular traffic onto other area roads, thereby increasing noise impacts to properties along those routes. No noise impacts would be generated by the airport as air traffic operations would be unchanged.	This alternative would shift vehicular traffic onto other area roads, thereby increasing noise impacts to properties along those routes. No noise impacts would be generated by the airport as air traffic operations would be unchanged.	No change to airfield operation. Roadways moved; but not closer to any noise sensitive receptors	Realigned roadway shifts closer to residences and other noise sensitive areas. No noise impacts would be generated by the airport as air traffic operations would be unchanged.	No impacts	No impacts
	Wetlands	None	None	1.776 (ADID) 1.884 (non-ADID)	0.18 (non-ADID)	3.918 (ADID) 2.061 (non-ADID)	0.18 (non-ADID)	1.776 (ADID) 1.884 (non-ADID)	0.18 (non-ADID)
	Total Wetland Impacts:			3.660 (Total West End)	0.18 (Total East End)	5.979 (Total West End)	0.18 (Total East End)	3.660 (Total West End)	0.18 (Total East End)
	Capital Cost	$0	$0	$4,261,517	$17,260,099	$5,147,997	$16,350,719	$12,440,480	$25,450,702
	Total Capital Cost:			$21,521,616		$21,498,716		$37,891,182	
	Life Cycle	$688,611	$688,611	$4,261,517	$17,260,099	$5,507,845	$16,719,649	$12,996,666	$26,087,402
	Total 20-Yr Life Cycle Cost:			$21,521,616		$22,227,494		$39,084,068	
Continue for Further Analysis and Comparison?		No	No	No. The City of Waukesha, County and WisDOT communicated the heavy use of these roadways, the benefits they provide to the overall accessibility and connectivity of the area, and the regional socioeconomic effects associated with their closure.		Yes. Through coordination with the City of Waukesha and the County of Waukesha, this was determined to be a feasible alternative.	No. The cost and expanse of impact to surrounding property and infrastructure are substantial.	No. Cost Exceeds Maximum Feasible. Concen with possible ground water issues given the wetlands and water table elevations in this area.	No. Cost Exceeds Maximum Feasible and grade modifications of Pewaukee Road could cascade into Bluemound and Intersection.

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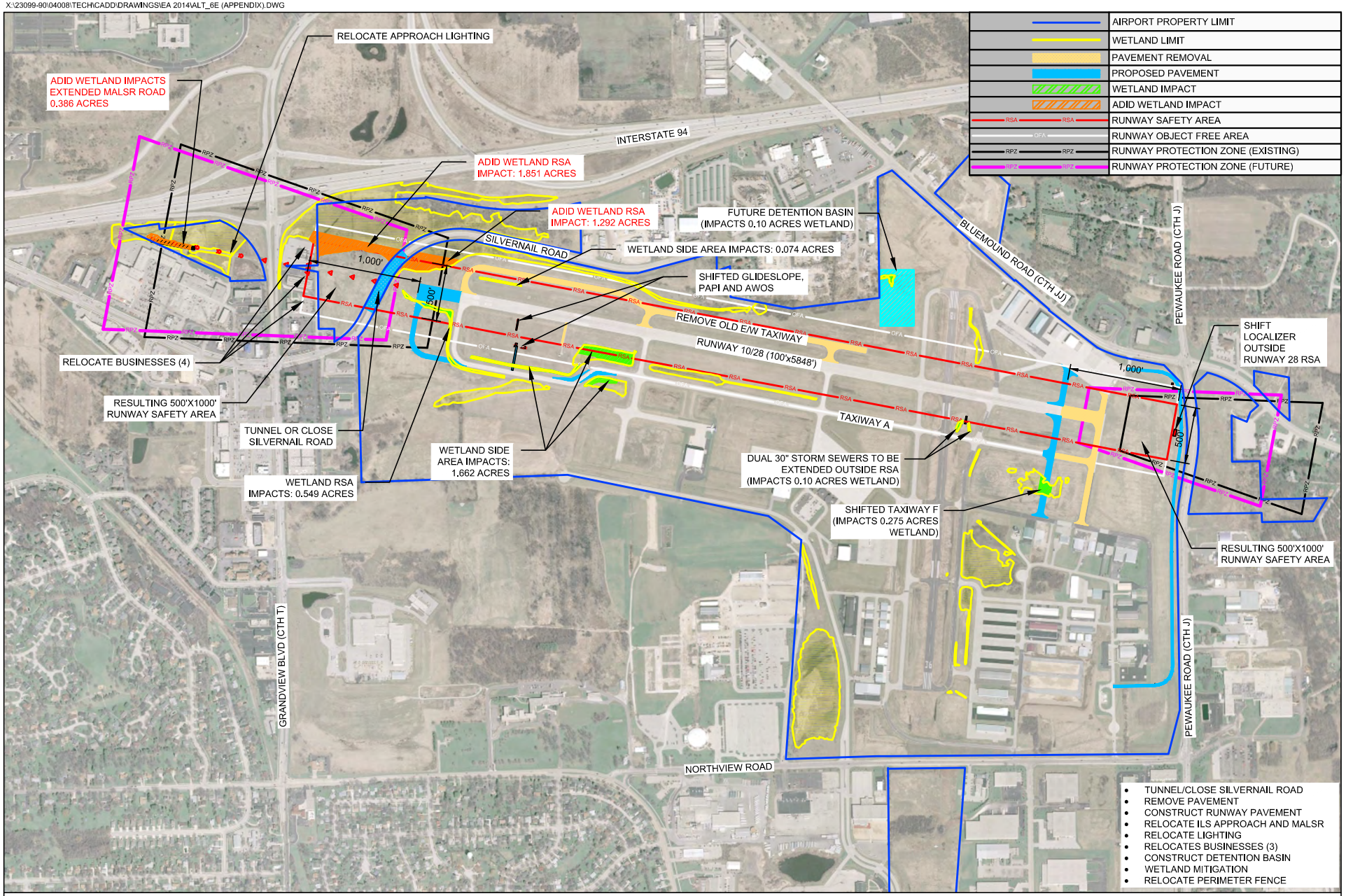
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	2.736 ACRES
TOTAL WETLAND IMPACTS:	**4.372 ACRES**

ALTERNATIVE W6 - SHIFT RUNWAY EAST FOR RUNWAYS 10 & 28 SAFETY AREA

WAUKESHA COUNTY AIRPORT CRITES FIELD

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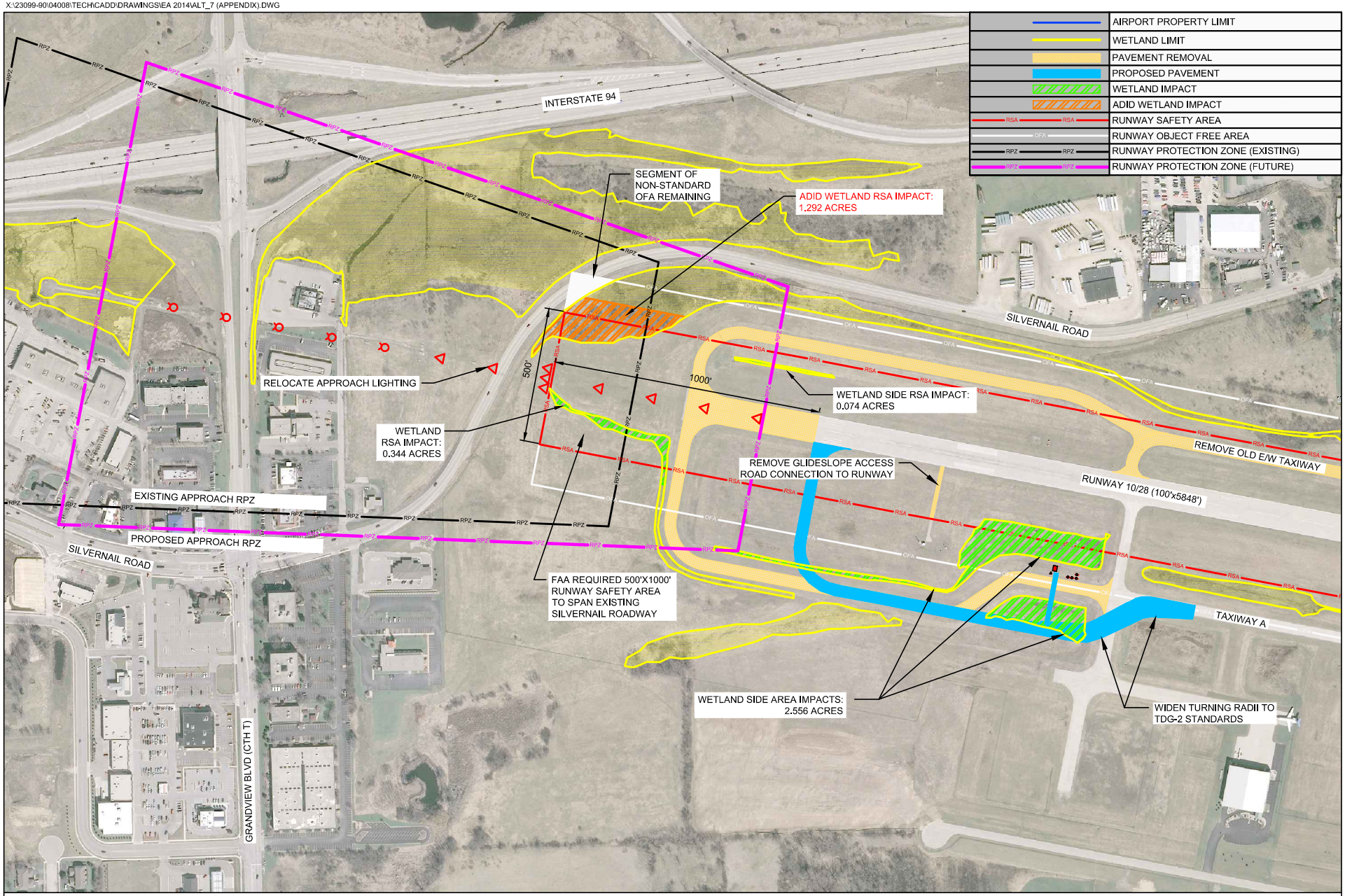
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	3.143 ACRES
APPROACH LIGHT ROAD EXTENSION ADID WETLAND IMPACTS:	0.386 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.549 ACRES
WETLAND SIDE AREA IMPACTS:	2.191 ACRES
TOTAL WETLAND IMPACTS:	**6.269 ACRES**

ALTERNATIVE E6 - SHIFT RUNWAY WEST FOR RUNWAYS 10 & 28 SAFETY AREA

WAUKESHA COUNTY AIRPORT CRITES FIELD

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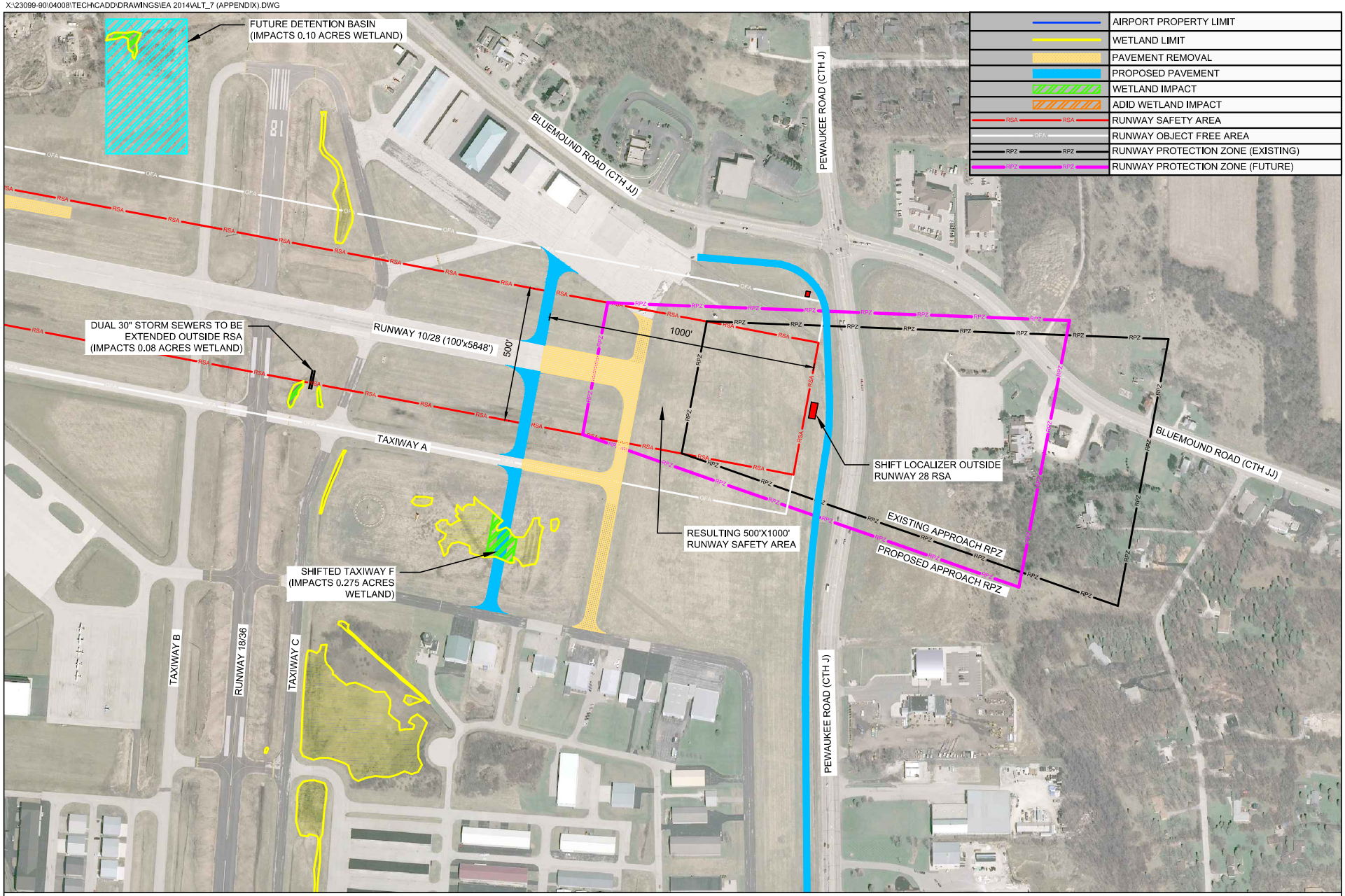
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	2.556 ACRES
TOTAL WETLAND IMPACTS:	**4.192 ACRES**

ALTERNATIVE W7 - SHORTEN RUNWAY 10 490' FOR RUNWAY 10 SAFETY AREA

WAUKESHA COUNTY AIRPORT CRITES FIELD

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ALTERNATIVE E7 - SHORTEN RUNWAY 28 375' FOR RUNWAY 28 SAFETY AREA

WETLAND IMPACTS THIS ALTERNATIVE: **0.455 ACRES**

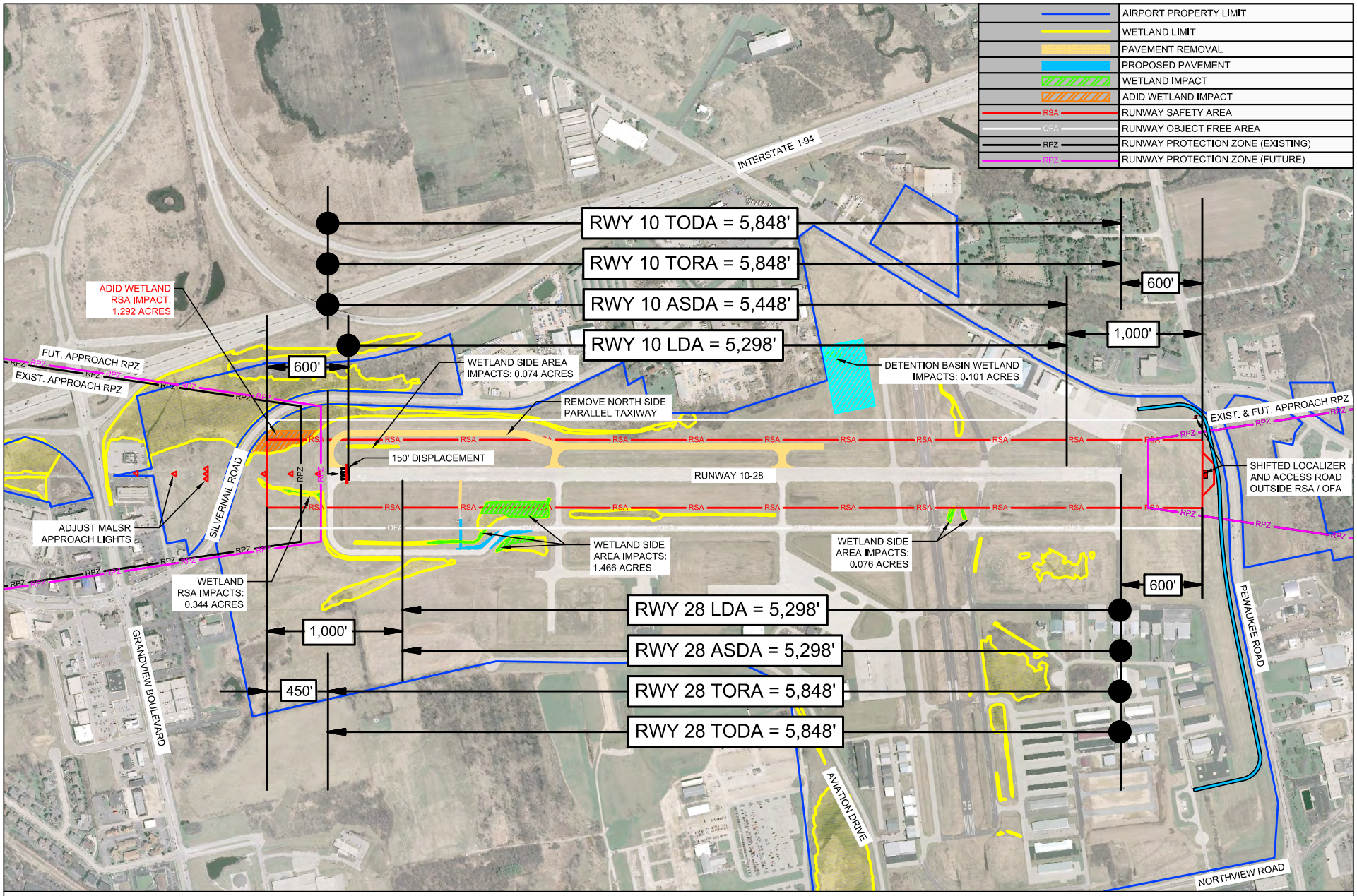
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Orthophotograph - 2010 NAIP, Waukesha County

WAUKESHA COUNTY AIRPORT CRITES FIELD

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0 500 1000

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
SIDE RSA WETLAND IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**3.353 ACRES**

FIGURE 3-4
DECLARED DISTANCES (ALTERNATIVE 8)

WAUKESHA COUNTY AIRPORT CRITES FIELD

AIRPORT PROPERTY LIMIT
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT
ADID WETLAND IMPACT
RSA — RUNWAY SAFETY AREA
OFA — RUNWAY OBJECT FREE AREA
RPZ — RUNWAY PROTECTION ZONE (EXISTING)
RPZ — RUNWAY PROTECTION ZONE (FUTURE)

RWY 10 TODA = 5,698'
RWY 10 TORA = 5,698'
RWY 10 ASDA = 5,698'
RWY 10 LDA = 5,698'
600'
150'
INTERSTATE I-94
FUTURE APPROACH RPZ
EXISTING APPROACH RPZ
NON-STANDARD OFA INTO SILVERNAIL ROAD.
ADID WETLAND RSA IMPACT: 1.292 ACRES
250' ASPHALT LEAD-IN TO EMAS
REMOVE EXIST. PARALLEL TAXIWAY
WETLAND SIDE AREA IMPACTS: 0.074 ACRES
EMAS
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 5,698' (PROPOSED)
150' THRESHOLD & TAXIWAY DISPLACEMENT
350'x110' EMAS BED
RELOCATED MALSR APPROACH LIGHTS
EXISTING SILVERNAIL ROAD
CTH T - GRANDVIEW BLVD
TAXIWAY A
WETLAND RSA IMPACTS: 0.344 ACRES
WETLAND SIDE AREA IMPACTS: 1.466 ACRES
150'
RWY 28 LDA = 5,698'
RWY 28 ASDA = 5,698'
RWY 28 TORA = 5,698'
RWY 28 TODA = 5,698'
450'
600'

BLUEMOUND ROAD
330' ASPHALT LEAD-IN TO EMAS
EMAS
EXIST. & FUTURE APPROACH RPZ
SHIFTED LOCALIZER, AND ACCESS ROAD OUTSIDE RSA / OFA
270' X 110' EMAS BED
TAXIWAY A
600'
CTH J - PEWAUKEE ROAD
FUEL FARM

0 250 500

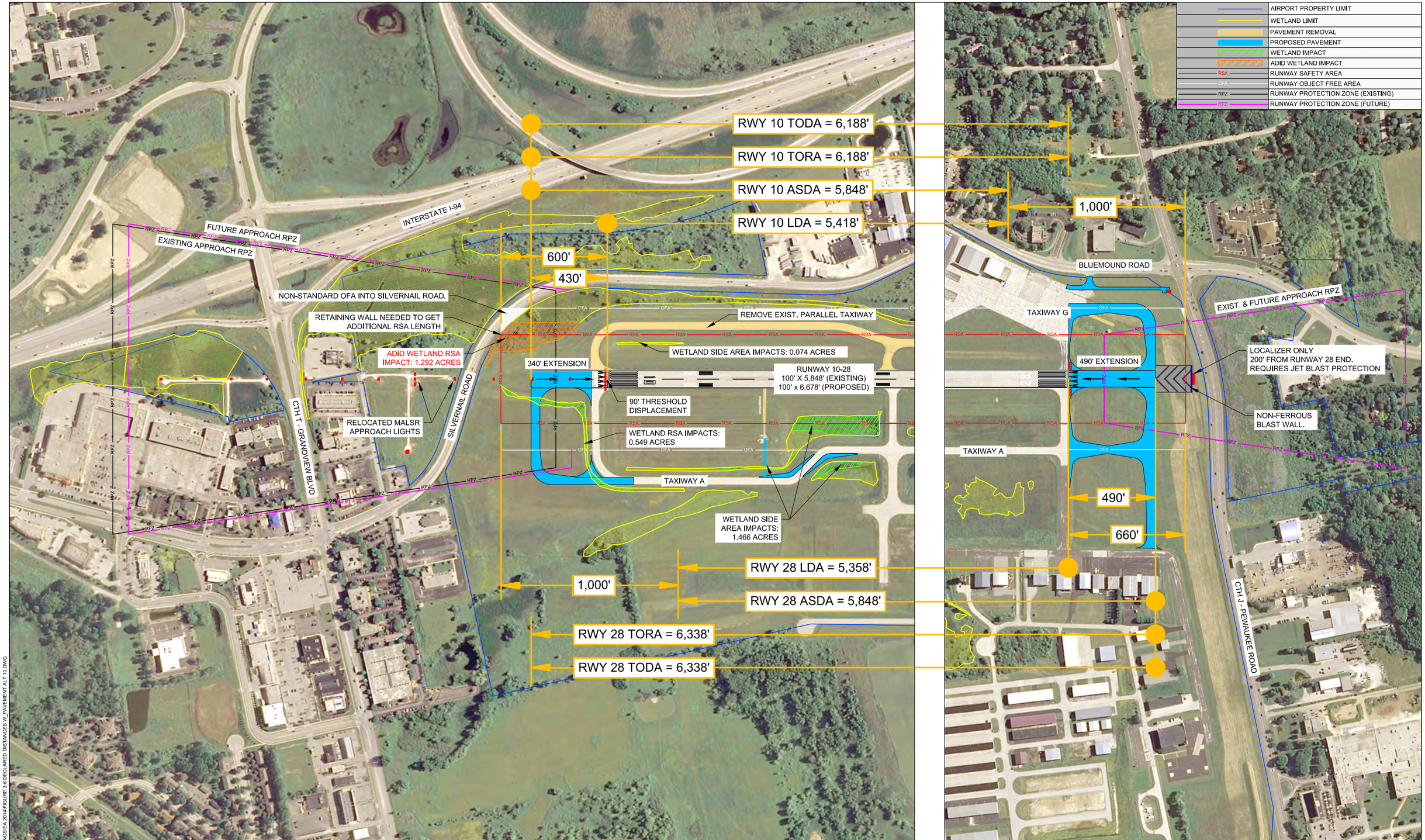
Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
SIDE RSA WETLAND IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**3.353 ACRES**

FIGURE 3-5
EMAS INSTALLATIONS (ALTERNATIVE 9)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04068\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-5 EMAS ALTERNATIVE 9.DWG



0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.292 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.549 ACRES
SIDE RSA WETLAND IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**3.558 ACRES**

FIGURE 3-6

DECLARED DISTANCES WITH PAVEMENT (ALTERNATIVE 10)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-6 DECLARED DISTANCES W_PAVEMENT ALT 10.DWG

Tiered Analysis for Runway 10-28 Safety Areas Alternatives (Airfield Modifications)

Parameters		No Build Alternatives		Build Alternatives - Airfield Modifcations									
		No Action	Request Waiver	Alternative 6 (Shift)		Alternative 7 (Shorten)		Alternative 8 (Delcared Distances)		Alternative 9 (EMAS)		Alternative 10 (Delcared Distances w/Pavement)	
				Shift Runway East - W6	Shift Runway West - E6	Runway 10 (West) End - W7	Runway 28 (East) End - E7	Runway 10 (West) End	Runway 28 (East) End	Runway 10 (West) End	Runway 28 (East) End	Runway 10 (West) End	Runway 28 (East) End
Tier Level 1													
Purpose and Need	Provides Compliant Runway Safety Areas?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Continue to Next Level?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Tier Level 2		(Retained for Comparison)											
Project Criteria	Maintain Existing Useable Runway Lengths?	NA	NA	Yes	Yes	No	No	No	No	No, Runway 10 threshold would need to shift 150' east to provide 600' RSA and a standard EMAS installation.	Yes	No. Maintains takeoff length, but landing distances are reduced by 430' - 490'	
	Complies with Maximum Feasible Cost Oultined in FAA Order 5200.9?	NA	NA	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Continue to Next Level?	No	No	No	No	No	No	No	No	No	Yes	No	No
Tier Level 3													
Practicability and Feasibility	Construction Impacts - *Scope of Improvements*	None	None	Shift Runway 10/28 490' east, reconfigure taxiways and pavement markings, tunnel Pewaukee Road.	Shift Runway 10/28 375' west, reconfigure taxiways and pavement markings, tunnel Silvernail Road.	Remove 500' of runway pavement, reconfigure taxiways and pavement markings, relocate navigational aids and airfield lighting.	Remove 375' of runway pavement, reconfigure taxiways and pavement markings, relocate navigational aids and airfield lighting.	Remark Runway 10 threshold, relocate navigational aids and adjust airfield lighting.	Remark Runway 28 threshold, relocate navigational aids and adjust airfield lighting.	Construct 350' EMAS arresting bed with 250' lead-in ramp off Runway 10 approach. Adjust MALSR lights, some to go in EMAS bed.	Construct 270' EMAS arresting bed and 330' asphalt lead-in ramp off end of Runway 28 approach.	Extend Runway 10 pavement and corresponding taxiways by 340', shift threshold and approach lights, pavement marking and edge lighting.	Extend Runway 28 pavement and corresponding taxiways by 490'. Install blast pad and non-ferrous jet blast fence for protectioni of traffic on Pewaukee Road.
	Required Property Acquisitions and/or Relocations	None	None	Property acquisition and/or modification of access along Pewaukee Road. Relocate 2 businesses along Bluemound Road. Cost estimated at approx. $16.2 M	Property acquisition and/or modification of existing businesses along Grandview Boulevard. Reloation of 4 businesses. Cost estimated at $14.8 M	None	None	None	None	None	None	None	None
	Fish, Wildlife, and Plants	None	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with Runway 10 RSA and airside RSA grading and wetland impacts.		The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with airside RSA wetland impacts.	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with airside RSA wetland impacts.	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; amphibian habitat would be affected with airside RSA wetland impacts.	None	The Butler garter snake has been found in the wetland areas on either side of Silvernail Road; its habitat would be affected with airside RSA wetland impacts.	None
	Runway Protection Zone (RPZ)	None	None	RPZ on West End would be improved. RPZ on East End would be Worsened.	RPZ on East End would be improved. RPZ on West End would be worsened.	RPZ areas on either end would be improved as runway ends would be pulled in and more of the RPZ area would be encompassed within existing Airport property and control.		Approach RPZ would improve slightly with shifted threshold for Runway 10. No change to the departure RPZ.	None	Approach RPZ would improve slightly with shifted threshold for Runway 10. No change to the departure RPZ.	None	Approach RPZ areas off this end of the runway would be imrproved. Departure RPZs would be worsened.	No Impact
	Part 77 Airspace	None	None	Substantial Approach Procedure Changes and Airspace Changes to both ends.		Substantial Approach Procedure Changes and Airspace Changes to both ends.		Minor shifts to the Runway 10 threshold would result in some commensureate airspace modifications.	None	Minor shifts to the Runway 10 threshold would result in some commensureate airspace modifications.	None	Would shift east commensurate with the shift in the Runway 10 threshold.	No changes
	Navigational Instruments	None	None	All Existing Navigational Instruments would be shifted to correspond with new runway end locations. All existing edge lighting would need to shift.		All Existing Navigational Instruments would be shifted to correspond with new runway end locations. All existing edge lighting would need to shift.		Shift in the approach lights requiring some to be installed in-pavement.	Runway 28 VASIs and REILS would need to shift to correspond with Runway 28 threshold. Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.	Some approach lights to be installed in-pavement or in the EMAS arresting bed or lead-in ramp. Some reporting changes in threshold crossing height.	Runway 10 Localizer and equipment shelter would need to shift east outside of Runway 28 RSA and OFA.	Approach lights and edge lights to be modified - some to be installed in-pavement.	REILs to shift outward.
	Noise	None	None	Some small changes in either direction, but no significant impacts.		Some small changes in either direction, but no significant impacts.		No significant impacts	No significant impact	No impacts	No impacts	No significant impacts	No significant impacts
	Wetlands	None	None	1.292 (ADID) 3.080 (non-ADID)	3.529 (ADID) 2.740 (non-ADID)	1.292 (ADID) 2.90 (non-ADID)	0.455 (non-ADID)	1.292 (ADID) 2.061 (non-ADID)		1.292 (ADID) 1.881 (non-ADID)	0.18 (non-ADID)	1.292 (ADID) 2.086 (non-ADID)	0.18 (non-ADID)
	Total Wetland Impacts:			4.372 Total (both ends)	6.269 (Total both ends)	4.192 (Total West End)	0.455 (Total East End)	3.353 (Total both ends)		3.173 (Total West End)	0.18 (Total East End)	3.378 (Total West End)	0.18 (Total East End)
	Capital Cost	$0	$0	$45,416,864	$33,219,333	$3,893,533	$2,563,848	$1,377,427	$1,400,981	$7,209,510	$7,163,368	$4,932,569	$7,163,368
	Total Capital Cost:			NA		$6,457,381		$2,778,408		$14,372,878		$12,095,937	
	Life Cycle	$688,611	$688,611	$46,393,632	$34,149,488	$4,135,076	$2,891,203	$1,721,732	$1,745,287	$9,637,448	$9,551,986	$5,389,171	$7,788,381
	Total 20-Yr Life Cycle Cost:			NA		$7,026,280		$3,467,019		$19,189,434		$13,177,552	
Continue for Further Analysis and Comparison?		No	No	Yes. While a full shift in either direction would not be practicable or feasible as a standalone alternative, options for smaller shifts were carried forward for evaluation in combination with other improvements.		No. Does not meet the stated purpose and need. Airport tenants were surveyed and resported that a loss in useable runway length for both takeoffs and landings would represent a significant impact to their operations. FAA confirmed the existing length is needed.		Yes. Declared distances would not maintain existing runway length and would not be practicable or feasible as a standalone alternative. However, the use of declared distances was carried forward for evaluation in combination with other improvements.		No. Non-standard EMAS on this end and requires 150' loss in landing length for shifted threshold.	Yes. While not a standalone solution, a standard EMAS installation can be installed on this end and was carried forward for consideration in combination with other improvements.	Yes. Declared distances would not maintain existing runway length and would not be practicable or feasible as a standalone alternative. However, the use of declared distances was carried forward for evaluation in combination with other improvements.	

AIRPORT PROPERTY LIMIT
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT
ADID WETLAND IMPACT
RUNWAY SAFETY AREA
RUNWAY OBJECT FREE AREA
RUNWAY PROTECTION ZONE (EXISTING)
RUNWAY PROTECTION ZONE (FUTURE)

RWY 10 TODA = 6,248'
RWY 10 TORA = 6,248'
RWY 10 ASDA = 5,848'
RWY 10 LDA = 5,848'
600'
1,000'
INTERSTATE I-94
ADID WETLAND ROADWAY IMPACTS: 2.142 ACRES
EXISTING APPROACH RPZ
FUTURE APPROACH RPZ
PROPERTY ACQUISITION REQUIRED FOR SHIFTED MALSR LIGHTS
PROPOSED SILVERNAIL ROAD
ADID WETLAND RSA IMPACT: 1.292 ACRES
REMOVE EXIST. PARALLEL TAXIWAY
WETLAND SIDE AREA IMPACTS: 0.074 ACRES
ADID WETLAND RSA IMPACT: 0.484 ACRES
400' EXTENSION
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 6,248' (PROPOSED)
ADID WETLAND IMPACTS EXTENDED MALSR ROAD 0.386 ACRES
RELOCATED MALSR APPROACH LIGHTS AND SHELTER
SHIFTED GLIDESLOPE, PAPI AND AWOS
EXISTING SILVERNAIL ROAD
EXISTING AIRPORT PROPERTY TO BE TRANSFERRED TO THE CITY OF WAUKESHA FOR NEW SILVERNAIL RD. RIGHT-OF-WAY 2.437 ACRES
TAXIWAY A
WETLAND RSA IMPACTS: 0.549 ACRES
EXISTING SILVERNAIL RD. TO BE REMOVED & R-O-W TRANSFERRED TO AIRPORT 3.614 ACRES
WETLAND SIDE AREA IMPACTS: 1.662 ACRES
SILVERNAIL ROAD
CTH T - GRANDVIEW BLVD
EXISTING GAS STATION PROPERTY TO BE SHIFTED COMPLETELY OUTSIDE OF RWY 10 APPROACH RPZ.
EXISTING BANK PROPERTY TO BE ACQUIRED AND RELOCATED 0.509 ACRES
RWY 28 LDA = 5,848'
RWY 28 ASDA = 5,848'
RWY 28 TORA = 5,848'
RWY 28 TODA = 5,848'
1,000'
600'
BLUEMOUND ROAD
SHIFTED LOCALIZER, AND ACCESS ROAD OUTSIDE RSA / OFA
EXIST. & FUTURE APPROACH RPZ
TAXIWAY A
CTH J - PEWAUKEE ROAD
FUEL FARM

0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES
APPROACH LIGHT ROAD EXTENSION ADID WETLAND IMPACTS:	0.386 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.549 ACRES
WETLAND SIDE AREA IMPACTS:	1.916 ACRES
TOTAL WETLAND IMPACTS:	**6.769 ACRES**

FIGURE 3-8
REALIGN SILVERNAIL, EXTEND RWY 10, DECLARED DISTANCES (ALTERNATIVE 11)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04008\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-8 - ALTERNATIVE 11.DWG

AIRPORT PROPERTY LIMIT
WETLAND LIMIT
PAVEMENT REMOVAL
PROPOSED PAVEMENT
WETLAND IMPACT
ADID WETLAND IMPACT
RUNWAY SAFETY AREA
RUNWAY OBJECT FREE AREA
RUNWAY PROTECTION ZONE (EXISTING)
RUNWAY PROTECTION ZONE (FUTURE)

RWY 10 TODA = 5,848'
RWY 10 TORA = 5,848'
RWY 10 ASDA = 5,848'
RWY 10 LDA = 5,848'

ADID WETLAND ROADWAY IMPACTS: 2.142 ACRES
INTERSTATE I-94
EXISTING AND FUTURE APPROACH RPZ
600'
PROPOSED SILVERNAIL ROAD
ADID WETLAND RSA IMPACT: 1.292 ACRES
REMOVE EXIST. PARALLEL TAXIWAY
ADID WETLAND RSA IMPACT: 0.484 ACRES
WETLAND SIDE AREA IMPACTS: 0.074 ACRES
EXISTING SILVERNAIL ROAD
RUNWAY 10-28
100' X 5,848' (EXISTING)
100' x 5,848' (PROPOSED)
WETLAND RSA IMPACTS: 0.344 ACRES
EXISTING AIRPORT PROPERTY TO BE TRANSFERRED TO THE CITY OF WAUKESHA FOR NEW SILVERNAIL RD. RIGHT-OF-WAY 2.437 ACRES
TAXIWAY A
WETLAND SIDE AREA IMPACTS: 1.466 ACRES
EXISTING SILVERNAIL RD. TO BE REMOVED & R-O-W TRANSFERRED TO AIRPORT 3.614 ACRES
SILVERNAIL ROAD
CTH T - GRANDVIEW BLVD
1,000'
RWY 28 LDA = 5,848'
RWY 28 ASDA = 5,848'
RWY 28 TORA = 5,848'
RWY 28 TODA = 5,848'
EXISTING BANK PROPERTY TO BE ACQUIRED AND RELOCATED 0.509 ACRES

600'
BLUEMOUND ROAD
EXIST. & FUTURE APPROACH RPZ
SHIFTED LOCALIZER, AND ACCESS ROAD OUTSIDE RSA / OFA
600'
EMAS
270' X 120' EMAS BED
330' ASPHALT LEAD-IN TO EMAS
TAXIWAY A
600'
CTH J - PEWAUKEE ROAD
FUEL FARM

0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

RSA ADID WETLAND IMPACTS:	1.776 ACRES
ROADWAY ADID WETLAND IMPACTS:	2.142 ACRES
RSA NON-ADID WETLAND IMPACTS:	0.344 ACRES
WETLAND SIDE AREA IMPACTS:	1.717 ACRES
TOTAL WETLAND IMPACTS:	**5.979 ACRES**

FIGURE 3-9
REALIGN SILVERNAIL, INSTALL EMAS OFF RUNWAY 28 (ALTERNATIVE 12)

WAUKESHA COUNTY AIRPORT CRITES FIELD

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X:\23099-90\04\08\TECH\CADD\DRAWINGS\EA 2014\FIGURE 3-9 - ALTERNATIVE 12.DWG

Appendix G. RPZ Analysis Exhibits and FAA letter Documenting Support for Alternative 11

U.S. Department
of Transportation
**Federal Aviation
Administration**

Federal Aviation Administration
Great Lakes Region

2300 E. Devon Avenue
Des Plaines, Illinois 60018

Date: July 17, 2014

Attention: Andy Trimble
Wisconsin Bureau of Aeronautics
4802 Sheboygan Avenue, Room 701
Madison, WI 53707-7914

RPZ Land Use Analysis Request – Waukesha, WI (UES)

FAA has reviewed the RPZ analysis and alternatives provided for Waukesha County Airport (UES), Waukesha, WI.

FAA supports the preferred alternative #11, as identified in Runway Protection Zone analysis.

The improvements that are identified in Alternative #11 will provide a clear RSA for Runway 10. This alternative also includes the realignment of Silvernail Road, and as a result, the road will be located slightly further from the threshold for Runway 10. These improvements provide a net safety benefit, while allowing the airport to maintain runway length for their most demanding aircraft. Unconditional approval of the sponsor's preferred alternative on the ALP remains subject to the sponsor fulfilling NEPA review requirements. Please let us know if you have any questions or concerns.

.

Please pass this information on to the Airport Sponsor and Consultant.

If you have any questions or need more information please contact me at (847) 294-7436 or by email at Al.Richardson@faa.gov.

Sincerely,

Al Richardson, P.E.
Airport Engineer - Program Manager
Chicago Airports District Office
Al.Richardson@faa.gov
(847) 294-7436

Parcel Information

2

Owner	STATE OF WISCONSIN
Tax Key	WAKC0947001and 002
Zoning	N/A
Land Use	TRANS. - WISDOT DMV FACILITY
Parcel Acres	12.04
Existing RPZ Acres	**1.82**

4

OwnerName	WAUKESHA RETAIL LLC
Tax Key	WAKC0974008
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - GROCERY & STRIP MALL
Parcel Acres:	10.46
Existing RPZ Acres	**2.96**

7

Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974008
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - STRIP MALL BUSINESSES
Parcel Acres:	10.46
Existing RPZ Acres	**10.46**

8

Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974011
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - UPS STORE
Parcel Acres:	0.94
Existing RPZ Acres	**0.94**

9

Owner	M B REAL ESTATE
Tax Key	WAKC0974012001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK
Parcel Acres:	1.10
Existing RPZ Acres	**0.78**

10

Owner	SHIV HOTEL CORPORATION
Tax Key	WAKC0974015
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - HOTEL PARKING
Parcel Acres:	0.09
Existing RPZ Acres	**0.09**

11

Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974016
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - TIRES & AUTO CARE
Parcel Acres:	0.47
Existing RPZ Acres	**0.47**

12

Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974006
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.11
Existing RPZ Acres	**0.42**

13

Owner	SHIV HOTEL CORPORATION
Tax Key	WAKC0974005001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - HOTEL
Parcel Acres:	1.76
Existing RPZ Acres	**1.76**

14

Owner	H & L PROPERTY INVESTMENTS LLC
Tax Key	WAKC0974005
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BATTERIES PLUS STORE
Parcel Acres:	0.44
Existing RPZ Acres	**0.44**

15

Owner	DENNIS HRONIS & PETER HRONIS
Tax Key	WAKC0974004
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.67
Existing RPZ Acres	**1.53**

16

Owner	THE MANDEL-SONNER TRUST
Tax Key	WAKC0974003002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - OIL CHANGE SHOP
Parcel Acres:	0.24
Existing RPZ Acres	**0.04**

17

Owner	DM SCHMIDT ENTERPRISES LLC
Tax Key	WAKC0974003001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - GAS STATION
Parcel Acres:	0.96
Existing RPZ Acres	**0.18**

18

Owner	SILVERNAIL PROPERTIES LLC
Tax Key	WAKC097399 1002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.67
Existing RPZ Acres	**1.67**

19

Owner 1	WILLIAM & MARCIA HOHNSTEIN
Owner 2	VENTURE TWO LLC
Tax Key 1 and 2	WAKC0973005001and 5002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK & ACCOUNTING
Parcel Acres:	3.45
Existing RPZ Acres	**3.45**

20

Owner	M EI SHANG & WEI SHING TSAO
Tax Key	WAKC0973003
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.12
Existing RPZ Acres	**1.12**

21

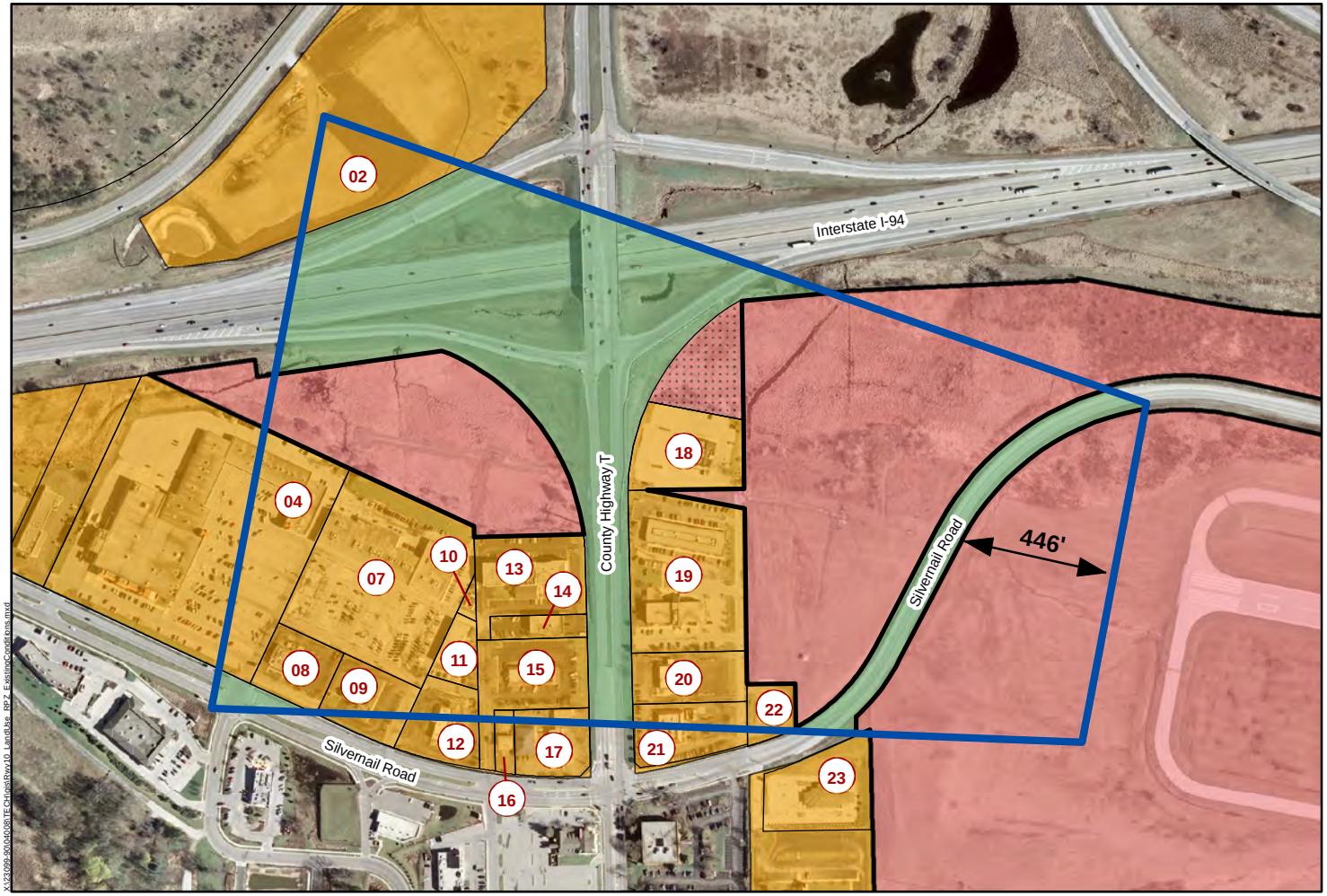
Owner	THE ROAD REAL ESTATE LLC
Tax Key	WAKC0973001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.20
Existing RPZ Acres	**0.53**

22

Owner 1	JOHN M FITZGERALD
Owner 2	JOHN S MARESH
Tax Key	WAKC0973002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK
Parcel Acres:	0.50
Existing RPZ Acres	**0.43**

23

Owner	PRIME FINANCIAL CREDIT UNION
Tax Key	WAKC0973007001
Zoning	B-4 OFFICE AND PROFESSIONAL BUSINESS
Land Use	COMMERCIAL/UNUSED OR OPEN
Parcel Acres:	1.61
Existing RPZ Acres	**0.004**



WAUKESHA COUNTY AIRPORT

RUNWAY 10 PROTECTION ZONE

EXISTING CONDITIONS

MAP KEY

- RUNWAY PROTECTION ZONE
- AIRPORT OWNERSHIP BOUNDARY
- PARCEL BOUNDARY
- FEE SIMPLE COUNTY
- FEE SIMPLE CITY
- AVIGATION EASEMENT
- TRANSPORTATION RIGHT-OF-WAY
- 18 PARCEL MAP NUMBER

RPZ = Runway Protection Zone

Base Map - NAIP, 2010

Parcel and Land Use Data - Waukesha County, current Department of Parks & Land Use Land Information System

Zoning Data - City of Waukesha Official Zoning Map, 2008

0 500 1,000

Feet

N

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Parcel Information

1	
Owner	GENERAL ELECTRIC COMPANY
Tax Key	WAKC0947999
Zoning	M-2 GENERAL MANUFACTURING
Land Use	UNUSED OR OPEN
Parcel Acres	180.99
Future RPZ Acres	0.17

2	
OwnerName	STATE OF WISCONSIN
Tax Key	WAKC0947001and 002
Zoning	N/A
Land Use	TRANSPORTATION - DMV FACILITY
Parcel Acres:	12.04
Future RPZ Acres	4.29

3	
Owner	HAWK REALTY III LLP
Tax Key	WAKC0974007
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL/WETLANDS - CAR WASH
Parcel Acres:	1.97
Future RPZ Acres	0.02

4	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974008
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - GROCERY & STRIP MALL
Parcel Acres:	10.46
Future RPZ Acres	9.44

5	
Owner	GARBER PROPERTIES INC
Tax Key	WAKC0974082
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - STRIP MALL BUSINESSES
Parcel Acres:	1.53
Future RPZ Acres	0.23

6	
Owner	SCP 2006-C23-119 LLC
Tax Key	WAKC0974081
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - CVS PHARMACY
Parcel Acres:	2.31
Future RPZ Acres	0.11

7	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974008
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - STRIP MALL BUSINESSES
Parcel Acres:	10.46
Future RPZ Acres	10.46

8	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974011
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - UPS STORE
Parcel Acres:	0.94
Future RPZ Acres	0.81

9	
Owner	M B REAL ESTATE
Tax Key	WAKC0974012001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK
Parcel Acres:	1.10
Future RPZ Acres	0.42

10	
Owner	SHIV HOTEL CORPORATION
Tax Key	WAKC0974015
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - HOTEL PARKING
Parcel Acres:	0.09
Future RPZ Acres	0.09

11	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974016
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - TIRES / AUTO CARE
Parcel Acres:	0.47
Future RPZ Acres	0.47

12	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974006
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.11
Future RPZ Acres	0.16

13	
Owner	SHIV HOTEL CORPORATION
Tax Key	WAKC0974005001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - HOTEL
Parcel Acres:	1.76
Future RPZ Acres	1.76

14	
Owner	H & L PROPERTY INVESTMENTS LLC
Tax Key	WAKC0974005
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BATTERIES PLUS STORE
Parcel Acres:	0.44
Future RPZ Acres	0.44

15	
Owner 1	DENNIS HRONIS & PETER HRONIS
Tax Key 1 and 2	WAKC0974004
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.67
Future RPZ Acres	1.32

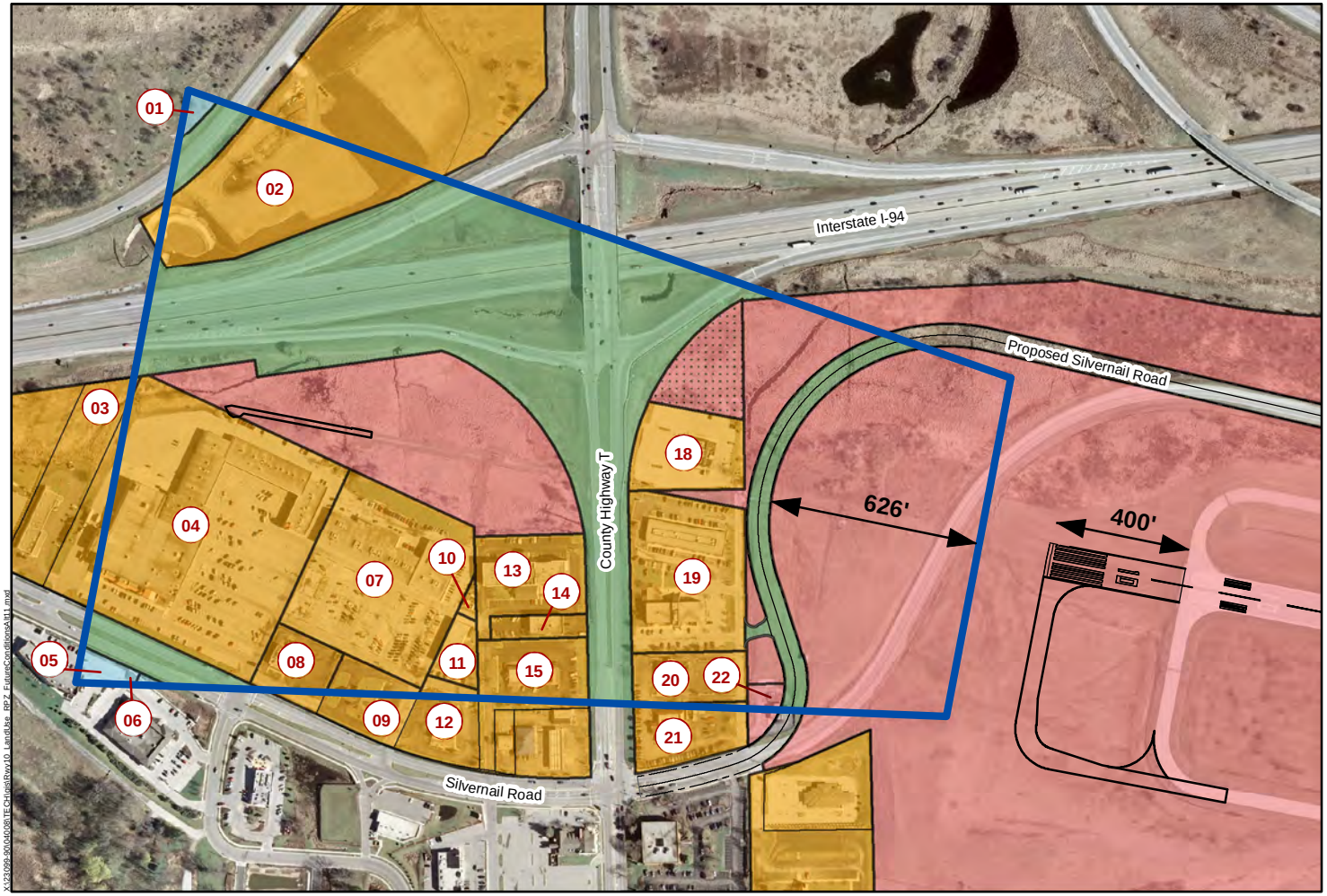
18	
Owner	SILVERNAIL PROPERTIES LLC
Tax Key	WAKC0973991002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.67
Future RPZ Acres	1.67

19	
Owner 1	WILLIAM & MARCIA HOHNSTEIN
Owner 2	VENTURE TWO LLC
Tax Key 1 and 2	WAKC0973005001and 5002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK & ACCOUNTING
Parcel Acres:	3.45
Existing RPZ Acres	3.45

20	
Owner 1	MEI SHANG & WEI SHING TSAO
Tax Key	WAKC0973003
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.12
Future RPZ Acres	1.12

21	
Owner	THE ROAD REAL ESTATE LLC
Tax Key	WAKC0973001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.20
Future RPZ Acres	0.08

22	
Owner 1	JOHN M FITZGERALD
Owner 2	JOHN S MARESH
Tax Key	WAKC0973002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK
Parcel Acres:	0.50
Future RPZ Acres	0.18



WAUKESHA COUNTY AIRPORT

RUNWAY 10 PROTECTION ZONE

FUTURE CONDITIONS ALTERNATIVE 11

MAP KEY

- RUNWAY PROTECTION ZONE
- AIRPORT OWNERSHIP BOUNDARY
- PARCEL BOUNDARY
- FEE SIMPLE COUNTY
- FEE SIMPLE CITY
- AVIGATION EASEMENT
- TRANSPORTATION RIGHT-OF-WAY
- NEW PROPERTIES WITHIN RPZ
- 18 PARCEL MAP NUMBER

RPZ = Runway Protection Zone

Base Map - NAIP, 2010
Parcel and Land Use Data - Waukesha County, current
Department of Parks & Land Use Land Information System
Zoning Data - City of Waukesha Official Zoning Map, 2008

0 500 1,000
Feet

N

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Parcel Information

2	
Owner	STATE OF WISCONSIN
Tax Key	WAKC0947001and 002
Zoning	N/A
Land Use	TRANS. - WISDOT DMV FACILITY
Parcel Acres	12.04
Existing RPZ Acres	**1.82**

9	
Owner	M B REAL ESTATE
Tax Key	WAKC0974012001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK
Parcel Acres:	1.10
Existing RPZ Acres	**0.78**

13	
Owner	SHIV HOTEL CORPORATION
Tax Key	WAKC0974005001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - HOTEL
Parcel Acres:	1.76
Existing RPZ Acres	**1.76**

17	
Owner	DM SCHMIDT ENTERPRISES LLC
Tax Key	WAKC0974003001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - GAS STATION
Parcel Acres:	0.96
Existing RPZ Acres	**0.18**

21	
Owner	THE ROAD REAL ESTATE LLC
Tax Key	WAKC0973001
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.20
Existing RPZ Acres	**0.53**

4	
OwnerName	WAUKESHA RETAIL LLC
Tax Key	WAKC0974008
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - GROCERY & STRIP MALL
Parcel Acres:	10.46
Existing RPZ Acres	**2.96**

10	
Owner	SHIV HOTEL CORPORATION
Tax Key	WAKC0974015
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - HOTEL PARKING
Parcel Acres:	0.09
Existing RPZ Acres	**0.09**

14	
Owner	H & L PROPERTY INVESTMENTS LLC
Tax Key	WAKC0974005
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BATTERIES PLUS
Parcel Acres:	0.44
Existing RPZ Acres	**0.44**

18	
Owner	SILVERNAIL PROPERTIES LLC
Tax Key	WAKC0973991002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.67
Existing RPZ Acres	**1.67**

22	
Owner 1	JOHN M FITZGERALD
Owner 2	JOHN S MARESH
Tax Key	WAKC0973002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK
Parcel Acres:	0.50
Existing RPZ Acres	**0.28**

7	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974008
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - STRIP MALL BUSINESSES
Parcel Acres:	10.46
Existing RPZ Acres	**10.46**

11	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974016
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - TIRES & AUTO CARE
Parcel Acres:	0.47
Existing RPZ Acres	**0.47**

15	
Owner	DENNIS HRONIS & PETER HRONIS
Tax Key	WAKC0974004
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.67
Existing RPZ Acres	**1.53**

19	
Owner 1	WILLIAM & MARCIA HOHNSTEIN
Owner 2	VENTURE TWO LLC
Tax Key 1 and 2	WAKC0973005001and 5002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - BANK & ACCOUNTING
Parcel Acres:	3.45
Existing RPZ Acres	**3.45**

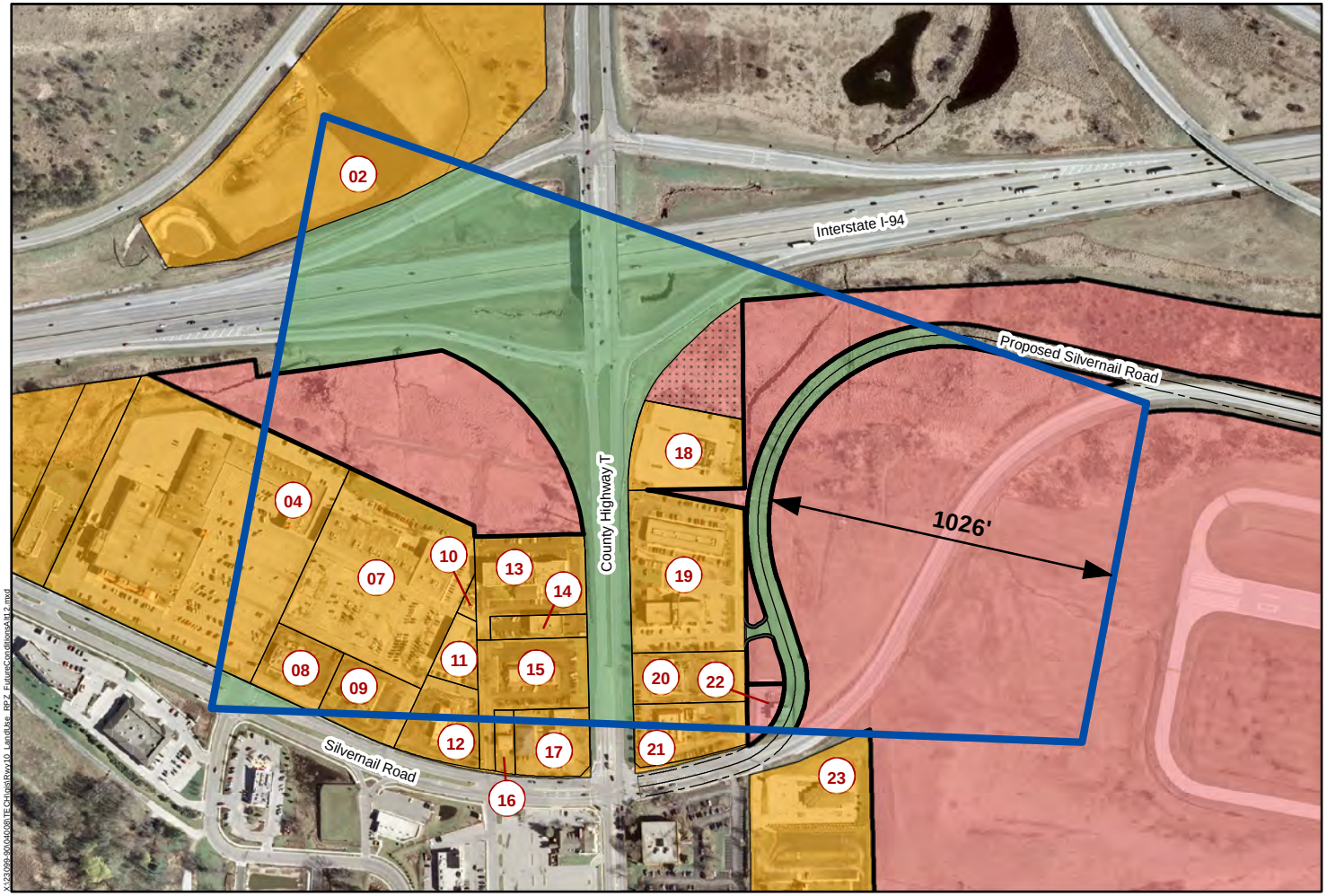
23	
Owner	PRIME FINANCIAL CREDIT UNION
Tax Key	WAKC0973007001
Zoning	B-4 OFFICE AND PROFESSIONAL BUSINESS
Land Use	COMMERCIAL/UNUSED OR OPEN
Parcel Acres:	1.61
Existing RPZ Acres	**0.004**

8	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974011
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - UPS STORE
Parcel Acres:	0.94
Existing RPZ Acres	**0.94**

12	
Owner	WAUKESHA RETAIL LLC
Tax Key	WAKC0974006
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.11
Existing RPZ Acres	**0.42**

16	
Owner	THE MANDEL-SONNER TRUST
Tax Key	WAKC0974003002
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - OIL CHANGE SHOP
Parcel Acres:	0.24
Existing RPZ Acres	**0.04**

20	
Owner	MEI SHANG & WEI SHING TSAO
Tax Key	WAKC0973003
Zoning	B-5 COMMUNITY BUSINESS
Land Use	COMMERCIAL - RESTAURANT
Parcel Acres:	1.12
Existing RPZ Acres	**1.12**



WAUKESHA COUNTY AIRPORT

RUNWAY 10 PROTECTION ZONE

FUTURE CONDITIONS ALTERNATIVE 12

MAP KEY

- RUNWAY PROTECTION ZONE
- AIRPORT OWNERSHIP BOUNDARY
- PARCEL BOUNDARY
- FEE SIMPLE COUNTY
- FEE SIMPLE CITY
- AVIGATION EASEMENT
- TRANSPORTATION RIGHT-OF-WAY
- 18 PARCEL MAP NUMBER

RPZ = Runway Protection Zone

Base Map - NAIP, 2010

Parcel and Land Use Data - Waukesha County, current
Department of Parks & Land Use Land Information System

Zoning Data - City of Waukesha Official Zoning Map, 2008

0 500 1,000

Feet

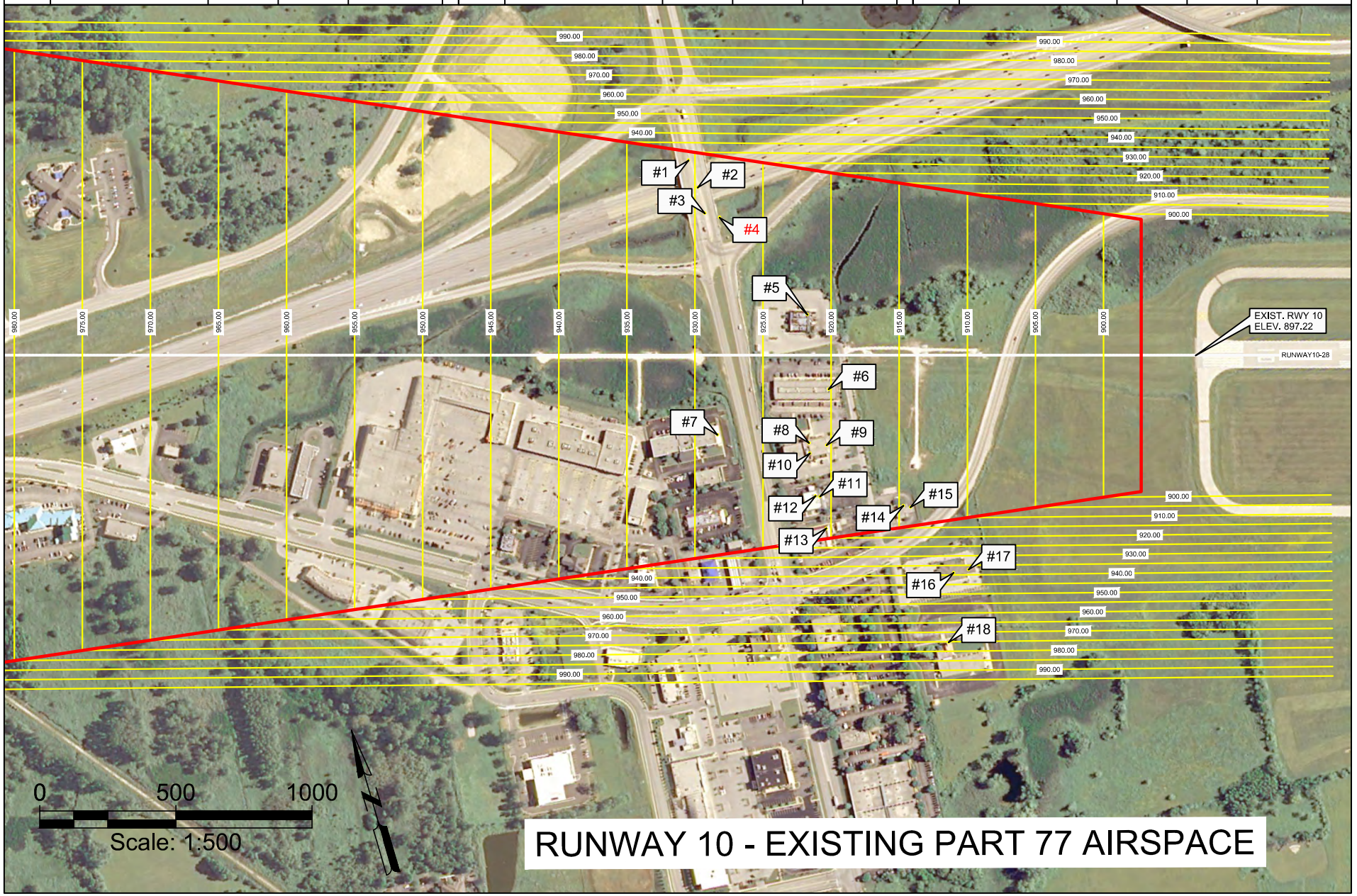
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POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARNACE
1	OVERPASS ROAD ELEV.	897.85	930.47	32.62'
2	OVERPASS ROAD ELEV.	897.52	929.80	32.28'
3	OVERPASS ROAD ELEV.	896.41	929.27	32.86'
4	HIGHWAY CAMERA ELEV.	944.60	928.20	-16.40'
5	RESTAURANT ROOF ELEV.	896.33	921.74	25.41'
6	BLDNG. ROOF ELEV.	896.84	920.18	23.34'

POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARNACE
7	HOTEL ROOF ELEV.	913.52	928.34	14.82'
8	BLDNG. ROOF ELEV.	911.53	921.61	10.08'
9	BLDNG. ROOF ELEV.	905.88	920.33	14.45'
10	BLDNG. AC UNIT ELEV.	913.24	921.56	8.32'
11	RESTAURANT ROOF ELEV.	900.96	920.82	19.86'
12	BLDNG. AC UNIT ELEV.	903.43	921.14	17.71'

POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARNACE
13	RESTAURANT ROOF ELEV.	901.78	920.36	18.58'
14	BANK ROOF ELEV.	905.43	914.69	9.26'
15	BANK ROOF ELEV.	905.56	914.16	8.60'
16	BLDNG. ROOF ELEV.	927.98	938.84	10.86'
17	BLDNG. ROOF ELEV.	923.06	937.24	14.18'
18	CHURCH ROOF ELEV.	952.30	975.38	23.08'

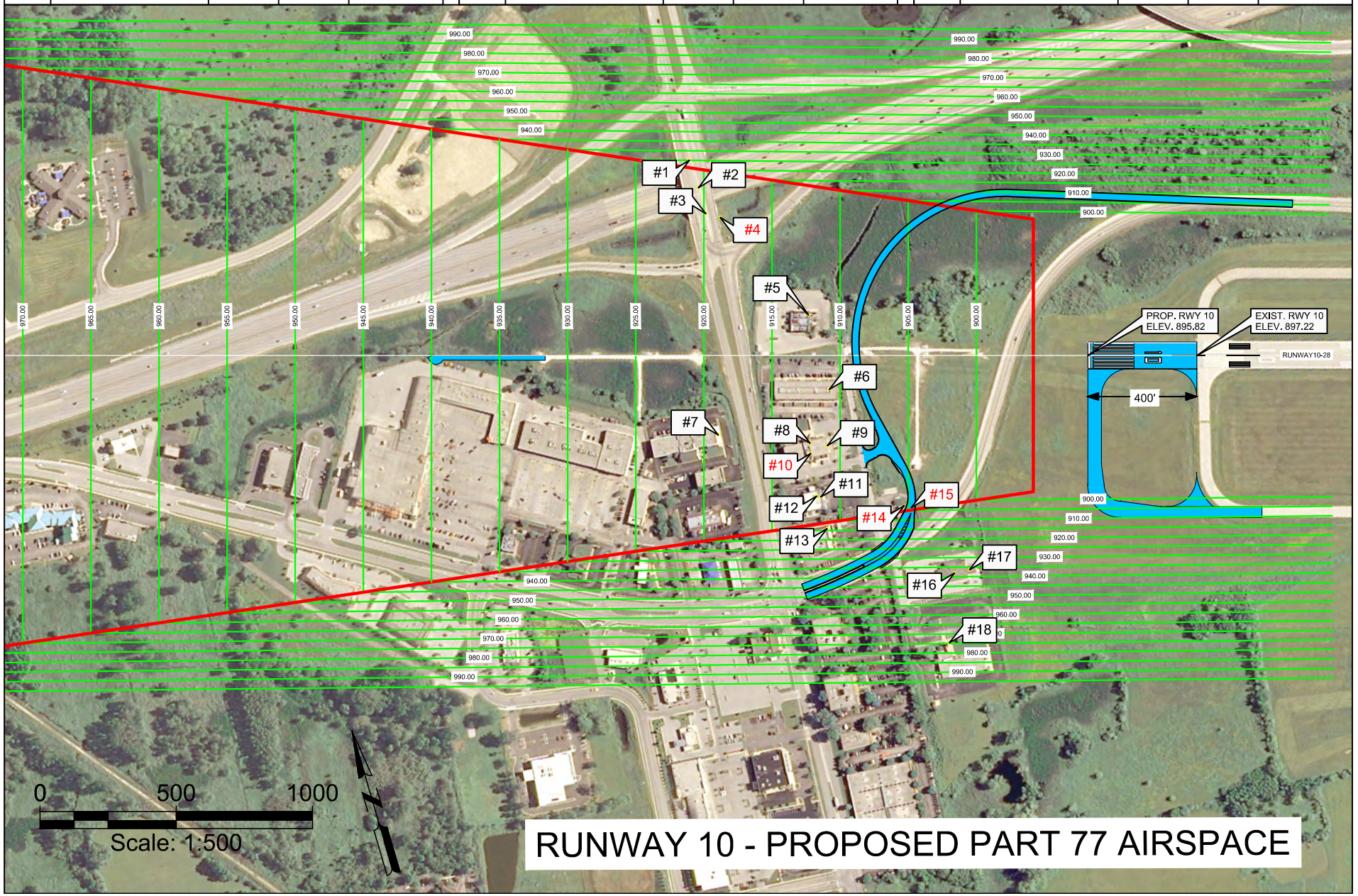


RUNWAY 10 - EXISTING PART 77 AIRSPACE

POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARNACE
1	OVERPASS ROAD ELEV.	897.85	925.00	27.15'
2	OVERPASS ROAD ELEV.	897.52	920.40	22.88'
3	OVERPASS ROAD ELEV.	896.41	919.87	23.46'
4	HIGHWAY CAMERA ELEV.	944.60	918.79	-25.81'
5	RESTAURANT ROOF ELEV.	896.33	912.33	16.00'
6	BLDNG. ROOF ELEV.	896.84	910.82	13.98'

POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARNACE
7	HOTEL ROOF ELEV.	913.52	918.94	5.42'
8	BLDNG. ROOF ELEV.	911.53	912.21	0.68'
9	BLDNG. ROOF ELEV.	905.88	910.93	5.05'
10	BLDNG. AC UNIT ELEV.	913.24	912.16	-1.08'
11	RESTAURANT ROOF ELEV.	900.96	911.42	10.46'
12	BLDNG. AC UNIT ELEV.	903.43	911.74	8.31'

POINT NO.	POINT DESCRIPTION	POINT ELEV.	PART 77 ELEV.	CLEARNACE
13	RESTAURANT ROOF ELEV.	901.78	914.08	12.30'
14	BANK (to be acquired / relocated)	905.43	905.29	0.14'
15	BANK (to be acquired / relocated)	905.56	904.76	0.80'
16	BLDNG. ROOF ELEV.	927.98	938.01	10.03'
17	BLDNG. ROOF ELEV.	923.06	936.41	13.35'
18	CHURCH ROOF ELEV.	952.30	974.55	22.25'



Appendix H. Construction Cost Estimates & Life-Cycle Cost Analyses

Runway 10/28 Safety Area Alternative Cost Estimates

Alternatives for Runway 10 RSA (West End)		Runway End Safety Area Construction[3]	Runway Side Safety Area Construction[4]	Land Acquisition	Relocations	Subtotal	15% Contingency	Total Initial Cost[1]
W1	No Action	$ -	$ -	$ -	$ -	$ -	$ -	$ -
W2	Continue Waiver	$ -	$ -	$ -	$ -	$ -	$ -	$ -
W3	Close Silvernail	$ 2,257,952	$ 847,715	$ 600,000	$ -	$ 3,705,667	$ 555,850	$ 4,261,517
W4	Realign Silvernail	$ 2,628,804	$ 847,715	$ 600,000	$ 400,000	$ 4,476,519	$ 671,478	$ 5,147,997
W5	Tunnel Silvernail	$ 9,970,094	$ 847,715	$ -	$ -	$ 10,817,809	$ 1,622,671	$ 12,440,480
W6	Shift Runway East 490 feet[2]	$ 21,652,495	$ 1,640,430	$ 8,600,000	$ 7,600,000	$ 39,492,925	$ 5,923,939	$ 45,416,864
W7	Shorten Runway 490' from West	$ 2,537,966	$ 847,715	$ -	$ -	$ 3,385,681	$ 507,852	$ 3,893,533
W8	Declared Distances for Rwy 10	$ 350,048	$ 847,715	$ -	$ -	$ 1,197,763	$ 179,664	$ 1,377,427
W9	EMAS for Runway 10	$ 5,421,424	$ 847,715	$ -	$ -	$ 6,269,139	$ 940,371	$ 7,209,510
W10	Declared Distances w/Pavement Rwy 10	$ 3,441,475	$ 847,715	$ -	$ -	$ 4,289,190	$ 643,379	$ 4,932,569
W11	Realign Silvernail & Extend Rwy 10	$ 6,173,117	$ 847,715	$ 600,000	$ 400,000	$ 8,020,832	$ 1,203,125	$ 9,223,956
W12	Realign Silvernail	$ 2,695,794	$ 847,715	$ 540,000	$ 400,000	$ 4,483,509	$ 672,526	$ 5,156,035

Alternatives for Runway 28 RSA (East End)		Runway End Safety Area Construction[3]	Runway Side Safety Area Construction[4]	Land Acquisition	Relocations	Subtotal	15% Contingency	Total Initial Cost[1]
E1	No Action	$ -	$ -	$ -	$ -	$ -	$ -	$ -
E2	Continue Waiver	$ -	$ -	$ -	$ -	$ -	$ -	$ -
E3	Close Pewaukee	$ 4,161,067	$ 847,715	$ 10,000,000	$ -	$ 15,008,782	$ 2,251,317	$ 17,260,099
E4	Realign Pewaukee	$ 4,370,302	$ 847,715	$ 4,750,000	$ 4,250,000	$ 14,218,017	$ 2,132,702	$ 16,350,719
E5	Tunnel Pewaukee	$ 18,783,330	$ 847,715	$ 2,500,000	$ -	$ 22,131,045	$ 3,319,657	$ 25,450,702
E6	Shift Runway West 375 feet[2]	$ 12,445,947	$ 1,640,430	$ 7,400,000	$ 7,400,000	$ 28,886,377	$ 4,332,957	$ 33,219,333
E7	Shorten Runway 375' from East	$ 1,381,718	$ 847,715	$ -	$ -	$ 2,229,433	$ 334,415	$ 2,563,848
E8	Declared Distances for Rwy 28	$ 370,530	$ 847,715	$ -	$ -	$ 1,218,245	$ 182,737	$ 1,400,981
E9	EMAS for Runway 28	$ 5,682,343	$ 847,715	$ -	$ -	$ 6,530,058	$ 979,509	$ 7,509,566
E10	Delcared Distances w/Pavement Rwy 28	$ 5,381,300	$ 847,715	$ -	$ -	$ 6,229,015	$ 934,352	$ 7,163,368
E11	Relocate Localizer, Grading, Per. Road	$ 1,714,324	$ 847,715	$ -	$ -	$ 2,562,039	$ 384,306	$ 2,946,344
E12	EMAS for Runway 28	$ 5,682,343	$ 847,715	$ -	$ -	$ 6,530,058	$ 979,509	$ 7,509,566

[1] Costs for wetland mitigation are yet to be determined and will vary with level of mitigation required; Rough estimates assume $10K/acre, but are not included in these totals.

[2] The runway shift alternatives would resolve RSA issues at both ends of Runway 10/28 and assumes construction of a tunnel for the roadway at the end that the runway is shifted toward. Costs should be compared accordingly.

20-Year Life Cycle Cost Analysis of RSA (Ends) Alternatives

Alternative Number	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Description of West End Alternatives (Runway 10 Approach)	No Action	Request Continuance of FAA Waiver	Close Silvernail Road	Realign Silvernail Road	Tunnel Silvernail Road	Shift Runway 10/28 East, Tunnel Pewaukee Rd	Shorten Runway 10/28 From the West	Establish Declared Distances for Runway 10	Construct EMAS	Lengthen Runway 10 with Declared Distances	Realign Silvernail, Extend Runway 10	Realign Silvernail Road
Present Value of Initial Capital Cost ($P_{initial}$)	$ -	$ -	$ 4,261,517	$ 5,147,997	$ 12,440,480	$ 45,416,864	$ 3,893,533	$ 1,377,427	$ 7,209,510	$ 4,932,569	$ 9,223,956	$ 5,156,035
Present Value of Future Replacement Cost (P_{repl})	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,982,562	$ -	$ -	$ -
$P_{repl} = F/(1+i)^n$												
F = Future Replacement Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,900,000	$ -	$ -	$ -
Present Value of Future Maintenance and Inspection Cost (P_{maint})	$ 344,305	$ 344,305	$ 344,305	$ 359,848	$ 556,186	$ 976,768	$ 241,544	$ 344,305	$ 445,376	$ 456,602	$ 481,679	$ 359,848
$P_{maint} = A[((1+i)^n-1)/(i(1+i)^n)]$												
A = Average Annual Inspection and Maintenance Cost	$ 32,500	$ 32,500	$ 32,500	$ 33,967	$ 52,500	$ 92,200	$ 22,800	$ 32,500	$ 45,321	$ 43,100	$ 45,467	$ 33,967
Present Value of Life Cycle Costs (P_{life})	$ 344,305	$ 344,305	$ 4,261,517	$ 5,507,845	$ 12,996,666	$ 46,393,632	$ 4,135,076	$ 1,721,732	$ 9,637,448	$ 5,389,171	$ 9,705,635	$ 5,515,883
$P_{life} = P_{initial} + P_{repl} + P_{maint}$												

Alternative Number	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
Description of East End Alternatives (Runway 28 Approach)	No Action	Request Continuance of FAA Waiver	Close Pewaukee Road (CTH J)	Realign Pewaukee Road (CTH J)	Tunnel Pewaukee Road (CTH J)	Shift Runway 10/28 West, Tunnel Silvernail Rd	Shorten Runway 10/28 From the East	Establish Declared Distances for Runway 28	Construct EMAS, Relocate Localizer	Lengthen Runway 28 with Declared Distances	Relocate Localizer, Grading, Per. Road	Construct EMAS, Relocate Localizer
Present Value of Initial Capital Cost ($P_{initial}$)	$ -	$ -	$ 17,260,099	$ 16,350,719	$ 25,450,702	$ 33,219,333	$ 2,563,848	$ 1,400,981	$ 7,509,566	$ 7,163,368	$ 2,946,344	$ 7,509,566
Present Value of Future Replacement Cost (P_{repl})	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,626,718	$ -	$ -	$ 1,626,718
$P_{repl} = F/(1+i)^n$												
F = Future Replacement Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,200,000	$ -	$ -	$ 3,200,000
Present Value of Future Maintenance and Inspection Cost (P_{maint})	$ 344,305	$ 344,305	$ 344,305	$ 368,930	$ 636,700	$ 930,154	$ 327,355	$ 344,305	$ 415,702	$ 625,013	$ 359,555	$ 455,871
$P_{maint} = A[((1+i)^n-1)/(i(1+i)^n)]$												
A = Average Annual Inspection and Maintenance Cost	$ 32,500	$ 32,500	$ 32,500	$ 34,824	$ 60,100	$ 87,800	$ 30,900	$ 32,500	$ 42,301	$ 63,600	$ 36,588	$ 46,389
Present Value of Life Cycle Costs (P_{life})	$ 344,305	$ 344,305	$ 17,260,099	$ 16,719,649	$ 26,087,402	$ 34,149,488	$ 2,891,203	$ 1,745,287	$ 9,551,986	$ 7,788,381	$ 3,305,899	$ 9,592,155
$P_{life} = P_{initial} + P_{repl} + P_{maint}$												
Total Combined Present Value of Life Cycle Cost (East & West):	**$ 688,611**	**$ 688,611**	**$ 21,521,616**	**$ 22,227,494**	**$ 39,084,068**	**$ 34,149,488**	**$ 7,026,280**	**$ 3,467,019**	**$ 19,189,434**	**$ 13,177,552**	**$ 13,011,534**	**$ 15,108,039**

Notes:

1. Life Cycle Cost analysis is based on procedure outlined in FAA Order 5200.9,*Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems.*
2. i = 7% = discount rate applied to calculate the time value of money per FAA Order 5200.9
3. n = number of interest periods
4. Roadway maintenance costs are based on $5,833 per lane mile according to*Waukesha County Capital Projects Operating Impact.*
5. Roadway maintenance costs reflect a net increase/decrease in lane miles from existing roadway alignments.
6. Tunnel maintenance costs are from Mead & Hunt, Inc. and are based on similar projects.
7. EMAS maintenance and inspection costs are based on $1/square foot/3 year estimate containted in FAA Order 5200.9
8. Maintenance costs resulting from improvements to surrounding roadway to accommodate diverted traffic due to a roadway closure could vary greatly depending on options chosen for each end of Runway 10/28. However, additional pavement on surrounding roadways as a result of this alternative would be expected to be relatively insignificant as compared to the initial capital cos required to purchase right-of-way and construct roadway improvements to accommodate diverted traffic.
9. Airfield concrete pavement maintenance costs are based on Waukesha County Airport pavement maintenance expenditures and Life Cycle Cost analyses completed at similar airports. Annual Maintenance Cost assumes $1.00/sy for new pavements to be added, and -$0.49/sy for pavements to be removed.

Comparison of Alternate Existing Airport Facilites & Cost to equal those of Waukesha County Airport

	Runway - Primary									
	Length (Feet)	Width (Feet)	(S.Y.)	*Cost*	Edge Lights / Intensity	*Cost*	Approach Lighting	*Cost*	PAPI / VASI	*Cost*
Waukesha County (UES)	5,848	100	64,978		High		MALSR		2	
East Troy (57C)	3,900	75	32,500	$2,652,389	Medium	$331,400	None	$600,000	1	$24,000
Timmerman (MWC)	4,103	75	34,192	$84,219,200	Medium	$333,430	None	$600,000	2	$0
Capitol Airport (02C)	3,501	44	17,116	$2,912,847	Medium	$327,410	None	$600,000	0	$48,000

	Runway - Crosswind									
	Length (Feet)	Width (Feet)	(S.Y.)	*Cost*	Edge Lights / Intensity	*Cost*	Approach Lighting	*Cost*	PAPI / VASI	*Cost*
	3,598	75	269,850		Medium		None		2	
	Turf	Turf	0	$2,398,667	Reflectors	$161,910	None		0	$48,000
	3,201	75	240,075	$264,667	Medium	$15,880	None		2	$0
	Turf	Turf	0	$2,398,667	None	$128,040	None		0	$48,000

	Taxiway - Primary					
	Length (Feet)	Width (Feet)	(S.Y.)	*Cost*	Edge Lights / Intensity	*Cost*
Waukesha County (UES)	5,848	40	25,991		Medium	
East Troy (57C)	3,900	35	15,167	$811,833	Medium	$77,920
Timmerman (MWC)	4,103	35	15,956	$752,625	Medium	$69,800
Capitol Airport (02C)	3,501	20	7,780	$1,365,833	None	$233,920

	Taxiway - Crosswind					
	Length (Feet)	Width (Feet)	(S.Y.)	*Cost*	Edge Lights / Intensity	*Cost*
	3,600	40	16,000			
	0	0	0	$1,200,000	None	$144,000
	3,201	35	12,448	$266,375	Medium	$15,960
	0	0	0	$1,200,000	None	$144,000

Ramp Space		
Ramp Areas	(S.Y.)	*Cost*
3	36,827	
1	24,028	$959,917
2	34,300	$189,500
1	2,222	$2,595,333

Auto Parking		
Number of Stalls	(S.Y.)	*Cost*
98		
55		$47,300
150		$0
12		$94,600

	Air Traffic Control Tower	
		Cost
Waukesha County (UES)	Yes	
East Troy (57C)	No	$2,931,245
Timmerman (MWC)	Yes	$0
Capitol Airport (02C)	No	$2,931,245

	Instrument Landing System (ILS)			
Glideslope	*Cost*	*Localizer*	*Cost*
Yes		Yes	
No	350,000	No	$200,000
No	350,000	Yes	$0
No	350,000	No	$200,000

	Weather Reporting	
		Cost
	AWOS	
	No	$110,000
	AWOS	$0
	No	$110,000

Approach Capability	
Visibility Minimums	*Cost*
1/2-mile	
1-Mile	$4,895,200
1-Mile	$79,125,000
Visual	$2,465,200

	Fueling Facilities		
	100 LL	*Jet A*	*Cost*
Waukesha County (UES)	Yes	Yes	
East Troy (57C)	Yes	Yes	$0
Timmerman (MWC)	Yes	Yes	$0
Capitol Airport (02C)	Yes	No	$250,000

Aircraft Storage	
Hangar s.f.	*Cost*
460,500	$41,445,000
187,000	$24,615,000
151,670	$27,794,700
75,460	$34,653,600

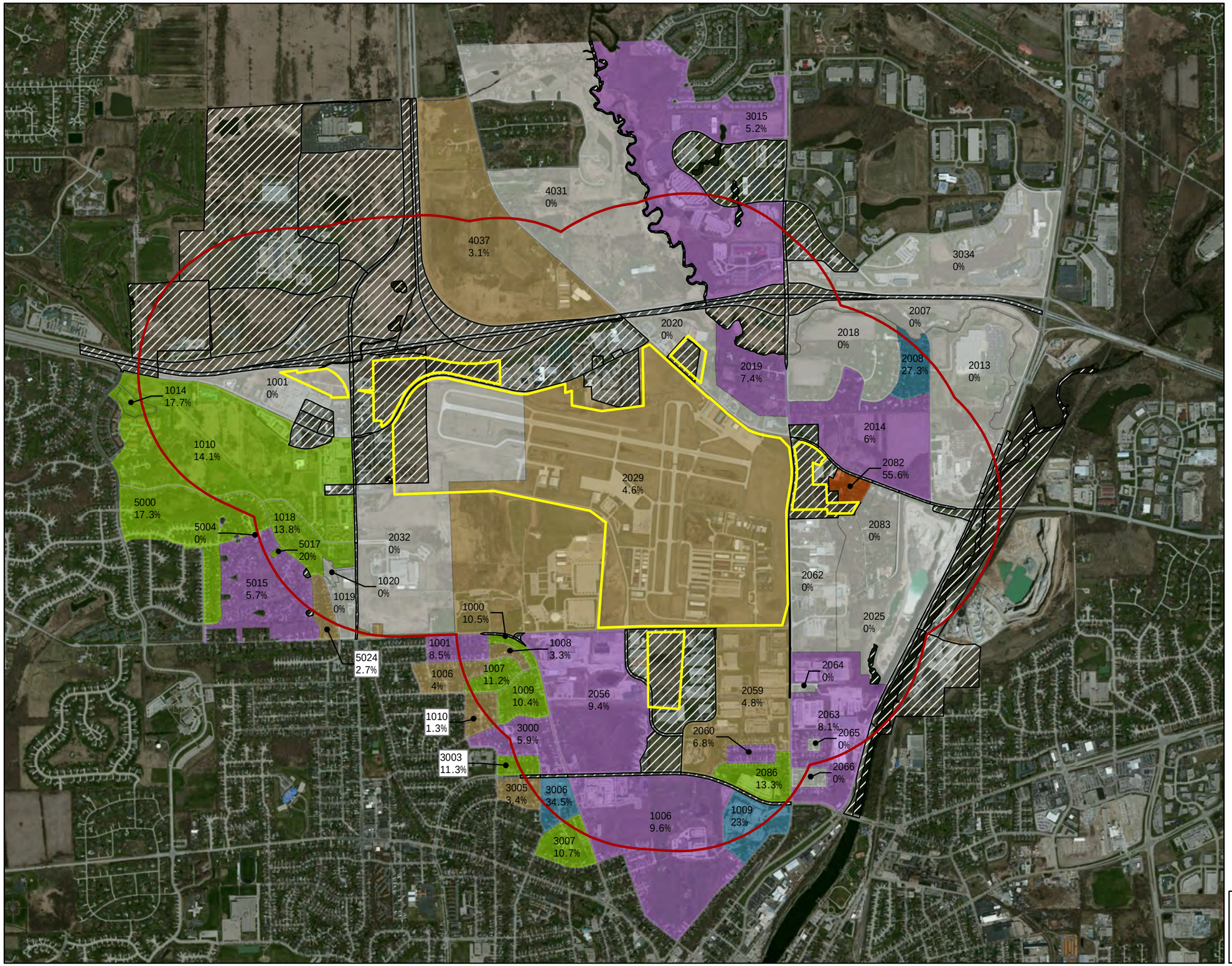
Heigh Limitation Zoning	
	Cost
Yes	
Yes	$0
Yes	$0
No	$62,500

Wildlife Hazard Assessment	
	Cost
Yes	
No	$30,000
Yes	$0
No	$30,000

Storm Water Management Plan	
	Cost
Yes	
No	$10,000
Yes	$0
No	$10,000

Appendix I. Census Data

WAUKESHA COUNTY AIRPORT
SAFETY AREA IMPROVEMENT
ENVIRONMENTAL ASSESSMENT
Waukesha County, Wisconsin



Legend

- Property Line
- 1/2 Mile Buffer
- Not Populated

Percent Non-White of Total Population

Percent

- No Minorities
- 0.1 - 5.0
- 5.1 - 10.0
- 10.1 - 20.0
- 20.1 - 35.0
- 35.1 - 60.0

Map Label Explanation

2029
4.6%

2029 = Census Block Number
4.6% = Percent of total population in block that falls into one of the race categories described below.

* Total Non-White population consists of Black/African American, American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander/Some Other Race alone, and Two or more Races categories under population subjects summarized to the block level. Hispanic populations are not included in these percentages.

N

0 380 760 1,520 2,280 3,040
Feet

FIGURE I-1
DEMOGRAPHIC DISTRIBUTION (2010)

Data Sources:
2010 US Census Bureau summary file, Waukesha County.

Image Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Block Number	Total Pop.	White	% White	Non-White	% Non-White	Black	% Black	American Indian	% American Indian	Asian	% Asian	Hawaiian or Pacific Islander	% Hawaiian or Pacific Islander	Other Race	% Other	Two or More Races	% Two or More Races	Hispanic	% Hispanic (a)
551332030001006	376	340	90%	36	9.6%	14	3.7%	2	0.5%	3	0.8%	0	0%	10	2.7%	7	1.9%	31	8.2%
551332030001009	504	388	77%	116	23.0%	105	20.8%	3	0.6%	3	0.6%	0	0%	2	0.4%	3	0.6%	30	6.0%
551332030002007	3	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002008	33	24	73%	9	27.3%	0	0%	0	0%	0	0%	0	0%	7	21.2%	2	6.1%	9	27.3%
551332030002013	3	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002014	67	63	94%	4	6.0%	0	0%	0	0%	0	0%	0	0%	4	6.0%	0	0%	7	10.4%
551332030002018	57	57	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002019	27	25	93%	2	7.4%	0	0%	0	0%	0	0%	0	0%	0	0%	2	7.4%	0	0%
551332030002020	11	11	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002025	19	19	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002029	216	206	95%	10	4.6%	8	3.7%	1	0.5%	1	0.5%	0	0%	0	0%	0	0%	6	2.8%
551332030002032	4	4	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002056	191	173	91%	18	9.4%	0	0%	0	0%	12	6.3%	0	0%	6	3.1%	0	0%	11	5.8%
551332030002059	63	60	95%	3	4.8%	1	1.6%	0	0%	0	0%	0	0%	1	1.6%	1	1.6%	5	7.9%
551332030002060	73	68	93%	5	6.8%	0	0%	0	0%	0	0%	0	0%	3	4.1%	2	2.7%	7	9.6%
551332030002062	7	7	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002063	160	147	92%	13	8.1%	1	0.6%	0	0%	4	2.5%	0	0%	8	5.0%	0	0%	29	18.1%
551332030002064	9	9	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	2	22.2%
551332030002065	10	10	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002066	57	57	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002082	9	4	44%	5	55.6%	5	55.6%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002083	20	20	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332030002086	113	98	87%	15	13.3%	1	0.9%	1	0.9%	2	1.8%	0	0%	8	7.1%	3	2.7%	25	22.1%
551332031011001	3	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332031011010	915	786	86%	129	14.1%	28	3.1%	6	0.7%	64	7.0%	0	0%	9	1.0%	22	2.4%	54	5.9%
551332031011014	141	116	82%	25	17.7%	3	2.1%	0	0%	18	12.8%	0	0%	0	0%	4	2.8%	8	5.7%
551332031011018	298	257	86%	41	13.8%	0	0%	1	0.3%	4	1.3%	0	0%	25	8.4%	11	3.7%	38	12.8%
551332031011019	29	29	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	3.4%
551332031011020	1	1	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%		0%
551332031015000	433	358	83%	75	17.3%	0	0%	0	0%	58	13.4%	0	0%	8	1.8%	9	2.1%	21	4.8%
551332031015004	3	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	33.3%
551332031015015	368	347	94%	21	5.7%	4	1.1%	2	0.5%	6	1.6%	0	0%	0	0%	9	2.4%	20	5.4%
551332031015017	15	12	80%	3	20.0%	0	0%	0	0%	1	6.7%	0	0%	0	0%	2	13.3%	0	0%
551332031015024	75	73	97%	2	2.7%	0	0%	0	0%	0	0%	0	0%	1	1.3%	1	1.3%	2	2.7%
551332031031000	38	34	89%	4	10.5%	2	5.3%	1	2.6%	0	0%	0	0%	0	0%	1	2.6%	6	15.8%
551332031031001	94	86	91%	8	8.5%	0	0%	1	1.1%	0	0%	0	0%	6	6.4%	1	1.1%	14	14.9%
551332031031006	126	121	96%	5	4.0%	0	0%	0	0%	0	0%	0	0%	3	2.4%	2	1.6%	24	19.0%
551332031031007	89	79	89%	10	11.2%	0	0%	0	0%	0	0%	0	0%	10	11.2%	0	0%	13	14.6%
551332031031008	30	29	97%	1	3.3%	0	0%	0	0%	0	0%	0	0%	0	0%	1	3.3%	2	6.7%
551332031031009	106	95	90%	11	10.4%	2	1.9%	1	0.9%	1	0.9%	0	0%	1	0.9%	6	5.7%	4	3.8%
551332031031010	77	76	99%	1	1.3%	0	0.0%	0	0%	0	0%	0	0%	1	1.3%	0	0%	2	2.6%
551332031033000	136	128	94%	8	5.9%	3	2.2%	3	2.2%	2	1.5%	0	0%	0	0%	0	0%	14	10.3%
551332031033003	62	55	89%	7	11.3%	0	0%	5	8.1%	2	3.2%	0	0%	0	0%	0	0%	0	0%
551332031033005	59	57	97%	2	3.4%	0	0%	0	0%	0	0%	0	0%	0	0%	2	3.4%	0	0%
551332031033006	58	38	66%	20	34.5%	0	0%	0	0%	0	0%	0	0%	17	29.3%	3	5.2%	22	37.9%
551332031033007	214	191	89%	23	10.7%	5	2.3%	0	0%	7	3.3%	0	0%	2	0.9%	9	4.2%	33	15.4%
551332033063015	211	200	95%	11	5.2%	1	0.5%	0	0%	8	3.8%	0	0%	1	0.5%	1	0.5%	7	3.3%
551332033063034	1	1	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
551332033064031	40	40	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Totals	**5,686**	**5,042**	**88.7%**	**644**	**11.3%**	**183**	**3.22%**	**28**	**0.5%**	**196**	**3.4%**	**0**	**0%**	**133**	**2.3%**	**104**	**1.8%**	**448**	**7.88%**

Note: (a) Hispanic Population is representative of an Ethnicity and as such overlaps several Races (i.e., White-Hispanic, African American-Hispanic, etc.). Therefore, summing the percentages in these will result in a value over 100%

Source: United States Census Bureau, 2010 Decennial Census, Summary File Block Data.

Profile of General Population and Housing Characteristics: 2010
2010 Census Summary File 1

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see http://www.census.gov/prod/cen2010/doc/sf1.pdf.

	Census Tract 2030, Waukesha County, Wisconsin:	Census Tract 2031.01, Waukesha County, Wisconsin	Census Tract 2031.03, Waukesha County, Wisconsin	Census Tract 2033.06, Waukesha County, Wisconsin
Average household size	2.00	2.45	2.33	2.08
Average family size [1]	2.89	2.97	2.94	2.74

[1] "Family households" consist of a householder and one or more other people related to the householder by birth, marriage, or adoption. They do not include same-sex married couples even if the marriage was performed in a state issuing marriage certificates for same-sex couples. Same-sex couple households are included in the family households category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households. "Nonfamily households" consist of people living alone and households which do not have any members related to the householder.

S1903: MEDIAN INCOME IN THE PAST
2007-2011 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Subject	Census Tract 2030, Waukesha County, Wisconsin				Census Tract 2031.01, Waukesha County, Wisconsin				Census Tract 2031.03, Waukesha County, Wisconsin				Census Tract 2033.06, Waukesha County, Wisconsin			
	Total		Median income (dollars)		Total		Median income (dollars)		Total		Median income (dollars)		Total		Median income (dollars)	
	Estimate	Margin of	Estimate	Margin of	Estimate	Margin of	Estimate	Margin of	Estimate	Margin of	Estimate	Margin of Error	Estimate	Margin of	Estimate	Margin of Error
Households	982	+/-65	45,714	+/-10,977	2,736	+/-89	72,376	+/-4,208	1,915	+/-97	55,905	+/-4,270	2,749	+/-145	64,947	+/-6,052
One race--																
White	91.0%	+/-4.4	48,266	+/-5,590	94.1%	+/-2.5	71,448	+/-4,063	96.1%	+/-2.8	56,332	+/-4,485	93.8%	+/-4.2	63,327	+/-5,911
Black or African American	1.0%	+/-1.6	-	**	2.2%	+/-1.8	61,923	+/-80,244	0.6%	+/-0.7	65,208	+/-56,686	1.2%	+/-1.3	29,500	+/-155,860
American Indian and Alaska Native	0.2%	+/-0.5	-	**	0.0%	+/-0.7	-	**	1.1%	+/-1.2	33,333	+/-68,415	0.0%	+/-0.7	-	**
Asian	1.7%	+/-1.6	250,000+	***	3.7%	+/-1.9	132,946	+/-36,395	0.0%	+/-1.0	-	**	4.9%	+/-3.8	160,571	+/-97,180
Native Hawaiian and Other Pacific	0.0%	+/-2.0	-	**	0.0%	+/-0.7	-	**	0.0%	+/-1.0	-	**	0.0%	+/-0.7	-	**
Some other race	2.7%	+/-3.2	30,515	+/-1,859	0.0%	+/-0.7	-	**	1.1%	+/-1.7	52,188	+/-22,154	0.0%	+/-0.7	-	**
Two or more races	3.3%	+/-3.6	9,239	+/-46,671	0.0%	+/-0.7	-	**	1.0%	+/-1.6	-	**	0.1%	+/-0.2	-	**
Hispanic or Latino origin (of any race)	6.6%	+/-4.7	31,985	+/-41,693	0.5%	+/-0.9	-	**	7.6%	+/-4.1	50,417	+/-34,875	2.3%	+/-2.6	31,831	+/-148,638
White alone, not Hispanic or Latino	87.2%	+/-5.4	47,863	+/-8,203	93.6%	+/-2.7	71,275	+/-4,054	89.6%	+/-4.3	56,941	+/-3,493	91.5%	+/-4.8	63,732	+/-5,750
Average Household size[2]	2.00				2.45				2.33				2.08			
Average family size[1]	2.89				2.97				2.94				2.74			
HOUSEHOLD INCOME BY AGE OF																
15 to 24 years	7.7%	+/-6.1	23,750	+/-74,601	9.0%	+/-4.2	51,570	+/-10,463	3.8%	+/-3.0	27,794	+/-37,556	3.1%	+/-2.2	36,063	+/-65,187
25 to 44 years	29.4%	+/-7.2	68,958	+/-29,443	40.8%	+/-4.9	75,950	+/-14,561	43.3%	+/-4.9	59,833	+/-11,054	37.0%	+/-5.1	68,561	+/-4,872
45 to 64 years	33.9%	+/-5.2	43,281	+/-14,400	34.1%	+/-4.5	101,598	+/-11,680	34.2%	+/-4.2	58,635	+/-3,391	38.3%	+/-4.6	80,141	+/-15,659
65 years and over	28.9%	+/-4.4	27,500	+/-9,654	16.1%	+/-2.4	53,672	+/-15,130	18.7%	+/-1.9	37,328	+/-13,772	21.6%	+/-3.3	41,351	+/-5,368
FAMILIES																
Families	459	+/-69	73,958	+/-14,106	1,805	+/-169	100,731	+/-13,874	1,070	+/-87	66,331	+/-3,425	1,581	+/-192	72,018	+/-14,500
With own children under 18 years	44.7%	+/-10.8	77,083	+/-32,208	44.6%	+/-5.8	101,982	+/-12,224	44.0%	+/-5.0	63,878	+/-8,351	38.5%	+/-7.7	69,219	+/-3,770
With no own children under 18 years	55.3%	+/-10.8	63,438	+/-21,264	55.4%	+/-5.8	92,283	+/-26,513	56.0%	+/-5.0	70,343	+/-6,622	61.5%	+/-7.7	82,267	+/-22,305
Married-couple families	84.3%	+/-8.8	80,694	+/-11,512	83.4%	+/-6.7	109,341	+/-9,355	72.8%	+/-6.7	75,016	+/-12,369	70.3%	+/-8.2	100,819	+/-20,890
Female householder, no husband	15.3%	+/-8.9	37,500	+/-62,418	13.1%	+/-5.3	40,199	+/-6,153	19.4%	+/-6.7	34,167	+/-10,575	19.0%	+/-6.7	30,774	+/-28,527
Male householder, no wife present	0.4%	+/-1.0	-	**	3.5%	+/-4.5	71,014	+/-32,405	7.8%	+/-5.6	70,710	+/-15,967	10.8%	+/-5.8	44,583	+/-33,303
NONFAMILY HOUSEHOLDS																
Nonfamily households	523	+/-84	27,137	+/-6,139	931	+/-167	51,017	+/-8,486	845	+/-121	38,625	+/-11,078	1,168	+/-219	44,844	+/-14,510
Female householder	37.3%	+/-11.4	21,397	+/-15,153	61.5%	+/-13.0	44,949	+/-10,105	41.2%	+/-9.8	33,000	+/-6,027	54.7%	+/-9.2	55,844	+/-14,972
Living alone	30.2%	+/-10.2	19,063	+/-2,988	49.7%	+/-13.8	43,229	+/-6,443	35.9%	+/-9.5	31,321	+/-3,882	39.1%	+/-9.4	40,974	+/-4,327
Not living alone	7.1%	+/-7.4	37,202	+/-54,273	11.8%	+/-6.6	76,667	+/-74,543	5.3%	+/-4.5	112,656	+/-77,338	15.6%	+/-8.8	79,881	+/-27,101
Male householder	62.7%	+/-11.4	27,917	+/-5,583	38.5%	+/-13.0	55,938	+/-16,248	58.8%	+/-9.8	48,125	+/-19,215	45.3%	+/-9.2	43,815	+/-4,513
Living alone	59.1%	+/-12.2	26,976	+/-7,064	24.6%	+/-11.5	63,482	+/-15,038	51.6%	+/-10.1	47,798	+/-19,835	40.7%	+/-9.1	43,112	+/-3,347
Not living alone	3.6%	+/-3.5	29,875	+/-71,876	13.9%	+/-10.3	9,871	+/-57,216	7.2%	+/-4.5	54,219	+/-68,093	4.6%	+/-4.1	95,769	+/-2,083
PERCENT IMPUTED																
Household income in the past 12	27.3%	(X)	(X)	(X)	19.0%	(X)	(X)	(X)	21.1%	(X)	(X)	(X)	22.5%	(X)	(X)	(X)
Family income in the past 12 months	29.4%	(X)	(X)	(X)	17.5%	(X)	(X)	(X)	22.1%	(X)	(X)	(X)	25.6%	(X)	(X)	(X)
Nonfamily income in the past 12 months	25.4%	(X)	(X)	(X)	22.0%	(X)	(X)	(X)	19.4%	(X)	(X)	(X)	17.6%	(X)	(X)	(X)

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables. While the 2007-2011 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities. Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization. Source: U.S. Census Bureau, 2007-2011 American Community Survey

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

[1] "Family households" consist of a householder and one or more other people related to the householder by birth, marriage, or adoption. They do not include same-sex married couples even if the marriage was performed in a state issuing marriage certificates for same-sex couples. Same-sex couple households are included in the family households category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households. "Nonfamily households" consist of people living alone and households which do not have any members related to the householder. [2] Data source: 2010 Census Summary File 1

WAUKESHA COUNTY AIRPORT
SAFETY AREA IMPROVEMENT
ENVIRONMENTAL ASSESSMENT
Waukesha County, Wisconsin

TRACT # 203306

TRACT # 203101

TRACT # 203000

TRACT # 203103

Legend

- Property Line
- 1/2 Mile Buffer
- Unpopulated Census Blocks

CENSUS TRACT #

- 203000
- 203101
- 203103
- 203306

N

0 380 760 1,520 2,280 3,040
Feet

FIGURE I-2
CENSUS TRACTS (2010)

Data Sources:
2010 US Census Bureau summary file, Waukesha County.

Image Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Document Path: X:\23099-90\04008\TECH\gis\Maps\UES_Census2010_Poverty.mxd

Appendix J. Agency Coordination

- **Meeting Minutes – March 16th, 2004**
- **Correspondence Letter – Feb/Mar 2007**
- **Meeting Minutes - August 26th, 2015**

Meeting minutes

Project name: Waukesha County Airport Runway 10/28 Safety Area Improvement Project
Agency Scoping Meeting

Project location: Waukesha County Airport (Crites Field)

Date: March 16, 2004

Attendees	Representing
Keith Markano, Michael Neau	Waukesha County Airport
Thomas DeWinter	Wi Bureau of Aeronautics
Bob Kunkel, Laura Morland, Michael Hall, Perry Rossa	Mead & Hunt, Inc.
Leakhena Au	US Fish and Wildlife Service
Dale Pfeiffle	US Corps of Engineers (COE)
Maureen Millmann	Wi Department of Natural Resources (WDNR)
Jay Waldschmidt	WisDOT BEES
Bob Schmidt	WisDOT D2 Environmental Coordinator
Karla Leithoff	WisDOT Wetland Ecologist
Allison Bussler	Waukesha County Exec.
Genia Bruce	Waukesha County Board
Richard Bolte	Waukesha County DPW
Gary Evans	Waukesha County DPW
Hon. Carol J. Lombardi	Mayor, City of Waukesha
Steve Howard	City of Waukesha Fire Department
Paul A. Feller	City of Waukesha Public Works
Steven Guanidell	City of Waukesha Community Development
Chuck Goetsch	Scenic Self Storage
Don Koepp	Silvernail Development Company
Mark Muskevitsch, Chuck Jorgensen	Peterbilt of Wisconsin
Sam Lahrache	Taste of Italy
Pat Lambo	Lambo & Associates
Rod Clarke	American Transmission Co. – ATC
Scott Williams	Milwaukee Journal Sentinel

The attached report represents this writer's interpretation of items discussed during the meeting. Any corrections or additional information should be brought to our attention for clarification.

Meeting Summary:

The meetings was held to introduce the project, which is to evaluate improvements to the runway safety areas for Runway 10/28 at Crites Field, and to gather input from agencies on issues that should be addressed. Laura Morland of Mead & Hunt explained that alternatives will be developed and evaluated that will provide the Airport with Runway Safety Areas (RSAs) at the ends of its Runway 10/28 that are compliant with current Federal Aviation Administration (FAA) criteria. The project is expected to last about one year and will result in an Environmental Assessment (EA) document.

Bob Kunkel introduced the project. Laura Morland provided an overview of the process.

Michael Hall presented a summary of the various alternatives that will be looked at for Runway 10 and Runway 28. The alternatives include:

- No Build Alternative
- Existing Site Alternatives
- Runway 10 Alternatives (west end of the runway)
    1. Close Silvernail Road
    2. Reroute Silvernail Road
    3. Tunnel Silvernail Road under the safety area
    4. Reduce runway length by approximately 700 feet
    5. Shift runway to the east to provide safety area
    6. Request FAA continuance to waive RSA criteria
    7. Establish declared distances
    8. Install Engineered Material Arresting System (EMAS)
    9. Some combination of the above
- Runway 28 Alternatives (east end of the runway)
    1. Reroute Pewaukee Road
    2. Close Pewaukee Road
    3. Reduce runway length by approximately 375 feet
    4. Install EMAS
    5. Construct tunnel for Pewaukee Road under the safety area
    6. Request FAA waiver to RSA criteria
    7. Establish declared distances
    8. Some combination of the above

Perry Rossa discussed the wetland areas that were surveyed for the project, which are generally located in the northwest portion of the Airport.

The meeting was open to discussion to solicit input from agency representatives, elected officials, property owners, and others present at the meeting to help identify issues that will need to be looked at during the course of the project.

Items discussed and particular action items were as follows:

- Richard Bolte, Waukesha County Public Works Director, expressed interest in the possibility of obtaining some assurance from the FAA that its criteria on the safety areas would not change, resulting in further impacts or liability in the future beyond the alternatives being considered in this project.

- The relocation of Silvernail Road was recommended 20 years ago in a master plan completed in the 1980's.

- The owner of Peterbilt Trucking on Silvernail Road noted that vehicular traffic uses Silvernail Road as an alternate to I-94, and that closing the road would shift traffic south to Northview Road as well as increase use of the Interstate and interchanges at Grandview and Pewaukee Roads. Property owners also noted that traffic volumes on Silvernail have increased over the past few years.

- Silvernail Road was turned over to the City of Waukesha by Waukesha County within the past year. The City's Public Works Department is looking forward to the results of the traffic study. The Mayor urged consideration of effects on property values/social impacts if changes are proposed to the roadway system.

- The City of Waukesha Fire Chief noted that two-way access to property for rescue services was desirable. The City of Waukesha, City of Pewaukee, and Waukesha County have a cooperative fire protection agreement in this area.

- Historical traffic data is available from a March 1998 traffic count conducted by the Waukesha County Public Works Department. The count measured 7300 vehicles/day on Silvernail Road at that time.

- City of Waukesha Mayor Carol Lombardi encouraged direct contact with local neighborhood groups. Keith Markano noted that he has directed Mead & Hunt to do as much targeted/direct mailing as possible so that all business owners and residents with interest in the project are kept informed.

  Action Item
  The City will provide contact information for community groups to Michael Hall at Mead & Hunt.

- The Mayor noted concerns of the budgetary impacts that a preferred alternative would have on local government.

- Jay Waldschmidt, WisDOT Bureau of Equity and Environmental Services (BEES), asked about funding sources, which agencies were expected to be signatories on the EA document, and whether the FHWA would be involved because of the potential for roadway improvements. Tom DeWinter explained that the potential funding would be 60 to 90% Federal from FAA, and the remaining 10 to 40% would be shared between the State and Sponsor. Tom also noted that the EA would be an FAA document.

- The Mayor of Waukesha asked if the City of Waukesha would be expected to fund any improvements to Silvernail Road because of their ownership, and Tom DeWinter explained that the County, being the sponsor of the project, would be the responsible party for funding any modifications to Silvernail Road.

- Jay Waldschmidt noted that roadway relocations should be included in the Southeastern Wisconsin Regional Planning Commission (SEWRPC) 2004-2006 Transportation Improvement Program (TIP).

  Action Item
  Mead & Hunt will contact SEWRPC on this issue.

- Jay Waldschmidt noted that the traffic study may identify needed improvements to area roadways due to current use, regardless of any impacts that alternatives under this study may have.

- The potential for impacts to area storm water management was noted. There is a large issue regarding storm water on the north side of Interstate 94.

  Action Item
  Mead & Hunt will contact Bob Pfeiffer from WisDOT District 2, who was mentioned as a contact for the most recent studies of storm water management north of Interstate 94.

- There was further discussion of methods of keeping the public informed, including direct mailings to property owners in the area, and the use of the City of Waukesha's local public access cable station for posting meeting notices and other information.

- The Wisconsin Department of Natural Resources (WDNR) agreed with studying storm water and wetland impacts and complemented Perry on delineating the wetlands early in the project. They also discussed the importance of sequencing.

- Dale Pfeiffle of the Corp of Engineers (USCOE) asked about the potential for compensation of wetland loss nearby. Perry Rossa talked about the USDA policy of mitigating wetland impact outside a 2-mile radius of an airport, unless an exceptional resource impact exists.

- Portions of the wetland delineated for this project were identified as a Primary Environmental Corridor according to Waukesha County's 2002 Recommended Land Use Plan.

Action Item
Mead & Hunt will review the advanced identification of wetlands with Don Reed of SEWRPC.

- Leakhena Au of the U.S. Fish and Wildlife Service (USFWS) noted that no federal endangered species had turned up in her search for the project area.

- It was recommended that the project area be surveyed for the presence of the Butler garter snake. Gary Casper of the Milwaukee Public Museum was suggested as a resource to survey the area for habitat compatibility. This survey is usually done in May or June.

  Action Item
  Mead & Hunt will contact Gary Casper and arrange for him to conduct a survey for this project.

- Perry Rossa and Laura Morland noted that an archaeological survey did not find anything in the project area, and that Mead & Hunt's Historical staff would conduct an investigation to determine if any historical structures are in the area of impact.

- Paul Day, Waukesha City Engineer, was mentioned as a source for local storm water standards.

- County and City traffic signal timings are available from their respective Public Works offices. The City of Waukesha would have traffic signal timings for the intersection of Grandview and Silvernail while the County would have timings for all other intersections surrounding the airport.

  Action Item
  Mead & Hunt will be contacting each office to obtain signal timings.

  Action Item
  Mead & Hunt will prepare conceptual exhibits depicting the various alternatives for the upcoming public workshop.

  Action Item
  Mead & Hunt will contact Dale Shaver, Director of the Waukesha County Parks & Land Use for this project.

Next Steps:

Mead & Hunt will be conducting a traffic study and other data collection activities. A public workshop will be held in the coming months to gather comments from the surrounding community and other interested parties regarding the alternatives that will be studied to bring the safety areas for Runway 10/28 in compliance with current FAA criteria.

Respectfully submitted,
MEAD & HUNT, Inc.

Michael A. Hall

cc: To all agencies

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
Gloria L. McCutcheon, Regional Director

Southeast Region Headquarters
2300 N. Dr. Martin Luther King, Jr. Drive
Milwaukee, Wisconsin 53212-3128
FAX 414-263-8606
Telephone 414-263-8500
TTY Access via relay - 711

March 1, 2007

Laura Morland
Mead & Hunt Inc.
6501 Watts Road
Madison, WI 53719-2700

Subject: Waukesha County Airport (Crites Field) - Runway Safety Area
Waukesha County
AIP# 3-55-0090-20

Dear Ms. Morland:

The Department has reviewed the Environmental Assessment Preferred Alternative for the Waukesha County Airport (Crites Field) Runway Safety Area. The DNR has the following preliminary recommendations:

- A review of the Wisconsin Wetlands Inventory indicates wetland complexes adjacent Waukesha County Airport runways. A determination of the extent (acres) and type of wetland affected, will need to be made for consistency with the DNR-DOT Cooperative Agreement-Compensatory Wetland Mitigation Policy. Please coordinate wetland issues with Karla Leithoff at WisDOT, Southeast Region.

- The Department recommends an alternative that would require the least amount of wetland fill for the runway slopes, in order to be consistent with the DNR-DOT Cooperative Agreement to avoid and minimize wetland fill wherever possible. Please consider tightening the slopes wherever possible to reduce the amount of wetland impact.

- A review of the Natural Heritage Inventory (NHI) files indicates the presence of the following rare species within your project area:

  Thamnophis butleri (Butler's Garter Snake) – Threatened Snake

The Butler's garter snake, a state-listed threatened species is present in the wetlands and uplands near Silvernail Road. We recommend that you continue coordination with the WDNR Bureau of Endangered Resources to determine how Butler's habitat can be avoided in your design and during construction.

Comprehensive endangered resource surveys have not been completed for the project area. As a result, our data files may be incomplete. The lack of additional known occurrences does not preclude the possibility that other endangered resources may be present. Please contact the Bureau of Endangered Resources for additional recommendations to avoid and minimize habitat for the above mentioned species.

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
190 FIFTH STREET EAST
ST. PAUL, MN 55101-1638

REPLY TO
ATTENTION OF:
Operations
Regulatory (2004-2815-DJP)

February 5, 2007

Ms. Laura D. Morland
Mead & Hunt, Inc.
6501 Watts Road
Madison, Wisconsin 53719-2700

Dear Ms. Morland:

This is in response to your January 22, 2007, letter requesting Corps of Engineers comments regarding the preferred alternative developed for the Runway 10/28 Safety Area Improvements at the Waukesha County Airport. The project site is located in Sections 27 and 28, T. 7N., R. 19E., Waukesha County, Wisconsin.

A review of our records indicates our previous involvement with this project was limited to our attendance of a March 16, 2004, Agency Scoping Meeting to introduce the proposed safety area improvements. The information presented at the scoping meeting included a brief outline of the project's "purpose and need" and the identification of alternatives to accomplish the purpose.

The project purpose identified at the scoping meeting was to "bring runway 10/28 safety areas (RSA's) into compliance with FAA standards". Our records do not indicate that a more definitive "purpose and need statement" has been subsequently developed or forwarded for agency concurrence.

A more concise purpose and need statement is needed for the Corps to correctly evaluate the range of alternatives, including the preferred alternative presented in your January 22, 2007, letter, We recommend that the purpose statement identified above should include limiting information such as loss of runway. We also recommend that the need statement should reflect the FAA standards for RSA's and include information regarding the critical aircraft mandating necessary runway lengths. Without additional information regarding the alternatives explored in 2004 and a clearer "purpose and need" statement, we cannot support or reject the alternative described in your January 22, 2007, letter.

We appreciate having an opportunity to comment on the Preliminary Environmental Assessment proposed for release in spring, 2007. Since this environmental assessment is an FAA document, it will be adopted by the Corps during our Section 404 permit review. As such, we recommend the final environmental assessment be written to respond to agency concerns. Their comments were included during our review process. We further recommend that the Bureau of Aeronautics pursue agency concurrence with three facets of the environmental assessment for purpose and need; preferred alternative; and regarding the need for an EIS determination.

If you have any questions, contact Dale Pfeiffle in our Waukesha office at 262) 547-0868. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely

for Robert J. Whiting
Chief, Regulatory Branch

Copy furnished:

Mr. Thomas A. DeWinter
Wisconsin Department of Transportation
Bureau of Aeronautics
4802 Sheboygan Avenue, Room 701
Madison, Wisconsin 53707

Mr. Daniel Millenaker
Federal Aviation Administration
6020 28th Avenue South, Room 102
Minneapolis, Minnesota 55450-2706

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
W239 N1812 ROCKWOOD DRIVE • PO BOX 1607 • WAUKESHA, WI 53187-1607• TELEPHONE (262) 547-6721
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WAUKESHA



February 26, 2007

Ms. Laura D. Morland, P.E.
Senior Project Manager
Mead & Hunt, Inc.
6501 Watts Road
Madison, WI 53719-2700

Dear Ms. Morland:

This will respond to your letter of January 22, 2007, requesting the Commission staff to review and comment on a proposed runway expansion alternative related to a Runway Safety Area Improvement Project at the Waukesha County Airport (Crites Field). The project area is located in parts of U.S. Public Land Survey Sections 27 and 28, Township 7 North, Range 19 East, Cities of Waukesha and Pewaukee, Waukesha County.

A review of the aerial exhibit enclosed with your letter indicates that a total of 1.2 acres of wetland will be filled to allow for a runway expansion adjacent to Silvernail Road in the northwestern portion of the airport property. The Commission staff has reviewed its aerial photographs dating back to 1985 and our existing files related to past airport projects. The purpose of this review was to determine overall wetland impacts related to airport development between 1985 and 2005. Large projects with significant wetland impacts during that time period included a runway expansion, Silvernail Road re-alignment, hangar construction, and commercial development west of the airport. Project Area A generally includes the airport property and other county-owned lands (see attached aerial exhibit). Project Area B generally includes commercial development and surrounding lands west of Grandview Boulevard within the runway safety zone area.

The areal extent of wetland in the Crites Field environs was identified and mapped on one inch equals 400 feet aerial photographs dated 1985 and 2005. A total of 128.3 acres and 91.6 acres of wetland were identified in Project Area A on the 1985 and 2005 aerial photos, respectively. Therefore, a net loss of 36.7 acres, a 29 percent loss, has occurred between 1985 and 2005 in Project Area A.

Project Area B was also evaluated for wetland impacts over the 1985 to 2005 time period. A total of 56.2 acres and 41.0 acres of wetland were identified in Project Area B on the 1985 and 2005 aerial photos, respectively. Therefore, a net loss of 15.2 acres, a 27 percent loss, has occurred in Project Area B.

Consequently, the total net loss (cumulative impact) of wetland in the Crites Field environs between 1985 and 2005 was 51.9 acres, a 28 percent loss.

Should you have any questions regarding this information, please do not hesitate to call.

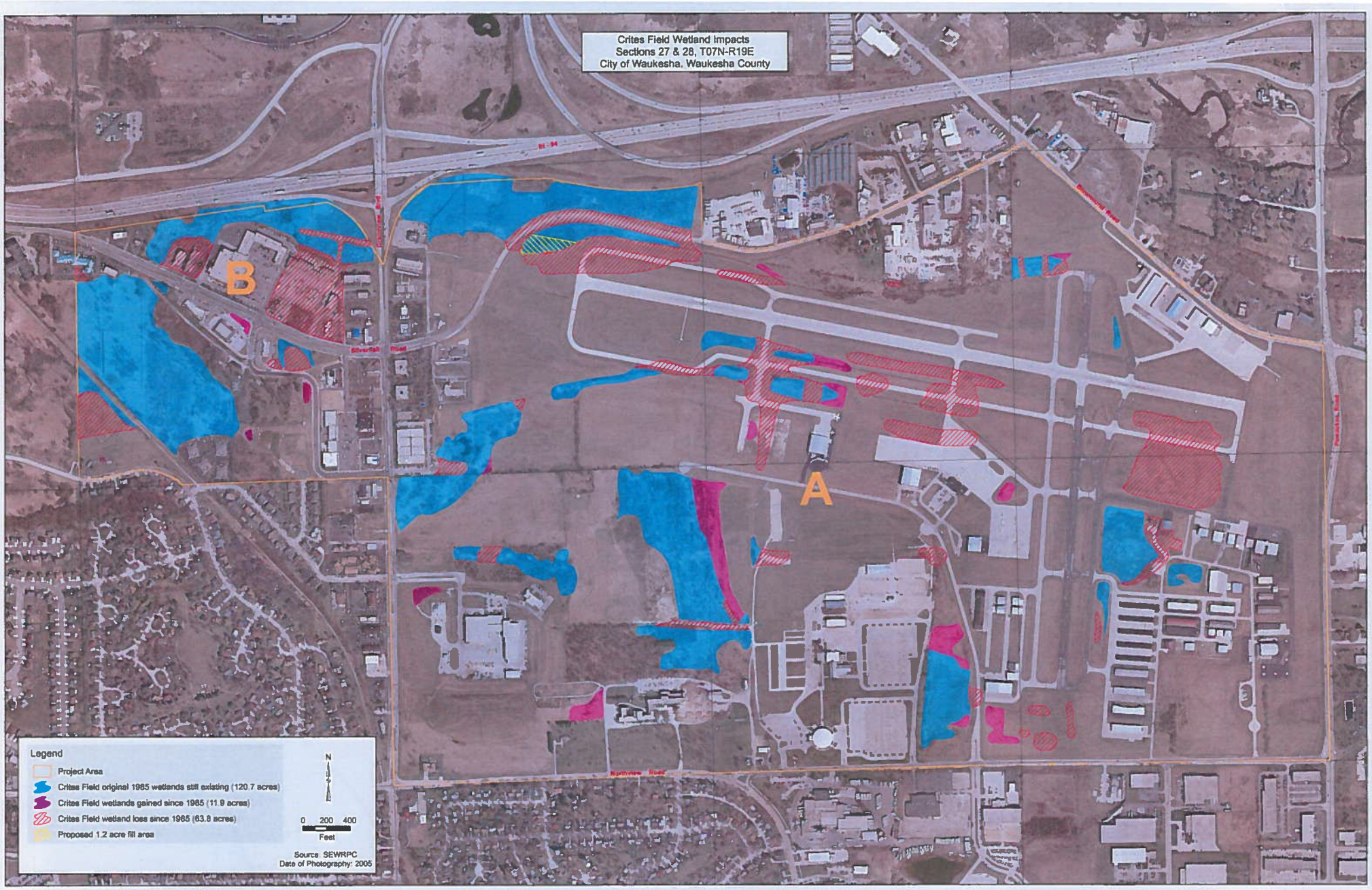
Sincerely,

Philip C. Evenson
Executive Director

PCE/DMR/CJJ/mlh
#125695 v1 - waukesha co airport expansion

Enclosures

cc: Mr. Richard A. Bolte, Waukesha County Department of Public Works
Mr. Richard L. Mace, Waukesha County Department of Parks and Land Use
Ms. Maureen McBroom, DNR-Waukesha
Mr. Joanne Kline, DNR-Milwaukee
Ms. Patricia A. Trochlell, DNR-Madison
Mr. Dale J. Pfeiffle, COE-Waukesha


Crites Field Wetland Impacts
Sections 27 & 28, T07N-R19E
City of Waukesha, Waukesha County
B
A
Legend
Project Area
Crites Field original 1985 wetlands still existing (120.7 acres)
Crites Field wetlands gained since 1985 (11.9 acres)
Crites Field wetland loss since 1985 (63.8 acres)
Proposed 1.2 acre fill area
N
0 200 400
Feet
Source: SEWRPC
Date of Photography: 2005

Meeting Minutes

Waukesha County Airport Runway Safety Area Improvements Environmental Assessment

Agency Coordination Meeting

Date: August 26, 2015

Attendees	Representing	E-mail
Henri Woods	USDA – Wildlife Service	henri.a.woodsii@aphis.usda.gov
Chris Egger	WisDOT-Bureau of Aeronautics	christopher.egger@dot.wi.gov
Andy Trimble	WisDOT-Bureau of Aeronautics	andrew.trimble@dot.wi.gov
Karla Leithoff	Wisconsin DOT	karla.leithoff@dot.wi.gov
Craig Webster	Wisconsin DNR	craig.webster@wisconsin.gov
Chris Jors	SEWRPC	cjors@sewrpc.org
Jack Gilbertsen	FAA – Chicago ADO (via phone)	jack.gilbertsen@faa.gov
Gary Evans	Waukesha County	gevans@waukeshacounty.gov
Kurt Stanich	Waukesha County Airport (manager)	kstanich@waukeshacounty.gov
Matt Grenoble	Waukesha County Airport (operations)	mgrenoble@waukeshacounty.gov
Laura Morland	Mead & Hunt, Inc.	laura.morland@meadhunt.com
Perry Rossa	Mead & Hunt, Inc.	perry.rossa@meadhunt.com
Greg Stern	Mead & Hunt, Inc.	greg.stern@meadhunt.com

The attached report represents this writer's interpretation of items discussed during the meeting. Any corrections or additional information should be brought to our attention for clarification.

Items discussed were as follows:

Purpose of meeting was to present opportunity for agencies to give input and comment on the identified impacts for Alternatives 11 and 12 which are being carried through the environmental process, with Alternative 11 being preferred by the Airport. Mead & Hunt gave a brief overview of project to date and explained how we got to the two alternatives currently under consideration. Mead & Hunt also provided a summary of the Wetland Functional Assessment Analysis completed for the ADID wetlands, which included analysis of both direct and secondary impacts. The Functional Assessment had been distributed in advance of the meeting for agency review.

Questions to be answered:

- Have we missed identifying any impacts?
- Are there any impacts that need further analysis?
- Any concerns with how the impacts were evaluated?
- What's an agreeable method to mitigate for direct and indirect wetland impacts?
- Is it possible to mitigate these below the FAA significance levels (FAA Order 1050.1F)?

Impacts of Alternative 12 (EMAS) are slightly less than Alternative 11 (0.38 acres less ADID) but both alternatives have the same Silvernail Road alignment, which causes the greatest impacts. Alternative 12 is about $2.1M more. Additionally there are concerns with the 10-year life cycle of EMAS, maintenance (special equipment needed for snow removal), its potential to be damaged by accidental driving or landing on it, and cold climate adverse effects on EMAS.

Summary of wetland functional impact analysis:

Existing wetland functional strengths:
ADID wetland 1 – Most western wetland, behind Pick & Save. Will need to extend approach lighting system further into wetland. Wetland functions moderate for wildlife & fishery habitat and flood/stormwater attenuation and high for water quality protection. Wetland receives a lot of channelized inflow and is surrounded by steep fill slopes. Lots of field evidence of flashy water flows.

ADID wetland 2 – Largest ADID wetland; used to be connected to ADID wetland 3 before construction of Silvernail Road. Wetland functions moderate for wildlife habitat, flood/stormwater attenuation and aesthetics (most visible) and high for water quality protection.

ADID wetland 3 – South side of Silvernail Road. Moderate water quality protection function, all other functions low.

Severity of direct ADID wetland impacts is commensurate with scale of impact/fill: about 5% effect on Wetland 1, where light system will be extended along south edge of wetland, avoiding central storage area. Wetland 2 will have 15% of its area filled, while Wetland 3 will lose 29% of its area.

Indirect or secondary impacts are more serious. There will be a moderate effect on water quality protection function of Wetland 1, a high impact to wildlife functions of Wetland 2 and Wetland 3. Wetland 2 will also experience moderate to high impacts to water quality protection because the new Silvernail Road alignment will divide the southern half of the wetland from the main hydraulic channel feature in the north half, leading to higher nutrient loadings there. The division of Wetland 2 by the road will also result in much higher wildlife road kill, especially for any reptiles and amphibians that may exist in this location. Butler's garter snake was documented at the site earlier in the EA process. The problem is due to the low profile of these animals and their inability to detect large-scale landscape features that would possibly allow them to bypass the road. Amphibian mortality is also high on secondary roads like Silvernail during wet nights in the spring and early summer. Intermittent traffic levels do not deter crossings and mortality is therefore higher. Risk is that the remnant wetlands will become mortality sinks, which are habitat areas where mortality exceeds reproduction.

The indirect effects on water quality and wildlife habitat can be mitigated by eco-passages (wildlife underpasses, which are oval culverts with drift walls and light wells to guide the wildlife through. The culverts would also serve to maintain water quality/hydraulic connections between the wetlands.) Land bridges would also accomplish this, but are very expensive ($100/square foot) and don't allow wetland vegetation to growth beneath them. Karla has been working with Gary Casper for five years on several successful wildlife underpass projects for these biota and can supply details. Their success has been documented by camera monitoring and track surveys. Cover at the culvert entries is very important in order to control predation by feral cats and other predators.

Craig Webster commented that he thought the impact analysis was thorough and did not miss any issues. He said a five to six-acre impact for a project of this size was significant, but he understood the safety-based purpose and need for the project. He suggested that a wetland wildlife species inventory be done to identify the species present in order to accurately mitigate for the indirect wildlife effect without undue effort or expense. Enough detail to generally describe this commitment is needed in the EA, but it is not necessary to wait for such studies to be done to issue a draft EA. The Butlers Garter Snake Survey Report completed by Gary Casper may be a good resource for this. Gary Evans (Waukesha Co. highways) commented that the stronger the EA was, the easier it would be to defend. It was discussed that the EA would identify the use of eco-passages for the dual purpose of both biotic and hydraulic mitigation of secondary impacts, and that the details of the underpasses will be determined during the design phase in accordance with the wildlife assemblage documented by field studies.

The discussion turned to wetland mitigation. On-site is preferred when it complies with FAA standards regarding potential creation of a wildlife attractant. There is an onsite opportunity to remove one acre of old road fill when Silvernail Road is re-aligned. This would reconnect ADID Wetland 3 with the severed remnant of ADID Wetland 2 on the south side of the new road alignment. Henri Woods of USDA –APHIS –WS thought this was feasible as long as there was only temporary standing water and that complete vegetative cover was attained as soon as practicable. There is an upland peninsula of shrub/forested land between two eastern fingers of ADID Wetland 2 that could possibly be made into wetland, but this is very close to the Interstate 94 Highway and potential future plans for dealing with WIS 16 exit ramps would re-disturb it. WDNR said a response is needed from WisDOT regarding its future plans for this land and the potential of it being used for airport mitigation for inclusion in the EA. There could also be cavity trees, removal of which could pose impacts to the recently-listed Northern Long-Eared Bat by the USF&WS.

Offsite mitigation was discussed. A project-specific mitigation site search, acquisition and restoration has a very low probability of success and could take several years. This is because of competition with commercial land values for farmed/drained lands, as well as agricultural impacts. However, Gary said that Waukesha County Parks is pursuing an acquisition of farmed wetlands next to Retzer Nature Center, about 5 miles from the Airport and within the Lower Fox watershed. It is being pursued as mitigation for the Waukesha Bypass project and could possibly accommodate the ADID impacts. The EPA and Corps have reviewed and approved the site as suitable for wetland mitigation. Karla also said that the WisDOT East Troy bank site, which will start yielding wetland credits next year, is partially within the Lower Fox watershed. The East Troy bank is estimated to yield about 170 credits.

ADID wetland mitigation and ratios were discussed. Chris Egger expressed his desire to know if mitigation, in light of the above, could reduce the identified impacts below the significance level. Craig responded that we would need to document the status and concerns of ADID wetlands and project impacts, our mitigation restrictions and findings and that, by following the inter-agency Cooperative Agreement procedures we could reduce the impacts to below the significance threshold. Chris Jors added that ADID wetlands are mostly associated with environmental corridors, major waterways and/or natural areas. ADID are not always of the highest quality but provide connectivity. Perry asked for clarity on the mitigation ratio if a bank is used. Mitigation for ADID wetlands adds 0.5 to the ratio. Therefore, the floor banking ratio is 1.5 to 1, and then wetland types (impact vs. bank), Wisconsin floristic province and watershed position are examined. For each criteria that doesn't match between the impact site and the bank, and additional 0.5 ratio is added to the requirement. For example, if the East Troy bank is wet

meadow, but our impact is shallow marsh, the result would be a 2.0 to 1 ratio because the floristic province and watershed match between the Airport and the East Troy bank.

The meeting concluded with all in agreement that enough detail had been presented and discussed to finish the draft EA, with further investigation into the ADID wetland wildlife assemblage to follow in order to determine the level of effort involved for mitigation of secondary (wildlife and water quality) impacts. Karla recommended that we get in touch with Gary Casper regarding these investigations.

Respectfully submitted,

MEAD & HUNT, Inc.

Perry Rossa

cc: To all attendees
Marie Kopka – US Corp of Engineers

Appendix K. Section 106 Documentation

AERONAUTICS

SHPO

SECTION 106 REVIEW
ARCHAEOLOGICAL/HISTORICAL INFORMATION

Wisconsin Department of Transportation

07-0155/WK

I. PROJECT INFORMATION

Project ID	County
0767-42-20	Waukesha
Airport Name	**Airport Manager**
Waukesha County Airport-Crites Field	Kurt Stanich
Project Engineer/Project Manager	**(Area Code) Telephone Number**
Greg Stern, P.E.	608-273-6380
Planning/Design Consultant	**(Area Code) Telephone Number**
Mead & Hunt, Inc.	608-273-6380
Archaeological Consultant	**(Area Code) Telephone Number**
AVD Archaeological Services, Inc.	262-878-0510
Architecture/History Consultant	**(Area Code) Telephone Number**
Mead & Hunt, Inc.	608-273-6380
Date of Need	
January 20, 2013	

RECEIVED
MAY 01 2013
DIV HIST PRES

II. PROJECT DESCRIPTION

Type of Project: X New Construction ❑ Reconstruction ❑ Recondition ❑ Other
❑ Wetland Mitigation ❑ Runway Extension ❑ Land Acquisition

❑ Known Cemetery

Amount of land to be disturbed:	Amount of acres to be acquired:
70 Acres	0 Acres

Describe ground disturbing activity associated with proposed construction - e.g., strip construction, slope grading, temporary bypass, realignment, stream channel change, etc.

Brief Project Description: (Be specific and include all activities associated with the project.)

The purpose of the project is to provide fully compliant safety areas off the ends and sides of the Airport's primary Runway 10/28. Runway safety areas are clear and graded surfaces that need to be capable of supporting equipment, including occasional aircraft, under dry conditions, without causing structural damage to the aircraft or injury to passengers. To bring the safety areas up to Federal Aviation Administration design standards will require grading approximately 42.5 acres on the west (Runway 10) end and along the north side for removal of a non-standard parallel taxiway. Approximately 23.0 acres will need to be graded on the east (Runway 28) end. Other ancillary ground disturbance will be required for the construction of a detention basin and other non-standard segments along the sides of the runway. Finished slopes will vary from 1.5 percent for the safety area to 4:1 transitional slopes to tie back to existing ground. The preferred alternative requires adding a total of 9 acres of pavement (combination runway and taxiway) in order to maintain useable runway lengths and to provide the ability for aircraft to taxi to the relocated runway take-off ends. A total of 4 acres of existing non-standard pavement will be removed as part of the project.

III. NOTIFICATION

How has notification of the project been provided to:

☒ Property Owners
- ☐ Public Information Meeting Notice
- ☐ Letter [required for Archaeology]
- ☐ Telephone Call
- ☒ Other Airport is the property owner

☒ Historical Societies/Organizations
- ☐ Public Information Meeting Notice
- ☐ Letter
- ☐ Telephone Call
- ☒ Other Airport is the property owner

☒ Native American Tribes
Must notify with:
- ☐ Public Info. Mtg. Notice
- ☒ Letter

*Attach one copy of the base letter, list of addresses and comments received. For history include telephone memos as appropriate.

IV. AREA OF POTENTIAL EFFECTS [APE]

HISTORY: Describe the area of potential effects for buildings/structures.

The APE for this project includes all properties adjacent to the project area that may be affected by the proposed project.

If you wish to claim there is no APE for buildings/structures, you must justify that claim. [NOTE: If there are no buildings/structures of any kind in the APE, go to Item V., check "Architecture/History survey is not needed" and state why.]

ARCHAEOLOGY: Area of potential effect for archaeology is the existing and proposed ROW, temporary and permanent easements. Agricultural practices do not constitute a ground disturbance.

V. SURVEY NEEDED

ARCHAEOLOGY	HISTORY
☒ Archaeological survey **is needed** [See Chapter 26-35-1 of FDM for procedure and # of exhibits]	☒ Architecture/History survey is needed
☐ Archaeological survey **is not needed** - provide justification ☐ SHPO records search conducted ___ (date). ☐ Screening list ___ (date). ☐ No potential to affect archaeological sites Describe project area and attach project plans	☐ Architecture/History survey is not needed

RECEIVED
MAY 01 2013
DIV HIST PRES

VI. SURVEY COMPLETED-Documentation required for submittal to BOE

ARCHAEOLOGY	HISTORY
☒ Project maps attached [most recent design]	☒ A/HSF attached [**NO** buildings/structures identified]
☐ ASFR attached [**NO** archaeological sites(s) identified]	☐ A/HSF attached [potentially eligible buildings/structures identified.]
☐ Report attached [**NO** potentially eligible site(s) in project area]	See the attached letter report
☐ Report attached [potentially eligible site(s) avoided]	
☐ Report attached - cemetery documentation	
☐ Native American response letters & reports [Send four reports + # of copies for NA requests to district.]	

VII. EVALUATION COMPLETED-Documentation required for submittal to BOE

- ☒ Report attached [no arch site(s) eligible for NRHP]
- ☐ Report and DOE attached [arch site(s) eligible for NRHP]
- ☐ Report and draft DOE attached [arch site(s) eligible for NRHP—avoided through project redesign]
- ☐ DOE attached [no buildings/structure(s) eligible for NRHP]
- ☐ DOE attached [building/structure(s) eligible for NRHP]

VIII. COMMITMENTS

07-0155/WK
pg 2/2

IX. PROJECT REVIEW

- ☒ No eligible properties in APE
- ☐ No effect on historic buildings and/or archaeological sites eligible for NRHP
- ☐ Eligible properties may be affected by project-go to Step 4: Assess effects and begin consultation

(District Project Manager)	(WisDOT Historic Preservation Officer)	(State Historic Preservation Officer)
3-19-13 (Date)	4/29/2013 (Date)	May 2 2013 (Date)
Greg Sturm (Consultant Project Manager)		
3/13/13 (Date)		

Appendix L. Noise Analysis

Appendix L - Noise Analysis

FAA Order 5050.4A, Chapter 5, Paragraph 47, Section e (1)(c), requires that noise analysis be performed for any project that involves airport location, runway location, major runway extension or runway strengthening. The RSA improvements proposed involve an extension to Runway 10-28. Also, given the amount of community concern that is anticipated regarding any airfield improvements at Waukesha County Airport (UES), noise analysis has been performed and noise exposure contours developed as part of this Environmental Assessment.

The noise modeling and noise exposure maps were computed using the FAA's Integrated Noise Model (INM) Version 7.0d. The INM is an accepted industry tool for evaluating aircraft noise impacts in the vicinity of airports. The INM has many analytical uses, such as assessing changes in noise impacts resulting from new or extended runways or runway configurations, assessing new traffic demand and fleet mix, assessing alternative flight profiles, and assessing modifications to operational procedures.

The INM 7.0d aircraft flight profile and noise calculation algorithms are based on three documents prepared by the Society of Automotive Engineers (SAE) Aviation Noise Committee (A-21). The three relevant documents to INM 7.0d are:

SAE-AIR-1845 *Procedures for the Calculation of Airplane Noise in the Vicinity of Airports*
SAE-AIR-1751 *Prediction Method for Lateral Attenuation of Airplane Noise During Takeoff and Landing*
SAE-AIR-866A *Standard Values of Atmospheric Absorption as a Function of Temperature and Humidity*

INM is an *average-value model* and is designed to estimate the long-term effects of noise using average annual input conditions. The model uses the annual day-night average sound level for quantifying airport noise. Federal Aviation Regulations (FAR) Part 150 defines it as the yearly day-night average sound level (DNL) which is the 365-day average, in decibels, day-night average sound level. DNL is a cumulative noise metric which represents the average daily noise level adjusted to an equivalent level in order to account for the lower tolerance of people to noise during the nighttime periods compared to the daytime periods. A nighttime penalty (equivalent to increasing decibel levels by ten) for increased annoyance is added to flights occurring between 10:00pm and 7:00am. DNL express the 24-hour average of the summed, energy adjusted levels. DNL does not precisely define noise impacts relative to specific locations at a specific time. The FAA requires the use of summation metrics in noise studies.

INM Input Data

The Integrated Noise Model requires a variety of user-supplied data: physical airfield facilities, aircraft activity, fleet mix, day-night split, runway use, and flight tracks.

Airfield Facilities. The airport has two runways. Runway 10/28 is the primary runway and is 5,849 feet long and Runway 18/36 is a crosswind runway at 3,599 feet long.

Aircraft Activity. Current aircraft activity for calendar year 2013 was obtained from the FAA's Terminal Area Forecast (TAF - Fiscal Years 2013–2040). The TAF is developed by the FAA's Forecast and

Performance Division and is considered the FAA's accepted forecasts for airports within the National Plan of Integrated Airports. Projected aircraft activity levels for the anticipated year of implementation (2016) were also obtained from the TAF. **Table 1** summarizes the current and forecast aircraft operations for the base year (2013) and the anticipated year of implementation (2016).

Table 1

Annual Aircraft Operations

	Base Year (2013)	Projected Activity (2016)
Air Taxi	2,691	2,691
General Aviation	45,766	44,736
Military	286	286
Total	48,743	47,713

Source: FAA Terminal Area Forecasts

Fleet Mix. Fleet mix refers to the various categories of aircraft operating at an airport. The INM model provided the operational characteristics and noise data for all of the aircraft modeled.

An aircraft fleet mix was developed based upon FAA database records. Operation data was obtained from the FAA's Enhanced Traffic Management System Counts (ETMSC) database. ETMSC data shows specific aircraft models from flight records when flight plans are filed. Typically most jet aircraft will file flight plans and these operations will be 100% accounted for. According to 2013 ETMSC data jet operations totaled 4,617. All remaining operations at UES are assumed to be by piston, turboprop and military (helicopters) aircraft.

Piston and turboprop aircraft may not always file flight plans and therefore not all of these aircraft operations are recorded in ETMSC. The sample of piston and turboprop operations in the ETMSC data was extrapolated out to total the remaining operations at UES.

Table 2 summarizes the percent of aviation operations by category for 2013 and 2016. It is assumed that jet operations will remain constant between 2013 and 2016. Piston and turboprop activity will drop slightly, to match the TAF forecast total for 2016. This reflects expected national trends in general aviation activity as documented in the FAA's TAF report – that business jet activity will remain steady while operations by smaller aircraft may decrease in the short-term.

Table 2

General Aviation Operational Fleet Mix

	2013	2016
Single Engine Piston	37.8%	37.9%
Multi Engine Piston	34.3%	34.3%
Turboprop	17.8%	17.5%
Jet	9.5%	9.7%
Helicopter (Military)	0.6%	0.6%

Source: Mead & Hunt

Specific aircraft were observed in the ETMSC records and then assigned an INM sub aircraft, since not every aircraft type is modeled within the INM. The FAA has a pre-approved list of aircraft substitutions

within the computer model. This list was used where appropriate. The list recommends the use of an aircraft titled GASEPV to represent general aviation single engine variable pitch propeller models. The list also recommends the use of the Beech Baron 58 to represent a portion of light twin-engine aircraft, and the Cessna 441 for most light general aviation turboprop aircraft. Jet aircraft types were assigned based upon a review of jet aircraft operations in the 2013 ETMSC data. Military operations are typically UH-1 helicopter operations. **Table 3** presents the annual operations by aircraft type used in the INM model.

Table 3

Annual Operations by Aircraft Type

Category	Representative Types	INM Type	2013	2016
Single Engine Piston	Cessna 152,172	CNA172	2,922	2,863
and Turboprops	Cessna 182, 206	CNA206	3,060	2,998
	Cessna 208, Pilatus PC-12	CNA208	2,803	2,747
	Cherokee, Cirrus SR20	GASEPV	12,456	12,205
	Single Engine Piston Total		21,241	20,813
Multi-Engine Piston	Twin Beech & Cessnas	BEC58P	13,344	13,075
	Piper Twin Comanche, Navajo	PA30	583	562
Multi-Engine Turboprop	Beech King Airs, Cessna 441	CNA441	8,053	7,763
	Embraer 120ER	EMB120	36	36
	Saab 340, Piaggio P-180 Avanti	SF340	583	562
	Multi-Engine Total		22,599	21,998
Jet	Bombardier Challenger 600	CL600	841	841
	Cessna Citation I	CNA500	494	494
	Cessna Citation Mustang	CNA510	124	124
	Cessna Citation CJ4	CNA525C	129	129
	Cessna 550 Citation Bravo	CNA55B	451	451
	Cessna Citation Ultra 560	CNA560U	215	215
	Cessna Citation Excel 560	CNA560XL	617	617
	Cessna Citation Sovereign 680	CNA680	124	124
	Cessna Citation X	CNA750	98	98
	Embraer 145 ER	EMB145	70	70
	Gulfstream GIV	GIV	133	133
	Gulfstream GV	GV	48	48
	IAI Astra 1125	IA1125	75	75
	Learjet 35	LEAR35	785	785
	Mitsubishi MU-300 Diamond	MU3001	413	413
	Jet Total		4,617	4,617
Military	Helicopter – UH-1	Bell 212 (UH-1N)	286	286
Grand Total			**48,743**	**47,713**

Note: Numbers may not add due to rounding
Source: Mead & Hunt, Inc.

Day-Night Split. The INM acknowledges that aircraft operations which occur at night are perceived to be louder to the surrounding environment due to the reduction of the "white noise" (i.e., automobile traffic and other daily noises) which is a part of our daily routine. To account for nighttime operations at an airport and to more accurately "weigh" the amount of noise they contribute to the noise contours, the INM assigns a "penalty" of 10 decibels to each nighttime operation which occurs between the hours of 10 p.m. local and 7 a.m. local. The INM then adjusts the noise contours accordingly to represent the impact of the nighttime operations to the vicinity of the Airport.

At Waukesha County Airport it is assumed that roughly 5 percent of all aviation activity occurs at night. All military activity is assumed to occur during the day. It is anticipated that these daytime-nighttime splits will be maintained throughout the planning period.

Runway Use. Runway use at Waukesha County Airport depends upon the type of aircraft and the prevailing winds. Jets, turboprops and military activity is assumed to operate exclusively on the primary Runway 10/28 in the direction favored by prevailing winds. All other general aviation activity at the airport is assumed to operate on the runway favored by the prevailing winds. Wind rose analysis was utilized to determine runway use percentages based upon prevailing winds. **Table 4** summarizes the runway use percentages.

Table 4

Runway Use Percentages

	Runway			
	10	28	18	36
Jets, Turboprops, Military	37.2%	62.8%	-	-
All Other Aircraft Types	11.9%	34.3%	26.1%	27.7%

Source: Waukesha County Airport, Airport Layout Plan & Windrose
Mead & Hunt, Inc.

Flight Tracks. Each airport has its own distinctive set of flight tracks. Flight tracks are the footprints the aircraft leaves on the ground when it is arriving or departing the airport. Due to the wide variety in possible destinations of the fleet, departure and arrival flight tracks were modeled at straight-in, straight-out flight tracks. Local flight tracks with left-turn traffic were also modeled for single-engine piston aircraft that perform touch-and-go operations on each runway.

INM Output Data

The Integrated Noise Model output is generated after all the above mentioned data was collected, analyzed, and entered into the model.

Noise Contours. Based upon the input data the INM generates the noise contours by plotting points of the noise level events which represent the average-annual day. The points are then connected to graphically represent the noise contours which the aircraft generate. The FAA, EPA, and HUD established the 65 DNL as the threshold indicating significant cumulative noise impacts. The 60, 65 and 70 DNL noise contours are overlaid on a high resolution aerial photo of the Airport and are presented on the following exhibits:

Figure 5-1 Noise Contours: Existing Conditions. 2013 operations on existing runway ends.
Figure 5-2 Noise Contours: Year of Implementation. 2016 operations on existing runway ends.
Figure 5-3 Noise Contours: Preferred Alternative 11. 2016 operations on extended Runway 10

Table 5 summarizes the surface area falling within the contours for the three different cases modeled within INM.

Table 5

Areas of Noise Exposure

	Acres within DNL Noise Contour		
	60	65	70
Existing Conditions (2013)	347.5	169.0	75.5
Existing Conditions (2016)	342.9	166.9	74.3
Proposed Conditions Alternative 11 (2016)	347.6	170.3	74.6

Source: FAA Integrated Noise Model (INM)
Mead & Hunt, Inc.

Compatible Land Use

Compatible land use is described in FAA Order 5050.4A, 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." The noise contours generated in the above section "Noise" will be used in this section to analyze the compatible land use impacts associated with the proposed airport development.

The degree of annoyance which people suffer from aircraft noise varies depending on their activities at any given time. The concept of "land use compatibility" has arisen from the variation in human tolerance to aircraft noise. Studies by governmental agencies and private researchers, in particular those by HUD and FAA, have defined the compatibility of different land uses with varying noise levels. **Table 6** lists the land use compatibility guidelines from FAR Part 150. These are only guidelines. Part 150 explicitly states that determinations of noise compatibility and regulation of land use are purely local responsibilities.

Table 6

Land Use Compatibility* with Yearly Day-Night Average Sound Levels (DNL)

	Yearly Day-Night Average Sound Level (DNL) in Decibels					
Land Use	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential Homes	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, & concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale/Retail -bldg matrls/hardware/farm equip.	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade - general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
MANUFACTURING & PRODUCTION						
Manufacturing - general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agricultural (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

*The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under FAR Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Key: Y (yes) = Land use and related structures compatible without restrictions.
N (no) = Land use and related structures are not compatible and should be prohibited.
25, 30, 35 = Land use and related structures generally compatible; measures to achieve Noise Level Reduction of 25, 30, 35 dB must be incorporated into design and construction of structure.

See following page for notes and source.

Notes: (1) = Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 DB over standard construction and assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problem.

(2) = Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) = Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) = Measures to achieve NLR 325 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) = Land use compatibility provided special sound reinforcement systems are installed.

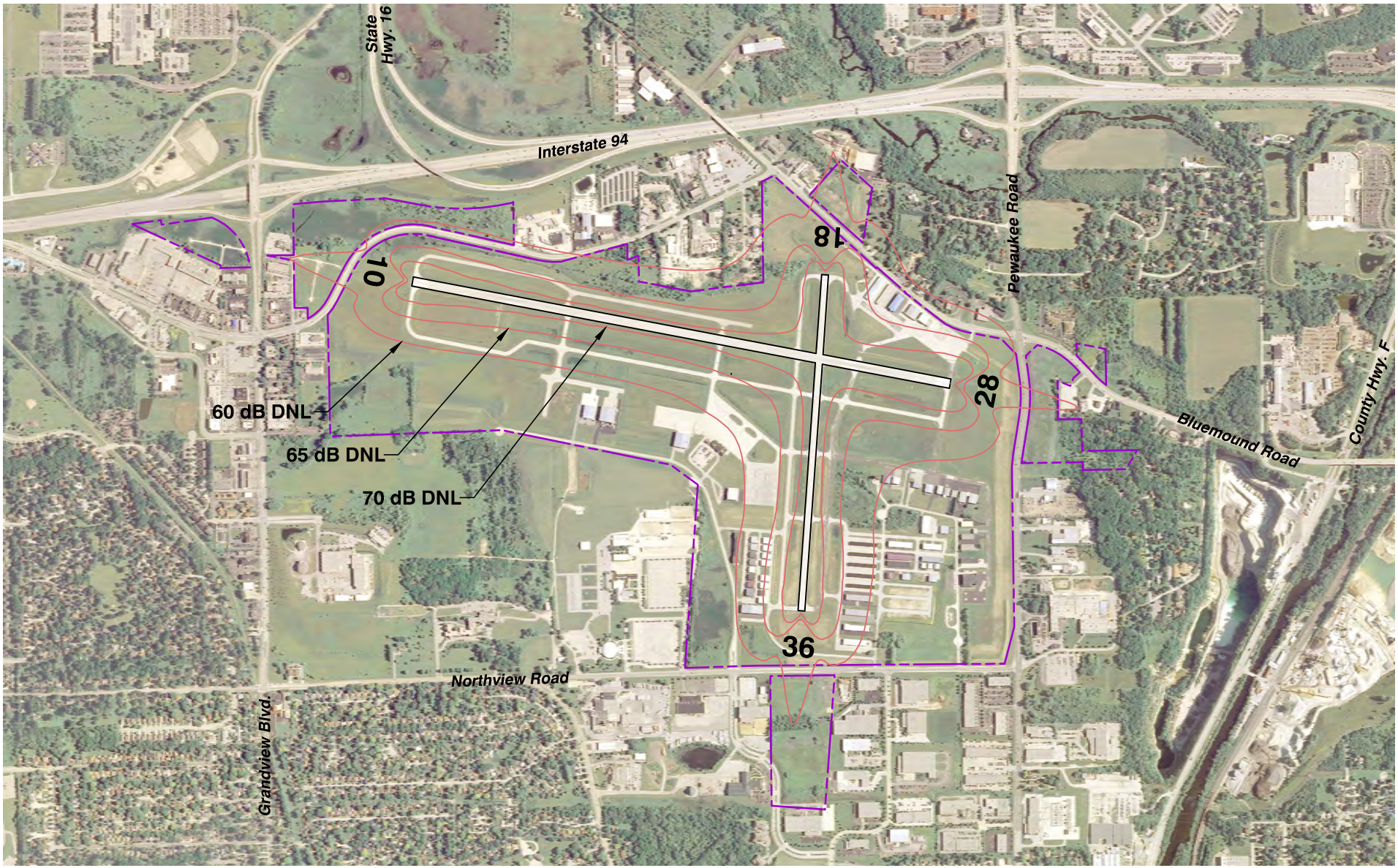
(6) = Residential buildings require an NRL of 25.

(7) = Residential buildings require an NRL of 30.

(8) = Residential building not permitted.

Source: FAR Part 150, *Airport Noise Compatibility Planning,* Appendix A, Table 1.

This scope does not include the survey of affected property or structures off Airport property, nor the development of mitigation plans regarding noise exposure related to any off Airport land uses. The noise analysis to be performed as part of this Environmental Assessment is for public information purposes only regarding existing and projected noise exposure from the airport.



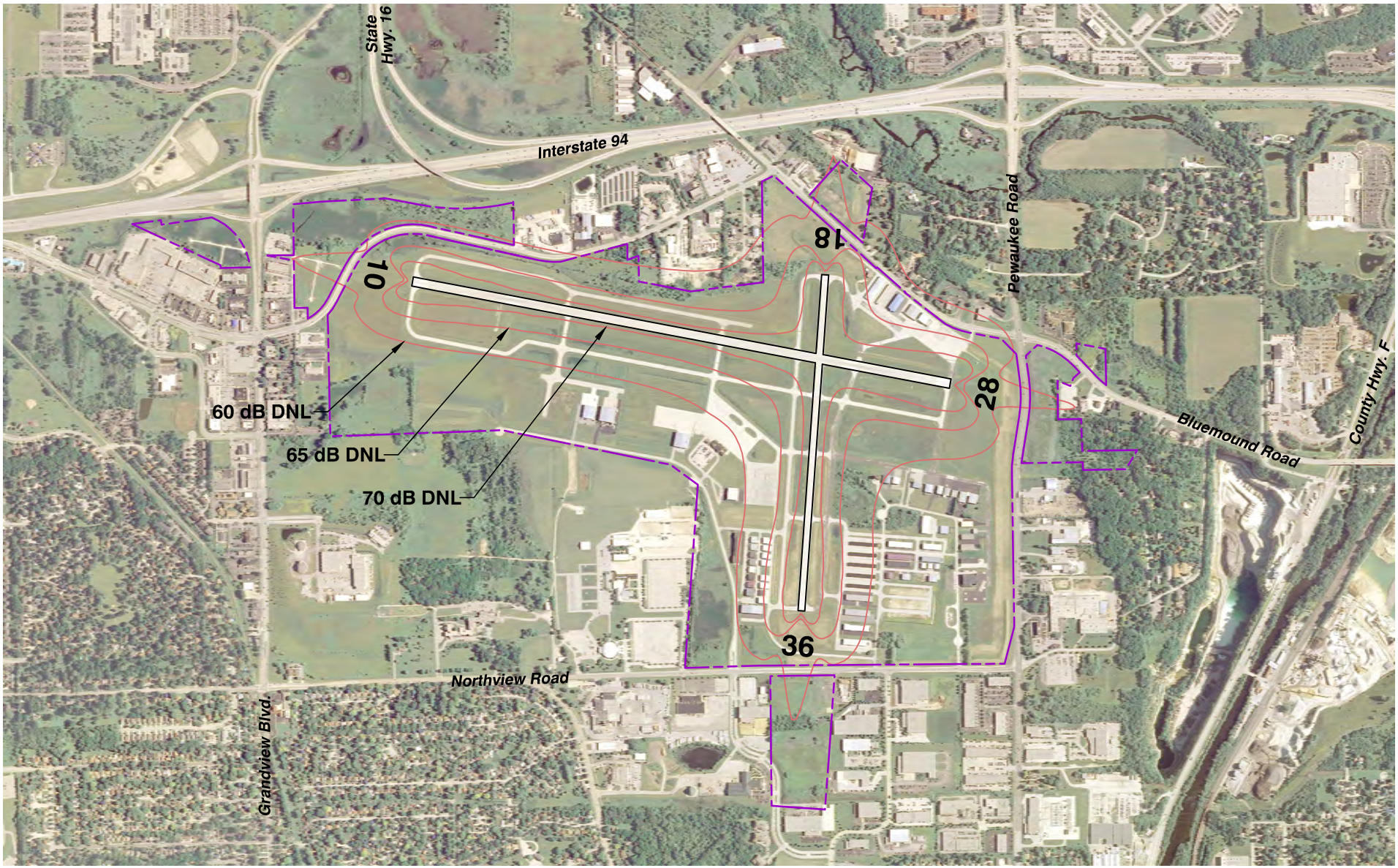
X:\230990\040008\TECH\cadd\noise contours\UES.Noise2014EA.2013ops.ExRwy.dwg May 08, 2017 - 11:15am

Figure 5-1

Noise Contours: Existing Configuration

2013 Operations, Existing Runway Ends

Waukesha County Airport



750'
0 Feet 1,500'

N

LEGEND
Airport Property
Noise Contour

Mead&Hunt

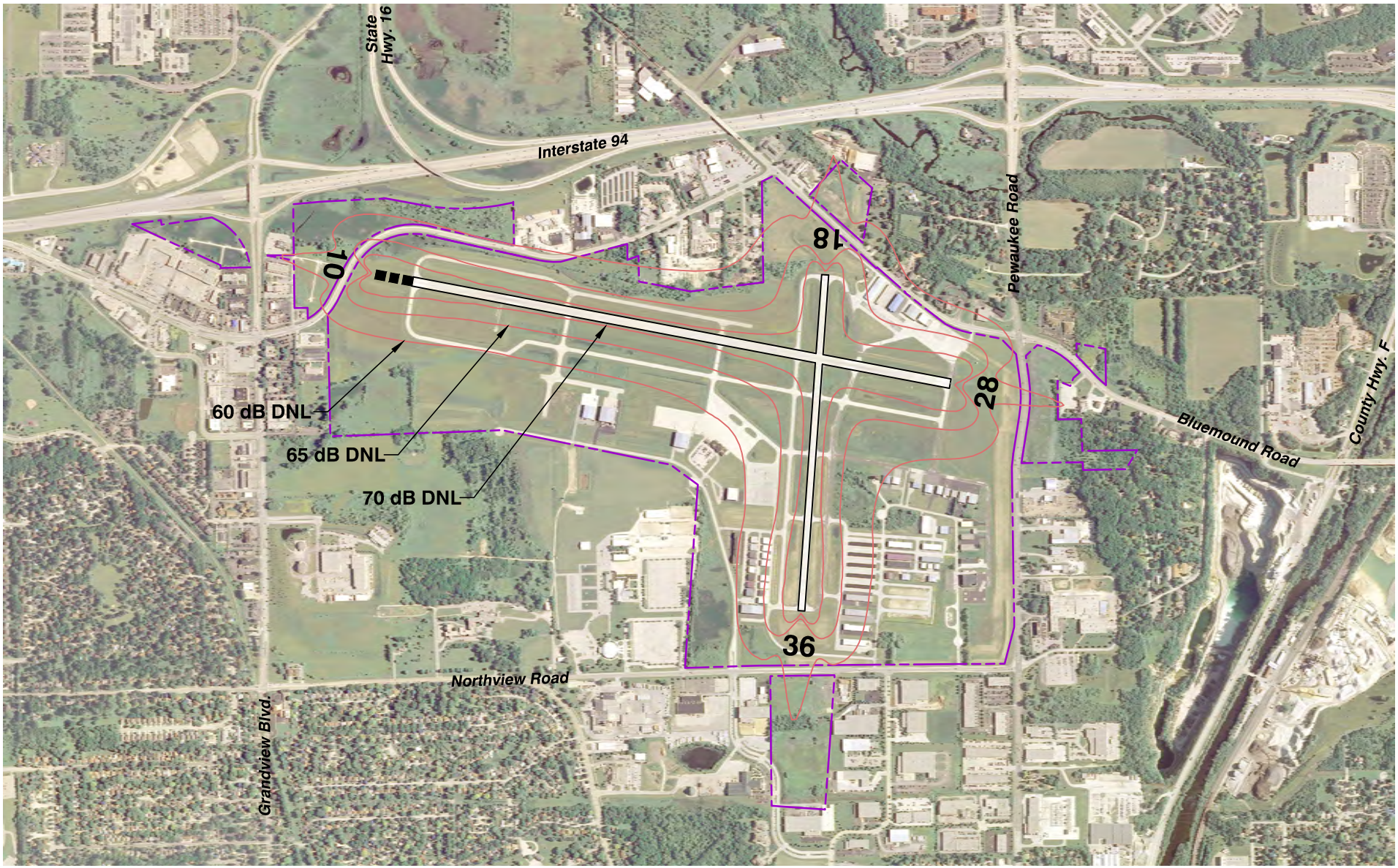
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Figure 5-2

Noise Contours: Existing Configuration

2016 Operations, Existing Runway Ends

Waukesha County Airport



750'
0 Feet 1,500'

N

LEGEND
- Proposed Runway Extension
- Airport Property
- Noise Contour

Mead&Hunt

X:\230990\040008\TECH\cadd\noise contours\UES.Noise2014EA.2016ops.Alt11c.dwg May 08, 2017 - 11:30am

Figure 5-3

Noise Contours: Preferred Alternative 11

2016 Operations, Extend Runway 10 400' West

Waukesha County Airport

Appendix M. Public Involvement


WAUKESHA
EXPO CENTER
ARENA
AIRPORT OPEN HOUSE
HERE WED 6:30-8P
ALL WELCOME
STOP

MAILING LIST FOR APRIL 2004 PUBLIC INFORMATION MEETING
BLUEMOUND ROAD BUSINESSES

First Realty - GMAC.
N12 W24488 Bluemound Road
Waukesha, WI 53188

Accurate Specialties, Inc.
N12 W14360 Bluemound Road
Waukesha, WI 53188

Airport Lodge
N10 W24250 Bluemound Road
Waukesha, WI 53188

The OK Coral
N9 W24200 Bluemound Road
Waukesha, WI 53188

Hogdson Niedecken Company
N9 W24198 Bluemound Road
Waukesha, WI 53188

Wisconsin Vehicle Emission Testing Station
Bluemound Road
Waukesha, WI 53188

Auto Glass Specialists
W240 N901 Pewaukee Road
Waukesha, WI 53188

Communication Packaging
N8 W24410 Bluemound Road
Waukesha, WI 53188

Waukesha Veterinary Referral Center
360 Bluemound Road
Waukesha, WI 53188

Lofts at Cedar Ridge
N7 W23827 Bluemound Road
Waukesha, WI 53188

Taste of Italy
N7 W23825 Bluemound Road
Waukesha, WI 53188

Lakeland Marine
N11 W24440 Bluemound Road
Waukesha, WI 53188

Mokros Cycles
N7 W23757 Bluemound Road
Waukesha, WI 53188

Computer & Monitor Repair Service
N6 W23673 Bluemound Road
Waukesha, WI 53188

Zenith Tech, Inc.
N6 W23633 Bluemund Road
Waukesha, WI 53188

Payne & Dolan
N3 W23650 Badinger Road
Waukesha, WI 53188

Waukesha Small Animal Hospital
W233 N660 Bluemound Road
Waukesha, WI 53188

Boy Scouts of America
N12 W24498 Bluemound Road
Waukesha, WI 53188

Scott Industries
N13 W24600 Bluemound Road
Pewaukee, WI 53072

Precision Gear
N13 W24705 Bluemound Road
Pewaukee, WI 53072

Meda Care Vans
N15 W24817 Bluemound Road
Pewaukee, WI 53072

Ralph Kinney
All Safe Mini Stor-it
N14 W24789 Bluemound Road
Pewaukee, WI 53072

SILVERNAIL ROAD BUSINESSES

Anthony Bryant
Century Fence
N11 W24711 Silvernail Road
Pewaukee, WI 53072

Mark Fetzer
N10 W24781 Silvernail Road
Pewaukee, WI 53072

Skipper Bud=s Marine
N10 W24850 Silvernail Road
Pewaukee, WI 53072

Badger Utility Company
N10 W24910 Silvernail Road
Pewaukee, WI 53072

LaSalle Investments
1620 Silvernail Rod
Pewaukee, WI 53072

Peking House
2815 N. Grandview Blvd.
Pewaukee, WI 53072

Denny=s Restaurant
2801 N. Grandview Blvd.
Waukesha, WI 53072

Dave=s Mobil
1800 Silvernail Road
Pewaukee, WI 53072

Jack Weissgerber
Gasthaus Restaurant
2701 N. Grandview Blvd.
Waukesha, WI 53188

Lazer Lube
1812 Silvernail Road
Pewaukee, WI 53072

Fazoli=s Restaurant
1900 Silvernail Road
Pewaukee, WI 53072

Dambeck & Associates, Ltd.
N11 W24649 Silvernail Road
Pewaukee, WI 53072

Symons Corporation
N11 W24651 Silvernail Road
Pewaukee, WI 53072

Ellis Mason
Mason Building Systems
19650 Sommer Drive
Brookfield, WI 53045

Chuck Jorgenson
Peterbilt of Wisconsin
N1 W24500 Silvernail Road
Pewaukee, WI 53072

Tom Tardiff
W236 N1196 Kings Court
Waukesha, WI 53188

Bud & Pauline Jaske
Fairway Trucking
930 Silvernail Road
Pewaukee, WI 53072

Bryce Styza
Harmony Realty
2727 N. Grandview Blvd
Waukesha, WI 53188

Rick Buss
Merry Time Play Systems
900D Silvernail Road
Pewaukee, WI 53072

Paul Sara
Clear Channel Communications
24600 Silvernail Road
Pewaukee, WI 53072

Rich Schoenholtz
Clear Channel Communications
24600 Silvernail Road
Pewaukee, WI 53072

Associated Bank
P. O. Box 1600.
Waukesha, WI 53187

Envirogen, Inc.
2835 N. Grandview Blvd.
Waukesha, WI 53188

Charles Waldvogel, CPA
2831 N. Grandview Blvd.
Waukesha, WI 53188

Accountable Health Plans
2831 N. Grandview Blvd.
Waukesha, WI 53188

Canyon City Wood Grill & Saloon
2903 N. Grandview Blvd.
Waukesha, WI 53199

Bill Osenga
N22 W28260 Beach Park
Pewaukee, WI 53072

Craig & Linda Osenga
N22 W24743 Silvernail Road
Pewaukee, WI 53072

Scenic Self Storage
900A Silvernail Road
Pewaukee, WI 53072

OTHER INTERESTED PARTIES

Steven Howard, Deputy Chief
City of Waukesha Fire Department
130 W. St. Paul Ave.
Waukesha, WI 53188

City of Pewaukee Fire Chief
City of Pewaukee City Hall
W239 N2242 Pewaukee Road
Pewaukee, WI 53072

Mr. William O'Reilly
2802 Keri Ct
Waukesha, WI 53188

ATTENDANCE REGISTRATION SHEET
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA CRITES FIELD COUNTY AIRPORT

PLEASE PRINT

NAME	REPRESENTING	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
JUANE PAULSON	Co. Supervisor	WAUKESHA	262-542-4174	
LORI SKRZYNIAK	SHERWOOD FOREST Neighborhood	N9 W23839 SHERWOOD DR Waukesha WI 53188	262-521-0554	LORI@KRIZEK.COM
LARRY LEPPLA	CENTURY FENCE	N11 W24711 HWY 164 PEWAUKEE	262-347-3331	LLeppla@centuryfence.com
Bob & Lora S.	Neighborhood	N18 W22226 Takoma Dr	262-549-5477	
Jessie Parra		1838 Jeffery Ln	262-547-2565	
Mary Bines		1407 B Josephine St	262-547-9410	
Dorothy Myers	Neighborhood	W226 N148 Takoma Dr	262-542-6023	
Esther Haeselin		W226-N.295 Lot Vernon	262-547-6376	
Nikola Hubert		W. 226 N. 325 Mt. Vernon	262-970-5989	
Keith Fuchs		W236 N1050 Archery	262-542-492	
Steve Brown	Resident	W226 N269 TAKOMA DR.	262-544-4439	Steve@thetasphere.com
MARK DEVLINGER	Resident	2759 PLATT ST		

NAME	REPRESENTING	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Donna Booker	Neighborhood	W226 N136 Takoma Dr.	262) 544-5374	
Sandra Tragos	Neighborhood	2432 Emslie Dr.	262 970-0297	
Mike Kroft	Neighborhood	W237 N404 Oakridge Dr	262-547-8350	
Mike & Jim Farmer	Neighborhood	2115 Wolf Rd	(262) 547-5317	
Rodell T. Sargent	County Bd. Supv.	W254 S7890 Hi Lo Dr Muskego, WI 53150	262-662-3830	
Amy Gilgenbach	Neighborhood	W238 N1065 Sherwood Dr.	544-5890	
Anne Bailie	Neighborhood	W238 N1010 Sherwood	542-9343	
Keith Bailie	Neighborhood	W238 N1010 Sherwood	542-9343	
John Marsh	La Salle	1620 Silvernail	650-1099	
Barbara Schaefer	Neighborhood	2304 Candlelight Ct	547-1597	
Joe Schaefer	"	"	"	
Mary Johnson	"	W235 N967 Busse Rd	547-2616	
Robert E Johnson	"	W235 N967 Busse Rd	547-2616	
Ray Perry	Airport		521 5250	
Joe Griffin	C. BD		782-4661	

NAME	REPRESENTING	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
KENNETH OAKLEAF		717 W WASHINGTON	524-8134	OAKLEAFKE@AOL.COM
Mike Senn		1524 Dorel Lane		
Louise Sudermueller		N226 N216 Mt Vernon		theindy5@wispc.com
N. O'REILLY		2802 KERI CT		
Tom Poppe		N11 W24440 Bluemound Rd.	262-542-3821	tlake/anm@aol.com
Mike Poppe		N11W24440 Bluemound Rd	262-542-3821	
DARRYL JUNSON		1285 SUNNYRIDGE PEWAUKEE	262-695-8800	
STAN BETZLER		1908 Hillside Dr DELAFIELD WI	368-2003 262-646-2539	SBETZLER@EmpireLaw.com
Ron Kees		900A SILVERHILL ROAD PEWAUKEE	262 542-2055	SCON.CSCHUSTER@ ~~STEP~~
Fred Zwefel		2203 WOLF RD Waukesha 53186	262-547-7913	
Dan Schlenvogt		N11W24058 River Lane Waukesha 53188	262-547-0773	
Joe & Kathy SOLTIS		W226 N220 TAKOMA DR WAUKESHA, WI 53186	549-1297	
Jeff + AARON Mede		2700 KERI CT Waukesha 53188	574-6983	Peggypm@patricksse.com
DAVID WAGNER		2423 PATRICK LN	6501508	
Larry Schmidt	WSCA	1721 Northview Rd. Waukesha	650-7777	

NAME	REPRESENTING	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Steve Panozzo	City of Waukesha	912 N Bel-Air Dr Waukesha 53186	262-548-6344	SPANOZZO@WI.RR.COM
Jim Wareing		W235 N1061 Busse Rd, Waukesha 53186	262.544.6850	
Coleen E Marshall	"	2127 Laura Ct Waukesha 53186	262 544-9623	
John R Marshall	"	2127 Laura Ct Waukesha 53186	262-544-9623	
Kathy Baltweg	11	1808 Jefferey Ln	262-544-1534	

NAME	REPRESENTING	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
SAM LAHARAKIS		N7W23885 Bluemound Rd	262 542 1761	
R.A. MUELLER		4236 N 114th ARCHERY WAUKESHA	262 544 8885	

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

Name: KATHY BALLWEG

Address: 1808 Jeffery Ln

City: Waukesha State: WI Zip Code: 53186

Comments:

Thank you for having this open house! I believe it is so important to become informed and kept educated on what is happening at the Airport. I think attendance would have been higher if more post-cards were sent out (I understand more will be sent out next time) I believe many people are against phases 3 and 4 and I realize this open house was concerning phase 2. PLEASE continue to keep the lines of communication open where the public can voice their opinions and ask questions

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

Keep in mind when looking at expanding the airport how the surrounding neighborhoods will feel: More noise, more air pollution and lower property value.

Laura Morland

From: Michael Neau <mneau@critesfield.com>
Sent: Tuesday, November 08, 2005 3:01 PM
To: Michael Hall
Cc: kmarkano@critesfield.com; Laura Morland
Subject: HS-125 RSA information - Applied Power

Hi Michael,

I talked with Brian Theisen of Applied Power, which operates a HS-125 out of Waukesha, N120AP, and explained the FAA alternative that is currently being investigated for declared distances. He said that the extra 375-400 feet of takeoff would give him an average of an additional 900 pounds he could add to his aircraft for takeoff weight, which he loves. The shortening to 5328 feet would not be an issue for a dry runway landing, but would be a case-by-case issue for landing on a wet runway. He would have to plot his fuel very carefully to make sure he could make the landing on a wet runway before leaving his destination for Waukesha. He said the wet runway scenario makes the shortened runway not so good for him, as there may be times when he won't be able to get into Waukesha if the weights don't work out for him on his trips. The max landing weight for his Hawker is 23,350 pounds. In looking at the whole thing overall, he would prefer us to do this alternative, with only the wet runway issue causing some concern.

Brian said if you wanted any further information from him, feel free to call him anytime. His phone number is 262-337-2009. He has a database system there where he calculates takeoff and landing scenarios for weights and stuff, so that could help you out if you needed more specifics. I have several more to call yet, so when I talk to others, will let you know what they say too.

Sincerely,

Michael Neau A.A.E.
Airport Operations
Waukesha County Airport

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

Ms. Loren Skerencak
Name

N9 W23839 Sherwood Drive
Address

Waukesha (City of Pewaukee) WI 53188
City State Zip Code

Comments: As I mentioned on 4/28, the Sherwood Forest subdivision is all on Septic and well ! When they lowered the intersection of Hwy's J & JJ several years ago to develop the current safety areas, they dug into an aquafur and many of our residents in the subdivision lost their wells. They had to have new wells redrilled (very costly). I speak on behalf of all the residents of our concerns of making the intersection and/or other areas of Hwy J lower than they are now and disrupting the water table and/or aquafurs again.

FYI - Our neighborhood has many, many concerns about the future development of the airport. But those need to be addressed at the appropriate time and place.

Thanks,

Loren

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA CRITES FIELD
COUNTY AIRPORT

PLEASE PRINT

JOHN MARESH
Name

1620 SILVERNAIL ROAD
Address

PEWAUKEE WI 53072
City State Zip Code

Comments:

If the re-route Silvernail Road to the East, can they use the existing frontage to the West? It would make sense.

I would suggest that they expand the runway to the East by re-routing or tunneling Pewaukee Road.

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

FAX

From John Connell
Century Fence Company

Please deliver the following pages to:

Name:
Firm:
Phone:
Fax:

CENTURY FENCE COMPANY

SINCE 1917 THE MARK OF PERMANENCE

www.CenturyFence.com

Project: RE: Runway Project 10 Alternatives ***Due Date:***

Location:

Comments:

Our firm would definatley object to the closing of Silvernail Road. This option would adversely impact our business operation.

Rerouting Silvernail or constructing the tunnel would be a far better choice in our opinion.

An additional item of concern is the impact on our property from any of the long term plans under consideration.

Sincerely,

John Connell
President

Exclusions:

Addendas Noted:

N11 W24711 Silvernail Rd.
Pewaukee WI 53072

John Connell President
(262) 547-3331
(262) 896-3803

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

Name: Sandra Tragos

Address: 2432 Emslie Drive

City: Waukesha State: WI Zip Code: 53188

Comments: I was under the understanding that a planes taking off were to travel WEST on 94 before turning. This was happening for 6 months or so. Now the planes are back to taking off going weston 94 but turning and going over Pebble Valley Subdivision The neighborhood is complaining of this again and I am writing this on their behalf. We would Appreciate it if the planes when taking off would continue with the route they are to have and not going over the homes in Pebble Valley.

Use other side if more space is needed.

Thank You!

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

JIM WHELAN
Name

W235 N1061 BUSSE RD
Address

WAUKESHA WI 53188
City State Zip Code

Comments: Reduce Runway By 375' ON EAST END

Request FAA FAR WAIVERS

ESTABLISH DECLARED DISTANCES

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

KEITH BAILIE
Name

W238N1010 SHERWOOD DR.
Address

PEWAUKEE WI 53188
City State Zip Code

Comments: OUR HOUSE IS CLOSED TO THE AIRPORT AND THERE IS ENOUGH NOISE NOW. WE DON'T NEED MORE

WE FEEL EXPANSION WOULD LOWER OUR HOUSE VALUE.

SHORTEN BY 350 FEET AND PUT IN THE BARRIER.

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

MIKE KROFTA
Name

W237 N4041 OAKRIDGE DR.
Address

WAUKESHA WI 53188
City State Zip Code

Comments: 1 WILL PROPERTY VALUES DROP BECAUSE OF THIS EXPANSION OF THE AIRPORT?
2 WILL YOU BUY UP PROPERTY ON OAKRIDGE DRIVE DUE TO THE EXPANSION OF THE AIRPORT?
3 CAN'T BUSINESS USE MITCHELL FIELD JUST LIKE THE REST OF US?
4. WHY NOT EXPAND WEST ONLY
5 WHY NOT CAP THE USAGE OF THE AIRPORT BECAUSE OF THE LOCATION. BEING SURROUNDED BY MOSTLY RESIDENTIAL PROPERTIES
6.

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA (CRITES FIELD) COUNTY AIRPORT

PLEASE PRINT

Ann Ballie
Name

W238 N1010 Sherwood Dr.
Address

Waukesha | WI | 53188
City | State | Zip Code

Comments: Extending West would disrupt wetlands Extending East disrupts neighbors - is extremely costly and seems to be extremely costly. What is the possibility of
① Maintaining this as a small airport - for local traffic
② Building a new airport in some area more remote. (Possibly closer to Interstate 43

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

MARY JOHNSON
Name

W235N967 Eastwood
Address

Waukesha WI 53188
City State Zip Code

Comments: Suggest shortening the E end of the runway by the 375'. Hopefully this would limit the size + amount of airplanes using this airport.

Reduce the W runway by 700' to exclude many types of a/c

Don't close

Stop larger planes

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

WRITTEN COMMENTS
WAUKESHA COUNTY AIRPORT
RUNWAY 10/28 SAFETY AREA
OPEN HOUSE
APRIL 28, 2004

WAUKESHA COUNTY AIRPORT

PLEASE PRINT

Amy Gilgenbach
Name

W238 N1065 Sherwood Dr.
Address

Waukesha | WI | 53188
City | State | Zip Code

Comments: Please take into consideration -- in terms of economic impact -- potential/ estimated decreases in property values, especially in our subdivision -- Sherwood Forest. Also, please study noise impacts in this area, and air quality concerns. Sometimes in summer, we have very poor air quality due to the jets, because we're in a valley.

Use other side if more space is needed.

PLEASE RETURN THIS SHEET TO THE WRITTEN COMMENT TABLE OR MAIL BY MAY 14

Environmental Assessment

Runway 10/28 Runway Safety Area Project

FACT SHEET

The County Board adopted a comprehensive Airport Master Plan in 2002. The plan developed a Capital Improvement Plan for a 20-year planning window. Capital Improvement Projects were identified for the Short Term (5 year planning window), Midterm (5 years further out) and Long-Term (10 years) planning periods. This Environmental Assessment (EA) covers these short-term improvements. Primarily the EA will evaluate projects on Runway 10/28 to meet current Federal Aviation Administration (FAA) design criteria for Runway Safety Areas and approaches.

The EA will assist the County in deciding the best alternatives to meet the FAA 's Runway Safety Area safety criteria. The EA will also be developed to further determine whether any potential impacts are significant to the degree that would necessitate an Environmental Impact Statement (EIS).

1. **Purpose:** To study and evaluate the potential impacts of the possible alternatives to meet current runway safety standards.

2. **Need:** The airport is currently operating under a waiver to the FAA Runway Safety Area (RSA) criteria for both ends of Runway 10/28. In order to receive future federal funding for this runway, the safety standards must be met. Airfield improvements are funded at 60% to 90% by federal and/or state funds.

3. **Alternatives:**

   Do Nothing

   If nothing is done the County will forgo future federal funding for future repairs, improvements and maintenance on the runway including the lighting systems. The airport is an important transportation facility for the region. State studies have indicated that in 2000 the total economic output of the Airport was $29.8 million, it supported 589 jobs and contributed $12.3 million in wage income to the local economy. Since 2000 use of the airport has increased substantially resulting in an even greater economic impact on the community. It is essential that this facility continue to safely meet the needs of the region. There are impacts and costs associated with a "do nothing" alternative, which will be determined during the study

   Runway 10 Alternatives (West End of Runway):

   1. Close Silvernail Road. Traffic studies will be done to help determine the impact.
   2. Reroute Silvernail Road to the west to provide required safety areas.

3. Reduce runway length by approximately 700 feet. This could prohibit many users from using the airport and resulting negative economic impacts.
4. Shift runway to the east to provide safety area. The impact on the east end will have to be studied.
5. Request FAA to continue to waive RSA criteria. Approval would be contrary to FAA's current policy.
6. Establish Declared Distances. This would shorten the runway length for certain aircraft operations.
7. Install Engineered Material Arresting System (EMAS). This material has been used at a few large airline (air carrier) airports.
8. Construct tunnel for Silvernail Road. Costs and impacts during construction will be determined.
9. Some combination of the above.

Runway 28 Alternatives (East End of the Runway):

1. Reroute Pewaukee Road. Major project with many impacts to evaluate.
2. Close Pewaukee Road. Traffic studies will be done to help determine the impact.
3. Reduce runway length by approximately 375 feet. Impact on safety and aircraft operations will be studied.
4. Install EMAS. Same comment as on west end.
5. Construct tunnel for Pewaukee Road. Costs and impacts during construction will be determined.
6. Request FAA waiver to RSA criteria. Same comment as on West End
7. Establish Declared Distances. Same comment as on West End.
8. Some combination of the above.

4. Analysis of Alternatives

Alternatives will be evaluated based on their associated environmental impacts, costs, safety and impact on the utilization of the airport. Categories to be considered for impact will include:

a. Noise - Noise contours will be developed for the existing Airport use to establish a baseline.

b. Compatible Land Use - Impacts may include noise, air quality, wetlands, floodplains or other which may result in a potential influence on surrounding land use. The impacts will be evaluated to determine if any individual or combination of impacts exceeds a threshold of significance. Wildlife attraction is a component of this category that the FAA is placing increased importance on and this study will include a discussion of the proposed action's impact on hazardous wildlife attractants.

c. Social Impacts – The principal social impacts to be considered are those associated with road relocation or other community disruption; such as altered traffic patterns. It includes consideration of induced impacts and environmental justice. Traffic studies will be conducted to analyze alternatives involving impacts to public roads. Coordination with the Southeast Regional Planning Commission, County Highway Commission, City of Waukesha and the WisDOT will be included in the traffic analysis.

d. Air Quality – Waukesha County is located in a non-attainment area for ozone. This project is initiated to meet safety criteria and not to increase capacity. Based on early coordination with the Wisconsin Department of Natural Resources Air Bureau, an air quality analysis for General Conformity will not be required for airside improvements as long as the project will not result in increased operations or a different class of aircraft. Air quality analysis will be performed for up to five intersections as part of the traffic study.

e. Historical, Architectural, Archaeological, and Cultural Resources - A Phase I archaeological survey was completed for areas of potential ground disturbance – no sites were found.

f. Wetlands – A field delineation of wetlands has already been completed in the potential impact areas and will be used to identify potential wetland impacts.

g. Hazardous Materials - A Phase I Study will be required for any areas of potential disturbance if a previous investigation has not been completed.

h. Other topics to be considered include: water quality, biotic communities, endangered/threatened species (flora and fauna), solid waste and construction impacts.

Cumulative impacts will also be addressed – particularly with the new Master Plan completed in 2002. The question of whether this project's proposed action, when considered together with other past, present, and reasonably foreseeable future development projects on or off the airport, federal or non-federal, would produce a cumulative effect on any of the above impact categories will be answered.

9. Public Involvement and Meetings

This project will provide several opportunities for public agency review and public involvement.

a. Web Site
It is proposed that this web site will be used to inform the public about the status of the project and any up coming events.

b. Initial Public Meeting

A public information workshop will be held on April 28 from 6:30 – 8:00 p. m. at the Waukesha County Expo Center adjacent to the airport. The purpose of the meeting will be to answer questions the public may have about the project and seek input on items to consider. The Mead and Hunt (who has contracted with the Wisconsin Bureau of Aeronautics to conduct the EA), Wisconsin Bureau of Aeronautics and Airport management will be present at the meeting.

c. Interim Public Meeting

A second public meeting will be held after alternatives are developed and impacts investigated. This phase includes traffic studies; preliminary engineering (adequate to assess impacts), identification of environmental impacts and cost estimates.

At the second meeting, the analysis of the alternatives will be discussed and public input solicited. After the meeting, Mead & Hunt will proceed on the analysis of the preferred alternative(s) and completion of the Preliminary EA.

d. Workshop and Public Hearing

After a Preliminary EA is completed and distributed for review and comment by the public, local, state and federal agencies, an informal workshop and public hearing will be held concurrently.

Comments received will be reviewed and incorporated appropriately in a Final EA.

Last updated 4/13/2004


WAUKESHA COUNTY
EXPO
Waukesha County
Victim Impact Panel
Arena 6:30 p - 8 p
Public Hearing
Proposed
Runway Safety
Area
Improvements
Forum North Hall
5:30 pm - 8 pm
STOP

WAUKESHA COUNTY AIRPORT
RUNWAY SAFETY AREA PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT – JAN. 2017
DISTRIBUTION LIST

NAME AND/OR AGENCY **ADDRESS**
Andrew Horton U.S. Department of the Interior – Fish & Wildlife Service Ecological Services - Twin Cities Field Office 4101 American Boulevard East Bloomington, MN 55425-1665
Marie Kopka U.S. Army Corps of Engineers 250 N. Sunnyslope Road, Suite 296 Brookfield, WI 53005
Craig Webster Wisconsin Department of Natural Resources 141 NW Barstow St. Waukesha, WI 53188
Henri Woods Wildlife Biologist USDA- APHIS Wildlife Services 5800C South Howell Avenue Milwaukee, WI 53207-6189
Mike Hahn, Executive Director Southeastern Wisconsin Regional Planning Commission W239 N1812 Rockwood Drive P.O. Box 1607 Waukesha, WI 53188
Joe Gallamore WisDOT – SE Freeways 141NW Barstow Street Waukesha, WI 53187
Ken Westlake US Environmental Protection Agency 77 W Jackson B-19J Chicago, IL 60604
Joseph Mionkowski Manager FAA ATO Tech Ops 5330 S. Howell Avenue Milwaukee, WI 53207
Jack L. Gilbertsen, REM Environmental Protection Specialist Chicago Airports District Office Federal Aviation Administration 2300 E. Devon Ave Des Plaines IL 60018 Linda Mitchell

WAUKESHA COUNTY AIRPORT
RUNWAY SAFETY AREA PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT – JAN. 2017
DISTRIBUTION LIST

NAME AND/OR AGENCY **ADDRESS**
WisDOT – SE Region
Jay Waldschmidt WisDOT - WEPA/NEPA Team Lead 4802 Sheboygan Ave. Room 451 Madison, WI 53707-7965
Andy Trimble Project Manager WisDOT BOA P.O. Box 7914 Madison, WI 53707-7914 *(to be hand delivered by Mead & Hunt at Airport meeting on Feb 22, 2017)*
Diann Danielsen Airport Land Program Manager WisDOT BOA P.O. Box 7914 Madison, WI 53707-7914 *(to be hand delivered by Mead & Hunt at Airport meeting on Feb 22, 2017)*
Kurt Stanich Airport Manager Waukesha County Airport 2525 Aviation Drive Waukesha, WI 53188 *(to be hand delivered by Mead & Hunt at Airport meeting on Feb 22, 2017)*
Michael Crowley, Chairman Waukesha County Airport Commission *(to be hand delivered via Airport)*
Gary Evans Manager – Waukesha County Highway Engineering Division Waukesha County Administration Center – Room 220 515 W. Moreland Blvd. Waukesha, WI 53188 *(to be hand delivered via Airport)*
Fred Abadi - Director of Public Works City of Waukesha 130 Delafield St Waukesha, WI 53188 *(to be hand delivered via Airport)*
Mike Grulke

WAUKESHA COUNTY AIRPORT
RUNWAY SAFETY AREA PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT – JAN. 2017
DISTRIBUTION LIST

NAME AND/OR AGENCY **ADDRESS**
City of Waukesha – Engineering Division 130 Delafield St Waukesha, WI 53188 *(to be hand delivered via Airport)*
Doug Koehler City of Waukesha - Community Development Department 201 Delafield Street Room 200 Waukesha, WI 53188 *(to be hand delivered via Airport)*
Public Document Copy to be provided at: Waukesha County – Department of Public Works 515 W. Moreland Boulevard (#220) Waukesha, WI 53188 *(to be hand delivered via Airport – also include notice of public hearing)*
Public Document Copy to be provided at: Waukesha Public Library 321 Wisconsin Avenue Waukesha, WI 53188 *(to be hand delivered via Airport – also include notice of public hearing)*

AFFIDAVIT OF PUBLICATION

State of Wisconsin Circuit Court Waukesha County

PROOF OF PUBLICATION

Account Name: Waukesha Co. Airport
Telephone Number: 262-521-5250
Address: Crites Field
2525 Aviation Drive
Waukesha, WI 53188

ACCT Number: 633131

RECEIVED
FEB 28 2017
WAUKESHA COUNTY AIRPORT

IN THE MATTER OF: 10/28 Safety Improvements
AD Number: 100054003
AD Cost: 57.55

NOTICE OF PUBLIC HEARING ON THE DESIGN AND ENVIRONMENTAL ASPECTS AND NOTICE OF AVAILABILITY OF A PRELIMINARY ENVIRONMENTAL ASSESSMENT FOR PROPOSED RUNWAY SAFETY AREA IMPROVEMENTS OF THE WAUKESHA COUNTY AIRPORT

Waukesha County Airport - Proposed Runway 10/28 Safety Area Improvements

A Preliminary Environmental Assessment (EA) document has been prepared which evaluates a proposed County Airport improvement project, in accordance with Federal Law. The project includes the following:

- Re-align Silvernail Road to the west
- Shift Runway 10 by 400 feet west with corresponding extensions to Taxiway A.
- Shift Runway 10 approach lights, glideslope, PAPI and AWOS by 400 feet west.
- Acquire and transfer property to accommodate a realigned Silvernail Road and shifted approach lights.
- Relocate the Runway 10 localizer array and shelter outside of runway safety critical areas.
- Implement declared distances for both directions of operation on Runway 10-28.
- Construct new access roads to the relocated navigational instruments.
- Remove the non-standard parallel taxiway along the north side of Runway 10-28.
- Extend or relocate storm sewer culverts outside the Runway 10-28 safety area.
- Perform grading operations associated with the proposed improvements.
- Construct dry storm water management facilities for the proposed improvements.
- Widen the Taxiway A alignment transition to Design Group 2 standards.

I, Teri Malczewski ,being sworn, state:

I am the billing coordinator of the Waukesha Freeman, a public newspaper of general circulation, printed and published in the English language in the City of Waukesha, in Waukesha County, Wisconsin, and fully complying with the laws of Wisconsin relating to the publication of legal notices.

The notice, of which a printed copy attached hereto, is a true copy taken from the newspaper as published on the following dates.

2/25/17

Signed: Teri Malczewski
Teri Malczewski, Billing Coordinator

STATE OF WISCONSIN SS.
WAUKESHA COUNTY

Personally came before me, this date of February 25, 2017
the above named Teri Malczewski to me known to be the person who executed the foregoing instrument and acknowledged the same.

Signed: Nancy Bellin
Nancy Bellin
Notary Public, Wisconsin
My Commission expires: 10/5/18

NANCY BELLIN NOTARY PUBLIC STATE OF WISCONSIN

WISCONSIN DEPARTMENT OF TRANSPORTATION
PUBLIC HEARING

On The Preliminary Environmental Assessment
Prepared for Waukesha County Airport (UES)

RUNWAY 10/28 SAFETY AREA IMPROVEMENTS

City of Waukesha, Waukesha County, WI

DATE:	TIME:	LOCATION:	PURPOSE:
March 29th, 2017	5:30 pm	Waukesha County Expo Center, 1000 Northview Rd., Waukesha, WI	Public Hearing, Public Information Workshop on Preliminary Environmental Assessment – Runway 10/28 Safety Area Improvements

ATTENDANCE RECORD

Please Note: The information in this document (including names, addresses, phone numbers, e-mail addresses, and signatures) is not confidential, and may be subject to disclosure upon request, pursuant to the requirements of the Wisconsin open records law, sections 19.31—19.39 of the Wisconsin Statutes.

NAME (Please Print)	STREET ADDRESS CITY/STATE/ZIP CODE	REPRESENTING	PHONE NUMBER	Email (Please fill out if you would like to receive notifications by email)
Jay Waldschmidt		WisDOT	608-267-9806	jay.waldschmidt@dot.wi.gov
Matt Greuble		Airport	262-364-9145	mgreuble@waukeshacounty.gov
Kate Johnson		Metal4	262-210-5804	kate@metal4.biz
Tracy Shilabrit		Metal4	262-825-2613	tracy@metal4.biz
DIANN DANIELSEN		WISDOT/BOA	608-266-1709	DIANN.DANIELSEN@DOT.WI.GOV
ANDY TRIMBLE		WisDOT/BOA	608-267-0454	ANDREW.TRIMBLE@DOT.WI.GOV
Debbie Harnen.		Gramann Reporting	414 272-7878	—
Matthew Messina		WisDOT/BOA	608-267-7108	matthew.messina@dot.wi.gov
LAURA MORLAND		MEAD & HUNT, INC	608-273-6380	LAURA.MORLAND@MEADHUNT.COM
JOHN MARESH		LASALLE	262 650 1099	
STEVE BETZLER		Commissioner		
ALEX DAMIEN		CITY OF WAUKESHA	262-524-3907	adamien@ciwaukesha.us
MICHAEL A. CROWLEY		AIRPORT COMMISSION	262-894-0723	MCROWLEY@WAUKESHACOUNTY.GOV

WISCONSIN DEPARTMENT OF TRANSPORTATION
PUBLIC HEARING

On The Preliminary Environmental Assessment
Prepared for Waukesha County Airport (UES)

RUNWAY 10/28 SAFETY AREA IMPROVEMENTS

City of Waukesha, Waukesha County, WI

DATE:	TIME:	LOCATION:	PURPOSE:
March 29th, 2017	5:30 pm	Waukesha County Expo Center, 1000 Northview Rd., Waukesha, WI	Public Hearing, Public Information Workshop on Preliminary Environmental Assessment – Runway 10/28 Safety Area Improvements

ATTENDANCE RECORD

Please Note: The information in this document (including names, addresses, phone numbers, e-mail addresses, and signatures) is not confidential, and may be subject to disclosure upon request, pursuant to the requirements of the Wisconsin open records law, sections 19.31—19.39 of the Wisconsin Statutes.

NAME (Please Print)	STREET ADDRESS CITY/STATE/ZIP CODE	REPRESENTING	PHONE NUMBER	Email (Please fill out if you would like to receive notifications by email)
GARY GLOJEK	High Meadow Court Pewaukee, WI 53072	AIRPORT COM	262-695-9258	gglojek@glojekltd.com
MIKE JUDSON	1285 SUNNYSIDE PEWAUKEE WI	OWNER	262-695-8800	
Ryan Klagmann	W145 N5069 Stone Dr. Menomonee Falls, WI 53051	Owner	262-227-5591	ryanklagmann@yahoo.com
FRANZ KLAGMANN	W145 N 5087 STONE DR MENOMONEE FALLS WI 53051	OWNER	262-781-2784	SUSANKLAG@YAHOO.COM
Kurt Stanich	2525 Aviation Dr Waukesha, WI 53188	Airport	262-424-6747	kstanich@waukeshacounty.gov
GREG STERN	2420 Deming Way Middleton, WI	Mead & Hunt	608-273-6380	greg.stern@meadhunt.com

RECEIVED DOT
MAR 20 2017
BUR. OF AERONAUTICS

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
W239 N1812 ROCKWOOD DRIVE • PO BOX 1607 • WAUKESHA, WI 53187-1607• TELEPHONE (262) 547-6721
FAX (262) 547-1103

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WAUKESHA



March 16, 2017

Mr. Andy Trimble
Wisconsin Bureau of Aeronautics
4802 Sheboygan Avenue, Room 701
P.O. Box 7914
Madison, WI 53707-7914

Dear Mr. Trimble:

Pursuant to the February 23, 2017, letter request from Mr. Greg Stern, Mead & Hunt, Inc., the Commission staff has reviewed the Waukesha County Airport, Waukesha, Wisconsin, Runway 10/28 Safety Area Improvement Project, Preliminary Environmental Assessment (PEA). Based upon our review of the PEA, we have the following two comments:

- *Federally or State Listed Species or Critical Habitat* (Section 4.8) - This section did not include the rusty-patched bumble bee. The USFWS included Waukesha County in the distribution of the rusty-patched bumble bee and listed this species as endangered in late 2016. However, an executive order on January 20, 2017, delayed the rule listing the species as endangered until March 21, 2017. Hence, it may be prudent to verify the species' status, and to include it within this section if appropriate.
- *Wetland Boundary Overview Maps* (Figures 4.8A through D)-There are several wetland boundaries that were delineated in years 2010-2011. The U.S. Army Corps of Engineers may consider these delineations to be expired, since they were completed more than five years ago.

We trust this is responsive to the request. Should you have any questions concerning these comments, please do not hesitate to call.

Sincerely,

Michael G. Hahn

Michael G. Hahn, P.E., P.H.
Executive Director

MGH/TMS/dd
Letter Response-Waukesha County Airport PEA (00236570)

cc: Mr. Greg Stern, P.E.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAR 15 2017

REPLY TO THE ATTENTION OF:
E-19J

Amy Hanson
Federal Aviation Administration
Chicago Airports District Office
CHI-ADO-600
2300 E Devon Avenue
Des Plaines, Illinois 60018

Re: Preliminary Environmental Assessment for Airport Runway 10-28 Safety Area Improvements at the Waukesha County Airport, Waukesha County, Wisconsin

Dear Ms. Hanson:

The U.S. Environmental Protection Agency (EPA) has reviewed the referenced project scoping document, which was prepared by Mead & Hunt, Inc., consultant to the Federal Aviation Administration (FAA). We are providing comments pursuant to our authorities under the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The proposed action involves the following infrastructure improvements at the Waukesha County Airport:

- Realign Silvernail Road west from its existing location;
- Shift Runway 10 by 400 feet west with corresponding extension of Taxiway A;
- Shift Runway 10 approach lights, glideslope, Precision Approach Path Indicator (PAPI), and Automated Weather Observing System (AWOS), by 400 feet west;
- Acquire and transfer property to accommodate a realigned Silvernail Road and shifted approach lights;
- Relocate the Runway 10 localizer array and shelter outside of the runway safety critical areas;
- Implement declared distances for both directions of operation on Runway10-28;
- Construct new access roads to the relocated navigational instruments;
- Remove the non-standard parallel taxiway along the north side of Runway 10-28;
- Extend or relocate storm sewer culverts outside the Runway 10-28 safety area;
- Perform grading operations associated with the proposed improvements;
- Construct dry stormwater management facilities for the proposed improvements; and
- Widen the Taxiway A alignment transition to Design Group 2 standards.

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Twelve alternatives have been proposed for this proposed project:

- Alternative 1. No Action Alternative;
- Alternative 2. Request Continuances of FAA Waivers;
- Alternative 3. Close Silvernail and Pewaukee Roads;
- Alternative 4. Relocate Silvernail and Pewaukee Roads;
- Alternative 5. Tunnel Silvernail and Pewaukee Roads;
- Alternative 6. Shift Runway 10 East, and Runway 28 West;
- Alternative 7. Shorten Runways 10 and 28;
- Alternative 8. Establish Declared Distances for Runways 10 and 28;
- Alternative 9. Install Engineered Material Arresting System off Runways 10 and 28;
- Alternative 10. Add Pavement to Runways 10 and 28, and Establish Declared Distances;
- Alternative 11. Realign Silvernail and Pewaukee Roads, Extend Runway 10, and Establish Declared Distances (Preferred Alternative); and
- Alternative 12. Realign Silvernail Road and Install Engineered Material Arresting System off Runway 28.

Based on our review, we have comments relating to best management practices, energy efficiency, recycling and reuse of construction materials, and creating a federal strategy to promote the health of honey bees and other pollinators, as stated below.

Best Management Practices
We concur with the proposal to implement air quality, water quality, and water quantity best management practices (BMP) into the proposed project. We urge FAA to construct enough stormwater retention to hold the volume of stormwater associated with a 500-year flood event.

Green Infrastructure
We recommend FAA install permeable pavement, where applicable.

Energy Efficiency
We encourage the use of energy-efficient runway and taxiway lighting, use of sustainable building materials, and installation of renewable energy sources. Section 438 of the Energy Independence and Security Act provides excellent examples of how to integrate energy efficiency into Federal projects.

Recycling and Reuse of Construction Materials
We recommend pavement (asphalt, concrete, or cement) and structural materials be reclaimed for future use for this project, or elsewhere.

Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators
The 2014 Presidential Memorandum (PM) entitled, "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators[1]," responds to evidence of steep declines in certain pollinator populations. Pollinators are critical contributors to our nation's economy, food system, and environmental health. Vegetation within the project area can provide much needed

[1] www.whitehouse.gov/briefing-room/presidentialactions/presidential-memoranda

habitat for pollinators, providing food, shelter, and connections to other patches of habitat. Maintenance staff and landscape designers can all take steps to improve the quality of vegetation to benefit pollinators, steps that can also reduce costs, maintain public safety, and improve public good will.

We are available to discuss these comments at your convenience. Please feel free to contact Mike Sedlacek of my staff at 312-886-1765, or by email at sedlacek.michael@epa.gov.

Sincerely,

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc: Andy Trimble, Wisconsin Bureau of Aeronautics

Laura Morland

From: Trimble, Andrew - DOT <Andrew.Trimble@dot.wi.gov>
Sent: Monday, April 10, 2017 2:22 PM
To: Greg Stern
Cc: Laura Morland
Subject: FW: Waukesha County Airport Preliminary Environmental Assessment

Categories: Filed by Newforma

Good afternoon… TAA
-Andy

From: Mohr, Bill - DOT
Sent: Monday, April 10, 2017 2:18 PM
To: Trimble, Andrew - DOT
Cc: Mohr, Bill - DOT ; Gallamore, Joe D - DOT
Subject: Waukesha County Airport Preliminary Environmental Assessment

Andy:

A request was sent out to Joe Gallamore to comment on the Preliminary EA for the Waukesha County Airport, Runway 10/28 Safety Area Improvement Project, with comments sent back to you by COB today. Joe asked me to respond with any comments.

Other than some minor spelling errors, the only other comment we have is that while we do not have a study going on at this time for Interstate 94 within the area of the Waukesha airport, any expansion of the freeway as shown in the SEWRPC VISION 2050: A Regional Land Use and Transportation Plan, will impact the airport's property – notably lands between the interstate and the airport east of CTH T. We would not impact Silvernail Road, however we would impact the wetlands to the north of Silvernail Road. Additionally, The CTH T interchange will someday require reconstruction, and we understand we will need to coordinate any work with the Bureau, City of Waukesha, Waukesha Regional Airport and FAA as it pertains to structures within the Runway Approach Protection Zone (RPZ).

For the spelling comments I have the following:

Page 33 – second paragraph change "it" to "its" for the second to last sentence… life cycle cost in its evaluation.

Page 49 – Section 4.3.1 Land Use – confusing sentence "…, the area containing the airport and its surrounding is designated as a medium density urban area." I'm assuming you mean the area surrounding the airport and the airport are designated as a medium density urban area.

Page 55 – 4.6 Natural Resources – Existing Environment – initial scoping meeting was held ~~in~~ on March 16, 2004 …

Page 87 – 5.12 Water Quality – Change the word "imperious" to "impervious" in the sixth paragraph.

Page 93 – remove the word "in" next to between under wetland 4 and wetland 5.

If you have any questions on these comments, please feel free to contact me at the Waukesha DOT office. Thank you.

Bill

William Mohr, P.E.
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City of Waukesha

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WISCONSIN DEPARTMENT OF TRANSPORTATION

Please place this form in the box on the registration table or mail by April 10, 2017

Name (please print): ALEX DAMIEN Date: 4/7/17

Address: 130 DELAFIELD ST

Phone Number (optional): _____ E-mail Address (optional): adamien@waukesha-wi.gov

Testimony (use additional pages if necessary):

Waukesha County Airport / Silvernail Road Relocation Comments

- The City supports the preferred alternatives as presented in the environmental documents.
- City has recently approved a 35 MPH posted speed limit on Silvernail Road. Roadway design should incorporate the lower posted speeds.
- Please minimize wetland impacts as much as possible. The 35 MPH posted speed should help.
- A large area of the City drains to this wetland and every effort should be made to insure all proper drainage is maintained.
- Existing Silvernail Road has drainage issue due to improperly sized culverts. Be sure that realigned Silvernail Road is raised and have properly sized culverts to pass under it.
- At one time, there was a configuration presented that had a roadway coming off the Silvernail Curve, where the existing Las Salle Bank is located and connected to an extension of Woodburn Road. The City does not support this connection.
- The City would like to see a master plan from the County for all lands the county owns near and around the airport. What are the future considerations for extending Woodburn Road and connecting to Airport Road? Are there other new roadways the County is considering.
- The City will need to work with the Silvernail Road design engineer to properly locate driveways or combined drives for the businesses that front N. Grandview Blvd. and have a shared access to Silvernail Road. The existing shared access to Silvernail Road for these businesses should not be reinstalled since it is now located much closer to the first curve.
- The city would prefer that the businesses still have a combined roadway but connecting to Silvernail Road at two locations.
- The City would prefer a typical City street cross section (curb & gutter, sidewalks, street lighting, storm sewer, etc.). We understand there may be some restrictions with the Airport runway components vs. street lighting.
- The City looks forward to working with the County on developing this roadway realignment.

The information in this document including names, addresses, phone numbers, e-mail addresses, and signatures is not confidential, and may be subject to disclosure upon request, pursuant to the requirements of the Wisconsin open records law, sections 19.31 - 19.39 of the Wisconsin Statutes.

Southeastern Regional Planning Commission (SEWPRC) – March 16, 2017 Comment Letter

Comment 1
Federally or State Listed Species or Critical Habitat (Section 4.8) - This section did not include the rusty-patched bumble bee. The USFWS included Waukesha County in the distribution of the rusty- patched bumble bee and listed this species as endangered in late 2016. However, an executive order on January 20, 2017, delayed the rule listing the species as endangered until March 21, 2017. Hence, it may be prudent to verify the species' status, and to include it within this section if appropriate.

Response:
The USFWS's website was reviewed for occurrences of the rusty-patched bumble bee in Waukesha County in the vicinity of the project. Although the rusty-patched bumble bee was on previous USFWS lists, it has since been removed. Their recently updated site (current as of April 5, 2017) does not list the endangered bee as occurring in Waukesha County. Therefore, no changes will be made to the Final EA to include mention of it.

Comment 2
Wetland Boundary Overview Maps (Figures 4.8A through D)-There are several wetland boundaries that were delineated in years 20I0-20II. The U.S. Army Corps of Engineers may consider these delineations to be expired, since they were completed more than five years ago.

Response:
During preliminary design, the wetland delineation will be certified and submitted to the US Army Corps of Engineers and Wisconsin Department of Natural Resources. Since there haven't been appreciable land use changes or other activities in the project area's wetlands, it is anticipated the boundary will be the same or very similar.

USEPA's March 15, 2017 Comment Letter

"Based on our review, we have comments relating to best management practices, energy efficiency, recycling and reuse of construction materials, and creating a federal strategy to promote the health of honey bees and other pollinators, as stated below."

Comment 1 - Best Management Practices
We concur with the proposal to implement air quality, water quality, and water quantity best management practices (BMP) into the proposed project. We urge FAA to construct enough stormwater retention to hold the volume of stormwater associated with a 500-year flood event.

Response:
Comment noted. Because of the potential for standing water to create a wildlife attractant, all storm water management facilities will be designed as dry detention, draining within 48 hours.

Comment 2 - Green Infrastructure

We recommend FAA install permeable pavement, where applicable.

Response:

FAA has design requirements for its airfield pavements as does the City of Waukesha for roadways. Given the potential for foreign object debris, there are limited opportunities to install permeable pavement within the active airfield. However, there may be opportunities to utilize permeable pavements for the extended access roadways to the shifted approach light stations, and roadway segments to relocated approach instrument shelters. This will be explored during design.

Comment 3 - Energy Efficiency

We encourage the use of energy-efficient runway and taxiway lighting, use of sustainable building materials, and installation of renewable energy sources. Section 438 of the Energy Independence and Security Act provides excellent examples of how to integrate energy efficiency into Federal projects.

Response:

Design will consider inclusion of these elements; including LED airfield lighting.

Comment 4 - Recycling and Reuse of Construction Materials

We recommend pavement (asphalt, concrete, or cement) and structural materials be reclaimed for future use for this project, or elsewhere.

Response:

As noted in Section 5.8, it is anticipated that some of the existing pavement materials may be able to be recycled. Efforts would be made during design to identify opportunities for recycling pavements for use as the underlying base course of new or relocated pavements.

Comment 5 - Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators

The 2014 Presidential Memorandum (PM) entitled, "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators responds to evidence of steep declines in certain pollinator populations. Pollinators are critical contributors to our nation's economy, food system, and environmental health. Vegetation within the project area can provide much needed habitat for pollinators, providing food, shelter, and connections to other patches of habitat. Maintenance staff and landscape designers can all take steps to improve the quality of vegetation to benefit pollinators, steps that can also reduce costs, maintain public safety, and improve public good will.

Response:

Comment noted.

WisDOT SE Freeways – April 10th, 2017 E-mail Comments

Comment
Other than some minor spelling errors, the only other comment we have is that while we do not have a study going on at this time for Interstate 94 within the area of the Waukesha airport, any expansion of the freeway as shown in the SEWRPC VISION 2050: A Regional Land Use and Transportation Plan, will impact the airport's property – notably lands between the interstate and the airport east of CTH T. We would not impact Silvernail Road, however we would impact the wetlands to the north of Silvernail Road. Additionally, The CTH T interchange will someday require reconstruction, and we understand we will need to coordinate any work with the Bureau, City of Waukesha, Waukesha Regional Airport and FAA as it pertains to structures within the Runway Approach Protection Zone (RPZ).

Response:
Grammar and spelling corrections have been made.
Regarding future WisDOT road projects in the area and their impact to wetlands north of Silvernail, since a study isn't currently going on, the extent of impacts aren't known and it is assumed that sequencing of impacts will need to occur to minimize the wetland impact. The cumulative impacts Section 5.14 discusses the potential future wetland loss associated with public transportation projects and private development.

City of Waukesha – April 7th, 2017 Comment Letter

The City engineer provided comments summarized as follows:

1. The City supports the preferred alternative
2. The City provided comments related to the Silvernail Road design, and
3. The City recommended that the County undertake a master plan for all lands the County owns near and around the airport.

Response:
Comments 1 and 2. The Airport and its design engineers will work with the City on the Silvernail Road realignment design.
Comment 3: The recommendation for a Master Plan will be considered by the County in the future.

USACE – May 22, 2017 email

Marie Kopka from the USACE provided comments via email on May 22. Although provided after the comment period, they are included for the project record with response below.

Comment
It may be helpful for the reader to have one table which shows all of the alternatives considered and the reasons for dismissal. I believe there are several tables which list some but not all of the alternatives. These tables are currently contained within the text and appendices.

Response:
Comment noted.

Comment
Section 4.8 Federally listed species and critical habitat: The section states that the USFWS IPAC website was accessed on November 16, 2015 for a list of the ESA species in the project area. I recommend pulling an updated IPAC species list for the project area as the Rusty patched bumble bee was added to the ESA list in late March 2017. You could also use the interactive map on the USFWS to see if the project area overlaps with a 'high potential zone':
https://www.fws.gov/midwest/endangered/insects/rpbb/guidance.html

Response:
SEWPRC had similar comment. See response to SEWPRC comment above. Additionally, the high potential zone map was accessed which showed no high potential zone in the vicinity of the Airport.

Comment
Section 5.13.2 Wetland mitigation: the current proposal is to use the Kmetz and Jacobsen WisDOT banks. Both of these banks are within the Rock River watershed. The East Troy (STH 83) WisDOT bank is an approved bank that is within the same HUC 8 watershed as the project area. Credits may be released/available for this bank by the time the permit application is submitted.

Response:
As noted in Section 5.13.2. Wetland Mitigation of the Final EA, "While local or watershed-based, project-specific mitigation would be coordinated and discussed with the agencies during project design and permitting, it is likely that part or all of the impact would be banked at the most appropriate WisDOT statewide mitigation bank. The comparatively small area of wetland fill and lack of whole-unit converted hydric soil areas in the Waukesha region places a premium on wetland banking for alternative habitat compensation and banking remains the preferred mitigation option under current inter-agency guidance."

Most appropriate WisDOT bank and mitigation ratios will be determined during the design and permitting process.

Comment:
wetland delineation: I believe the last time a delineation was completed was in 2013 (also when the 2010, 2011, and 2012 boundaries were re-verified). This is getting close to 5 years and if there are conditions that may influence the wetland boundaries, a re-verification of the wetland boundaries may be warranted. We can also review jurisdiction at this time.

Response:
SEWPRC had similar comment on the age of the delineations. During preliminary design, the wetland delineation will be reverified and submitted to the US Army Corps of Engineers and Wisconsin Department of Natural Resources. Since there haven't been appreciable land use changes or other activities in the project area's wetlands, it is anticipated the boundary will be the same or very similar.

Appendix N. Wetland Functional Impact Analysis – Silvernail Road Relocation



ADID Wetland Functional Impact Analysis

Waukesha County Airport

Runway 10-28 Safety Area Environmental Assessment

Silvernail Road Relocation Alternative

Prepared for

Wisconsin Department of Transportation

Prepared by

Mead & Hunt

www.meadhunt.com

Date

February 2015

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Appendix

A WDNR Rapid Wetland Assessment Forms

1. Background

The Waukesha County Airport (Crites Field, referred to as Airport) does not currently meet Federal Aviation Administration (FAA) design standards associated with Runway Safety Areas (RSAs) and Object Free Areas (OFAs) at either end of its primary runway, Runway 10/28. Standards for these areas have been developed by the FAA to help protect lives and property. The Airport would like to address the deficiencies associated with the RSAs and OFAs and as a result a proposed safety improvement project has been initiated with the intent of identifying a practicable solution in lieu of continued operation under waivers the FAA granted to the Airport on November 29, 1993.

An RSA is defined by the FAA as "the surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway." RSAs provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots, and veer-offs. An RSA should be a level, graded area with good drainage and free of objects and topographic variations. It should be capable of supporting heavy rescue and maintenance vehicles and the occasional passage of aircraft without causing structural damage.

An OFA is defined by the FAA as "an area on the ground centered on a runway, taxiway or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering operations." Such objects essential for air navigation or aircraft ground maneuvering are of minimal dimension for their function and typically are of a frangible nature in order to minimize aircraft damage in the case of an excursion.

As a requirement of the National Environmental Policy Act (NEPA), an environmental document must be prepared for this project due to FAA participation. A preliminary draft Environmental Assessment (EA) was developed that studied 10 build alternatives to address the RSA deficiencies. One of alternative included the relocation of Silvernail Road in order to provide a standard safety area off the approach end of Runway 10. As a result of this alternative, a 17-acre marsh and shrub wetland complex that is in the Advanced Identification of Disposal Areas (ADID) program and is a primary environmental corridor would be impacted by fill, severance or other secondary effects. Thus, this alternative was initially dismissed from the analysis of alternatives. However, in May 2013 the FAA submitted review comments on the preliminary draft EA, and stated that it did not see that sufficient information had been presented for dismissing alternatives for either closing or relocating Silvernail Road. The FAA requested that additional information be gathered regarding these alternatives, including a functional assessment of the wetlands and both the direct and secondary effects resulting from a relocation of Silvernail Road. This *Wetland Functional Impact Analysis* provides detail regarding the direct impacts to the ecology and function of the Silvernail Road Marsh and an assessment of cumulative wetland impacts to the wetland and other wetlands of the Pewaukee River environmental corridor within the Airport vicinity.

The analysis was called for because of the wetlands inclusion in the ADID program. Altogether, there are three ADID wetlands that may be affected by this alternative. Figure 1 shows general ADID wetland boundaries in the project vicinity provided by an ADID wetland viewer hosted by the Southeast Wisconsin

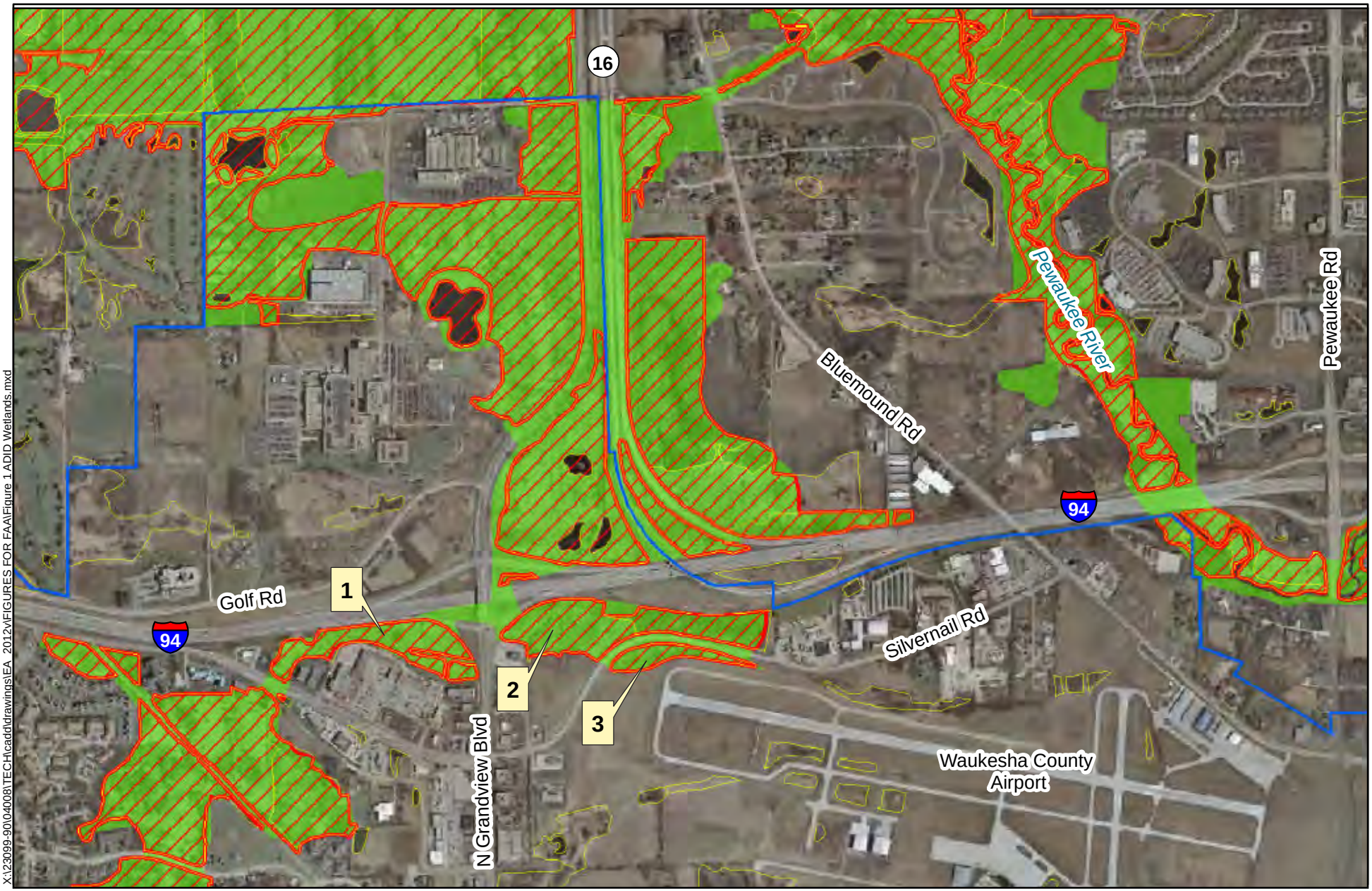
Regional Planning Commission (SEWRPC). A total of about 4.3 acres within the three ADID wetlands and 2.29 acres within four non-ADID wetlands could be impacted by the Silvernail Road relocation alternative. The potential scale of ADID wetland impacts raised the need for this analysis. In comparison to the ADID wetlands, the four non-ADID wetlands that would be impacted by the project represent landscape fragments of minimal wetland value and are not included in this analysis.

Under the Federal Clean Water Act, the U.S. Environmental Protection Agency (EPA) conducts the ADID program as part of its Outreach and Communication programs with other Federal, state and regional resource management agencies, including Indian tribes. The ADID process involves collecting and distributing information on the values and functions of wetland areas, including those of higher importance. Local communities can use this information to help them better understand the values and functions of wetlands in their areas. It also serves as a preliminary indication of factors likely to be considered during review of a Section 404 permit application.

The ADID process is intended to add predictability to the wetlands permitting process as well as better account for the impacts of losses from multiple projects within a geographic area. Although an ADID study generally classifies wetland areas as either suitable or unsuitable for the discharge of dredged or fill material, the classification does not constitute either a permit approval or denial and should be used only as a guide by community planners, landowners, and project proponents in planning future activities.

ADID wetland determinations were made jointly in the Southeast Wisconsin area by the USACE, the EPA and the Wisconsin Department of Natural Resources (WDNR). Within the project area ADID wetlands are those mapped wetlands that occur within the boundaries of any area designated as “Primary Environmental Corridor,” adopted prior to 1985. The SEWRPC and regulatory agencies have expanded the ADID wetland status to include all designated “Primary Environmental Corridors” post-1985 to 2005. In southeastern Wisconsin, advanced identification of such wetlands was undertaken in consultation with SEWRPC and the WDNR to redirect development outside of Primary Environmental Corridors.

At the Federal level, ADID classification is advisory and does not constitute either a permit approval or denial under the Clean Water Act. In Wisconsin, however, ADID wetlands are part of a special category of wetlands to be protected, “wetlands in areas of special natural resource interest” (NR 103.04, Wis. Adm. Code.). Fill into these wetlands is generally not in conformance with the Clean Water Act's Section 404 (b)(1) permit sequencing guidelines; however, fill is justifiable when there is no feasible alternative. The WDNR and Wisconsin Department of Transportation (WisDOT) have a wetland compensatory mitigation agreement that recognizes that the loss of ADID wetlands may be unavoidable in transportation projects. In instances where fill is deemed justifiable, the Wisconsin Mitigation Banking Technical Guidelines allow a discretionary increase in the compensatory ratio due to the red flag status of these wetlands. A discretionary 0.5 increase in the ratio is usually included in the ratio of debit for ADID wetlands but the debit of wetland loss with these special status wetlands will be determined in coordination with the Mitigation Bank Review Team, which includes the USACE, during the project permitting process. Specific information regarding wetland mitigation for this project is in Section 4, Potential Mitigative Actions.



X:\23099-90\04008\TECH\cadd\drawings\EA_2012\FIGURES FOR FAA\Figure 1 ADID Wetlands.mxd

City of Waukesha
ADID Wetlands
2010 Wetlands
2010 Primary Environmental Corridors

0 750 1,500 3,000
Feet

N

Source: http://maps.sewrpc.org/regionallandinfo/adid/viewer.htm

FIGURE 1: ADID Wetlands Southeast Wisconsin

City of Waukesha
Waukesha County, Wisconsin

Mead & Hunt

2. Existing ADID Wetland Characteristics

The three ADID wetlands associated with this alternative were individually analyzed using the WDNR Rapid Wetland Assessment Methodology (see Appendix A for the WDNR Rapid Wetland Assessment forms). The wetlands are numbered and described from west to east, as they relate to the project. All three would be directly impacted by fill if the alternative that requires Silvernail Road relocation is selected.

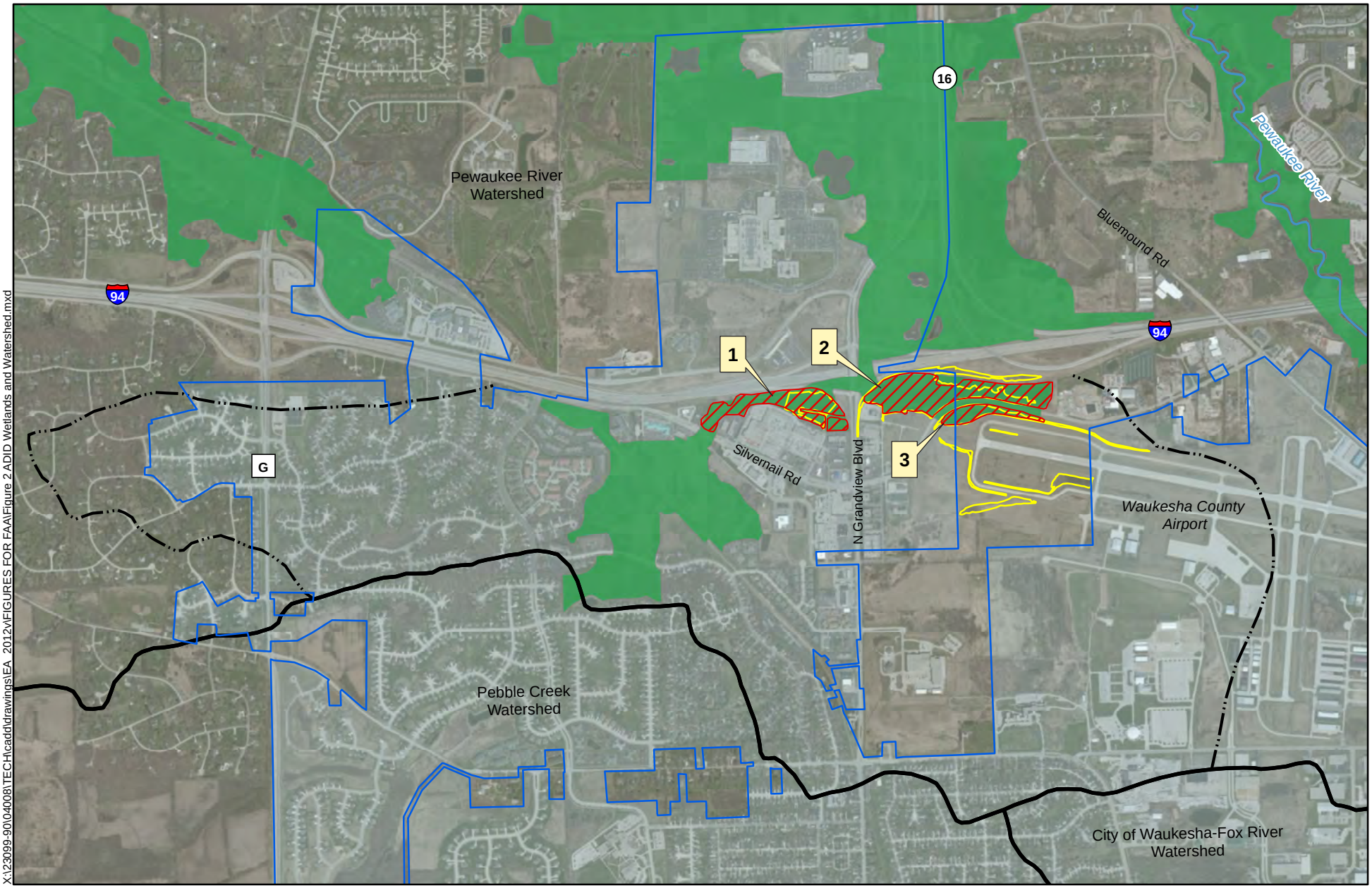
The wetlands were the subject of an environmental review by the SEWRPC (Reed and Lang, 1992), which documented 20 plant species in ADID Wetland 1, 35% of which were non-native and 24 plant species in ADID Wetland 2, 17% of which were non-native. The plant community of ADID Wetland 3 was not surveyed and no past data is available on this wetland. ADID Wetland 3 was once part of ADID Wetland 2 prior to 1988, but according to available land use data was severed by the construction of Silvernail Road sometime between 1988 and 1990.

The diversity documented in 1992 was not apparent during the 2013 wetland delineation, and the wetlands appear to have lost significant botanical diversity in the past 21 years due to the advance of non-native, monotypic cover (narrow-leaved cattail) and the elimination of woody cover in the west end of ADID Wetland 2. The following general wetland descriptions apply to current watershed conditions, which are shown in Figure 2:

- ADID Wetland 1 – This is a shallow marsh of about 8 acres that is completely dominated by narrow-leaved cattails. It covers a relatively deep basin between commercially-developed lands and the Interstate (I-) 94 southbound off-ramp that directly catches runoff from about 10 acres of adjacent developments and road surfaces via multiple culverts. It also receives drainage from about 675 acres south of Silvernail Road, including over 450 acres of developed land and about 80 acres of other ADID wetlands outside the project area. This drainage enters Wetland 1 on its west end and is directed east and north via ditches through the wetland and culverts beneath I-94 to the Pewaukee River floodplain. A stub road through the south side of the wetland provides access to the Runway 10 approach lighting system. This lighting system would need to be extended by 400 feet for the alternative that requires Silvernail Road relocation.

- ADID Wetland 2 – This 18.96-acre shallow marsh occupies an elongated basin between the north side of the Airport, as defined by Silvernail Road, and the east-west corridor of I-94. The marsh is dominated by narrow-leaved cattails and reed canary grass, with some shrub willow, red-osier dogwood, buckthorn, and cottonwood in drier areas near the wetland boundary and within the narrow, elevated eastern portion of the wetland paralleling Silvernail Road. From the road, the marsh appears to be a nearly uniform stand of tall cattail and native forbs appear absent. It receives drainage from about 640 acres of surrounding land via ditches along Silvernail Road, North Grandview Boulevard, and a local service road east of N. Grandview Boulevard. Some road drainage is conveyed to the wetland by culverts beneath Silvernail Road.

  Water is normally prevented from accumulating in the wetland by a drainage culvert on its northern boundary that conveys water beneath I-94 to a wetland complex on the Pewaukee River floodplain.



X:\23099-90\04008\TECH\cadd\drawings\EA_2012\FIGURES FOR FAA\Figure 2 ADID Wetlands and Watershed.mxd

Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, http://maps.sewrpc.org/regionallandinfo/adid/viewer.htm, USGS National Hydrography Dataset (NHD), Waukesha County GIS Department.

City of Waukesha

ADID Wetlands 2010 (Digitized)

Delineated Wetlands 2010

Local Subwatershed (Digitized)

Watershed Boundary (NHD)

Primary Environmental Corridor

0 800 1,600 3,200

Feet

N

FIGURE 2: ADID Wetlands and Watershed

City of Waukesha
Waukesha County, Wisconsin

Mead & Hunt

Marsh drainage is facilitated by a 15-foot-wide ditch running northeast across the west end of the wetland to the I-94 culvert. The marsh is isolated from a 4-acre remnant wetland directly west across North Grandview Boulevard, but is connected by road culverts to ADID Wetland 3 (4.51 acres) on the south side of Silvernail Road.

- ADID Wetland 3 – Wetland 3 is an elongated shallow marsh/shrub carr complex of reed canary grass, narrow-leaved cattail, sandbar willow, and red osier dogwood that was originally part of Wetland 2 prior to the Silvernail Road extension in the 1980s. It covers 4.51 acres, including over 2,000 feet of narrow ditch along the north side of the airport. It receives overland drainage from about 10 acres of airport property, including runoff from part of Runway 10/28 and associated taxiways. It drains north to Wetland 2 via culverts beneath Silvernail Road.

A. Existing ADID wetland functions

The functional strengths of the wetland in its current conditions are summarized in Tables 1, 2, and 3, with a discussion following each table.

Table 1. Wetland 1 Functional Summary

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	N/A
Floral Diversity	X				
Wildlife Habitat		X			
Fishery Habitat		X			
Flood/Stormwater Attenuation		X			
Water Quality Protection			X		
Shoreline Protection					X
Groundwater	X				
Aesthetics/Recreation/Education	X				

Wetland 1 – Water quality protection is highly rated because of the wetland's high vegetative density, favorable low-watershed position, and the opportunity afforded to treat runoff from a relatively large, developed watershed. In fact, this function exceeds that of Wetland 2, which has a much smaller watershed with less hardscape development.

Despite its relatively small size, Wetland 1 was rated moderate for Wildlife Habitat because of its association with a large complex of ADID wetlands. It also has a moderate rating for Flood/Stormwater Attenuation because the large size of the watershed in relationship to the wetland's size provides good flood storage opportunity. Evidence of large water level responses (elevated drift lines) was also apparent in the field. Flood storage is likely enhanced by a central basin that appears to hold water for

long periods and does not appear to be drained by the ditches. High flows may store additional water in this area, which led to a moderate rating for Fishery Habitat, despite the small size of the wetland. Its high water connection with the Pewaukee River, via ditches through I-94 and north and east along Highway 16 and Fatima Drive, were also considered when ranking this function.

The wetland's low Aesthetics/Recreation/Education rating is due to being completely surrounded by fill and development, poor viewsheds, presence of roads, and the runway approach lighting structures. Groundwater function is also low because the wetland lacks a favorable landscape position for either recharge or discharge.

Table 2. Wetland 2 Functional Summary

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	N/A
Floral Diversity	X				
Wildlife Habitat		X			
Fishery Habitat	X				
Flood/Stormwater Attenuation		X			
Water Quality Protection			X		
Shoreline Protection					X
Groundwater	X				
Aesthetics/Recreation/Education		X			

Wetland 2 – Only Water Quality Protection rated as a high function due to the advantageous position of the marsh between runoff and receiving waters, its dense vegetation, and the potential of adjacent development to deliver otherwise untreated nutrients to receiving waters. Flood and Stormwater Attenuation rated only medium because of the large size of the wetland in relation to its watershed, the lack of evidence of large water level responses to storm events, and the penetration of the central area by large ditches. The wetland also has moderately good aesthetics because it is within a populated area, there are long viewsheds, its interior appears relatively free of disturbance, and it is large enough to offer visual relief from surrounding development.

Wildlife habitat was also medium because of the lack of plant community diversity, low amount of open water, and the low quality of surrounding upland habitat. The wetland appears to be important mostly for invertebrates, amphibians, and some reptiles; the Butler's garter snake was found here during a 2008 study. Although the Butler's garter snake was removed from the Threatened/Endangered species list on January 1, 2014 per administrative rule ER-27-11, it remains a Special Concern species in Wisconsin subject to DNR review and non-mandatory recommendations on public infrastructure projects. General management guidelines for this snake call for habitat avoidance, exclusion fencing from November through March and the preservation and restoration of open-canopy uplands broadly connected to open-canopy wetlands.

Floral Diversity is ranked low because most of the wetland is dominated by just five plant species: narrow-leaved cattail, reed canary grass, sandbar willow, buckthorn, and red osier dogwood, with much of the shrub cover limited to the upland/wetland interface. Fishery Habitat is also low because open water is limited to a simple, straight ditch running through the wetland, and riparian vegetation is coarse cattail, which limits its utility for spring high-water spawning fish such as northern pike. Groundwater functions are low because, similar to Wetlands 1 and 3, the wetland has no favorable landscape position for either recharge or discharge, although its storage potential may contribute to base flow in the Pewaukee River downstream.

Table 3. Wetland 3 Functional Summary

FUNCTION	**SIGNIFICANCE**				
	Low	Medium	High	Exceptional	N/A
Floral Diversity	X				
Wildlife Habitat	X				
Fishery Habitat	X				
Flood/Stormwater Attenuation	X				
Water Quality Protection		X			
Shoreline Protection					X
Groundwater	X				
Aesthetics/Recreation/Education	X				

Wetland 3 – This wetland is isolated from Wetland 2 by Silvernail Road and not surprisingly has the lowest functional performance of all three ADID wetlands. Its small size, lack of riparian position, overwhelming dominance of edge habitat with mown fill slopes, and the presence of invasive species, fences, and obstructed views are some of the principal factors degrading the functional performance. Only Water Quality Protection was rated higher because it presents a good water treatment opportunity for its size, with a favorable watershed position and vegetative characteristics, including over 2,000 feet of wetland ditch that filters a good proportion of inflowing water.

3. Impacts of the Silvernail Road Relocation

The functional impact assessment is focused on direct fill impacts and the resulting secondary impacts, including severance effects, hydrologic impacts, increase of edge effects and wildlife mortality due to the penetration of Wetland 2 by Silvernail Road under this alternative. Table 4 lists the direct project impacts, including those to non-ADID wetlands while Table 5 presents a functional impact matrix. These possible functional impacts were discussed at a November 25, 2013, agency meeting between the Airport and the WBOA, WDOT, Waukesha County Highway Department, US Army Corps of Engineers, WDNR, Atlantic Aviation (the FBO) and Mead & Hunt.

A. Direct impacts

(1) Fill Impacts

Fill impacts include the re-alignment of Silvernail Road through Wetland 2, RSA grading in Wetland 3, and the extension of the Runway 10 approach lighting system in Wetland 1. These impacts are shown in Figure 3A and listed in Table 4. Non-ADID wetland numbers are from the Environmental Assessment and wetland delineation for the project.

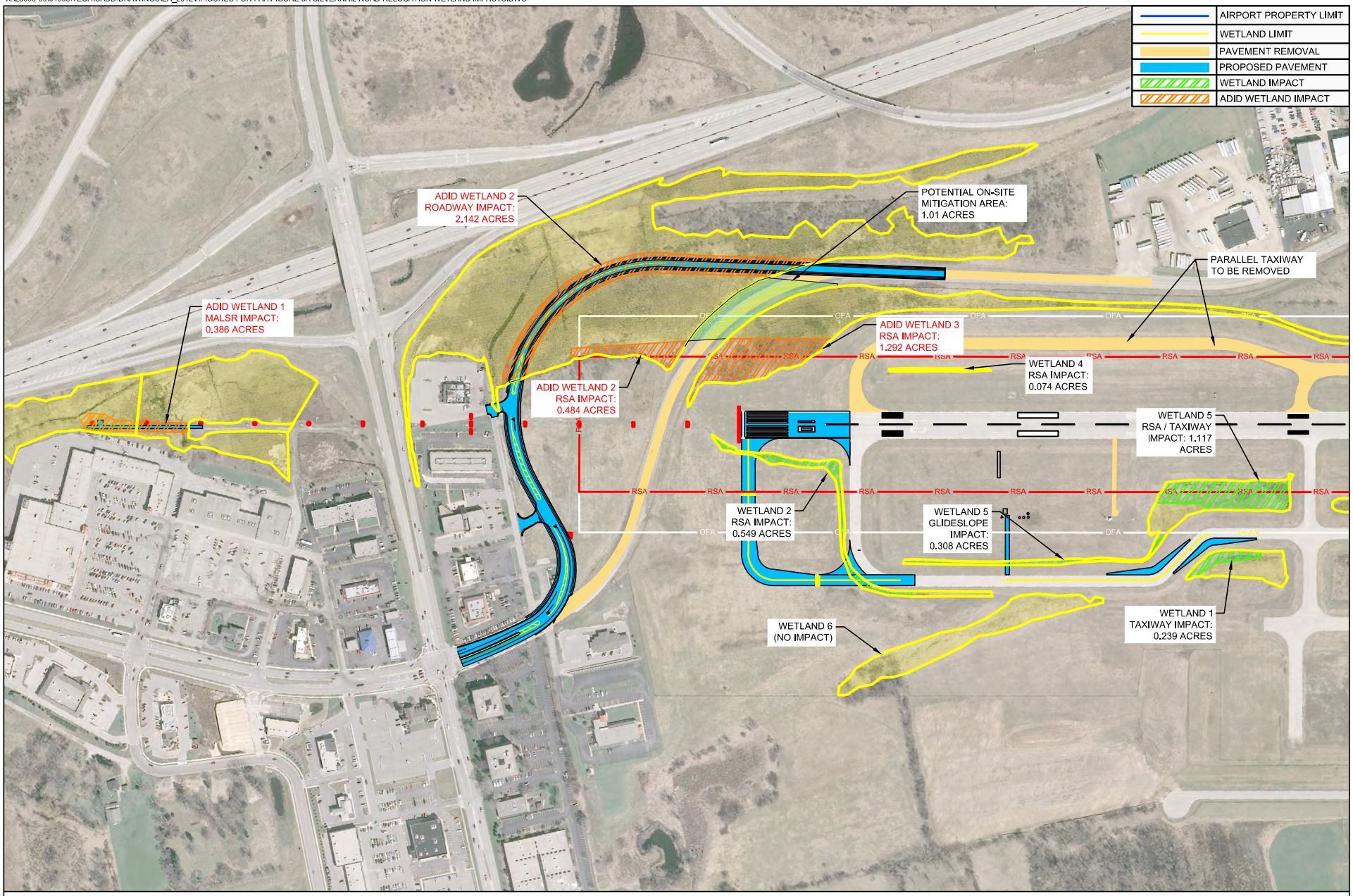
The road relocation alternative is fixed by the need to clear the runway protection zone (RPZ) and associated airspace surfaces. The alignment through Wetland 2 is unaffected by its terminal options, including roundabout and other configurations of the intersection with the private road paralleling Grandview Boulevard. The proposed road relocation comes straight off the east end of the existing curve and follows a uniform curve that just clears the RSA and OFA , with the fill slope crossing the eastern ditch and coming near the larger western ditch that is the main hydraulic feature of the wetland.

Along with safety area footprint on the southern edges of ADID wetlands 2 and 3, the total fill impact of the project is estimated at 6.59 acres, comprised of 4.30 acres of ADID wetland impact and 2.29 acres of other wetland impacts. Only the 4.30 acres of ADID wetland impact are assessed in this document because of their status as environmental corridors and wetlands unsuitable for wetland fill. The forecasted wetland impacts are general areas estimated in the absence of detailed engineering studies and slope intercepts and may decrease with impact minimization measures, including restriction of road fill slopes and horizontal curvatures and the use of the minimum grades or fill slopes allowed in accordance with FAA design criteria.

Table 4. Direct Project Impacts

Wetland	Wetland Area (acres)	Impact (acres)	Activity
ADID no. 1	8.00	0.39	Approach Lights
ADID no. 2	17.23	2.62	RSA & Silvernail Rd.
ADID no. 3	4.51	1.29	RSA
1	0.76	0.24	Taxiway
2	0.68	0.55	RSA
4	0.07	0.07	RSA
5	1.79	1.43	RSA, Taxiway & Glideslope
Total Impacts		**6.59**	
ADID		**4.30**	
Non-ADID		**2.29**	

7/13/2015 6:37:39 PM
X:\23099-90\04008\TECH\CADD\DRAWINGS\EA_2012V\FIGURES FOR FAA\FIGURE 3A SILVERNAIL ROAD RELOCATION WETLAND IMPACTS.DWG



0 250 500

Orthophotograph - 2010 NAIP, Waukesha County

ADID WETLAND IMPACTS:	4.304 ACRES
NON-ADID WETLAND IMPACTS:	2.287 ACRES
TOTAL WETLAND IMPACTS:	**6.591 ACRES**

FIGURE 3A: SILVERNAIL ROAD RELOCATION WETLAND IMPACTS

The direct functional impacts shown in Table 5 are generally commensurate with the existing functional strengths of the wetlands, with some exceptions. ADID Wetland 1, with only 5% of its area potentially filled by the project, will sustain low functional impacts except for moderate effects on flood/stormwater attenuation because of fill being placed in the deeper part of the wetland basin and moderate effects on aesthetics because of the increased penetration of the approach lighting system into the wetland. ADID Wetland 2, with about 15% if its area potentially filled, will see only moderate impacts to its strongest function, water quality protection, because the advantageous position of the marsh between runoff and receiving waters and the potential of adjacent development to deliver otherwise untreated nutrients to receiving waters will not change. ADID Wetland 3, the smallest wetland subject to this analysis, will experience high direct functional impacts to wildlife, flood/stormwater attenuation and water quality protection because 29% of the wetland will be filled, greatly increasing its edge to area ratio and leading to much higher nutrient loadings for a significantly smaller wetland basin.

B. Secondary Impacts

The National Environmental Policy Act of 1969 (NEPA) directs Federal agencies to examine the consequences of proposed activities in the light of an overall goal to protect and enhance the human environment. The agencies must examine direct and observable impacts plus those that may be indeterminate and not easily recognized, including secondary impacts. Secondary impacts are those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Generally, these impacts are induced by the initial action and arise from news sets of circumstances induced by that action. For natural environments, such impacts can include changes in plant species composition, hydrology, wildlife behavior, mortality and population viability.

The secondary effects described here are those reasonably foreseeable in light of the new configurations of road and runway safety area fill resulting from the proposed project and are considered likely to take effect within the first growing season following completion of the project.

(1) Severance effects and hydrologic impacts

The approach lighting fill in ADID Wetland 1 will impact about 5% of the total wetland area, but will not be a wetland severance because the fill is on the south margin of the wetland. Hydrologic impacts will be a 5% reduction of water quality function and a moderate effect on flood storage, because the fill will be close to the deep, central basin of the wetland where its storage capacity is concentrated. Other wetland functional impacts will be low and generally commensurate with the 5% loss of wetland area.

The projected road fill in ADID Wetland 2 will divide it into two long, relatively narrow remnants of comparable width on either side of the road, resulting in additional adverse effects to flood/stormwater attenuation, water quality protection and especially wildlife habitat functions over the long term. The scale of these adverse effects will greatly exceed the magnitude of the fill footprint (15% of the Wetland 2 area) for wildlife functions because the central area of the wetland

will be impacted, reducing or eliminating wildlife refuge values, principally for amphibians and reptiles. The remaining wetland will be mostly edge habitat.

The impacts to flood/stormwater attenuation and water quality protection for ADID Wetland 2 will be more moderate because of the comparative uniformity of the wetland vegetative cover and basin topography. However, the remnant wetland north and west of the new road alignment will probably experience higher nutrient loadings because it will remain contiguous with the ditch that conveys the bulk of floodwaters to the wetland, while remnant wetland south of the road will be hydraulically isolated and lose opportunity for water storage and treatment as it will remain connected only via such road culverts as may be positioned within the new road fill.

The safety area grading fill in Wetland 3 is 29% of the whole wetland area, which will reduce hydrologic functions (flood storage and water quality maintenance) by about 29%. This impact will not cause a wetland severance because the fill impacts the south end of the wetland.

(2) Edge effects and wildlife impacts

Edge effects refer to the changes in population or community structures that occur at the boundary between two habitats or land uses. In the case of edges between native plant communities, where the locations of edges preserve interior habitat conditions, the edges can enhance biodiversity and ecosystem functions. Alternatively, where disturbance penetrates a wildlife habitat and creates atypical disturbed (road fill slope) or abiotic (i.e., road) conditions, the effect will be adverse because the new edge is hostile to wildlife and introduces noise, pollution, and potentially dangerous vehicle movements.

The penetration of the new road alignment to the interior of ADID Wetland 2, however, will significantly degrade wildlife functions for that wetland, especially for amphibians and reptiles that are slow-moving animals with limited dispersal capabilities that will be easily killed by regular traffic on Silvernail Road. This means the secondary, or long-term impacts to wildlife functions will be high for this wetland. The low profile of amphibians and reptiles and their insensitivity to larger-scale landscape clues (i.e., inability to detect traffic or find culverts over long distances) makes road crossings especially dangerous.

This danger is compounded during the spring breeding season, when nightly amphibian migrations during wet weather can lead to mortality rates of between 34 and 61% on secondary roads like Silvernail (Mazerolle, 2004). The proximity of the new road alignment to the only open-water feature of the wetland is especially dangerous for amphibians. During wet spring nights, any amphibian dispersal will have a very high probability of encountering the road because of the road's proximity to much of the wetland. Considering the nature of the habitat, at-risk species may include green and leopard frogs and American toads. A lack of open water and basking structure in the wetland puts turtle species at lower risk, but common dispersing species such as painted turtles may also be periodically subject to high road mortality.

ADID Wetland 1 will experience the least impact in terms of increased edge effects and wildlife habitat because the 5% of the wetland that would be filled is on the previously disturbed southern edge that contains the existing approach lighting structures and road fill. A slightly greater effect on amphibian or forage fish habitat may be experienced, depending on how far the fill slope advances into the adjacent deep water habitat of the central basin.

The long-term effect of this new Silvernail Road alignment on breeding amphibian populations in ADID Wetlands 2 and 3 will be significant, when habitat loss and the increase in adverse edge effects (road mortality and increased pollution load) are considered together. Because the footprint of the projected fill within ADID Wetland 2 will eliminate nearly half of its broadest area, this wetland can be expected to lose at least half of its existing wildlife value because the resulting preponderance of edge habitat with its new condition of being hemmed in by RSA or road fill. The wetlands environmental corridor value will also be largely eliminated because the interior, refuge area will be lost to road uses. Transiting wildlife, especially furbearers, will have a much greater tendency to move on through the wetland, with consequent greater exposure to isroad mortality as well. ADID Wetland 3 will experience a similar condition, with the removal of almost a third of its area on its south end. The removal of non-functional Silvernail Road fill may have some mitigative effect that would counter-balance this wildlife impact (see Section 4, Potential Mitigative Actions).

Implicit in the new Silvernail Road alignment scenario is the possibility that ADID Wetlands 2 and 3 might become “mortality sinks” for remaining amphibians. A mortality sink is a habitat unable to support a viable long-term population by itself. It may offer suitable short-term cover, food, and water to a species or guild, but production of young in a local population is less than the mortality rate. Sink conditions can only be alleviated by provision of safe and effective passage configurations so that mobility between otherwise isolated habitat fragments is enhanced (see Section 4.C, Wildlife culverts). ADID Wetland 3 is vulnerable in this regard because so much of its area will be lost to fill.

Table 5. ADID Wetland Functional Impacts												
ADID Wetland 1												
Function	Significance				Direct Impact				Secondary Impact			
	low	medium	high	N/A	low	medium	high	N/A	low	medium	high	N/A
Floral Diversity	X				X				X			
Wildlife Habitat		X			X				X			
Fishery Habitat		X			X				X			
Flood/Stormwater Attenuation		X				X				X		
Water Quality Protection			X		X				X			
Groundwater	X				X				X			
Aesthetics/Recreation/Education	X					X			X			
ADID Wetland 2												
Function	Significance				Direct Impact				Secondary Impact			
	low	medium	high	N/A	low	medium	high	N/A	low	medium	high	N/A
Floral Diversity	X				X							
Wildlife Habitat		X				X					X	
Fishery Habitat	X				X				X			
Flood/Stormwater Attenuation		X				X				X		
Water Quality Protection			X			X				X		
Groundwater	X				X				X			
Aesthetics/Recreation/Education		X				X			X			
ADID Wetland 3												
Function	Significance				Direct Impact				Secondary Impact			
	low	medium	high	N/A	low	medium	high	N/A	low	medium	high	N/A
Floral Diversity	X				X				X			
Wildlife Habitat	X						X				X	
Fishery Habitat	X				X					X		
Flood/Stormwater Attenuation	X						X			X		
Water Quality Protection		X					X			X		
Groundwater	X				X				X			
Aesthetics/Recreation/Education	X				X				X			

4. Potential Mitigative Actions

A. General

Wetland mitigation for state-sponsored transportation projects in Wisconsin is guided by the procedures established under the *Wisconsin Department of Transportation Wetland Mitigation Banking Technical Guideline* (WisDOT Technical Guideline). This agreement between state and federal agencies guides the sequencing of impacts and procedures and strategies for the ultimate compensation (via mitigation banking) of unavoidable impacts for all public infrastructure projects supported by state and/or federal transportation funds, as required under Section 404 of the Federal Clean Water Act. Project impacts are only eligible for mitigation banking after wetland impacts have been "sequenced" by undertaking all reasonable measures to avoid, minimize wetland impacts before pursuing compensatory wetland mitigation. In this way, the WisDOT Technical Guideline mirrors the 404(b)1 sequencing process undertaken on all Clean Water Act permits.

Mitigation at a project site (also called "project-specific" mitigation) is generally considered within the immediate right-of-way or within a 2.5 mile distance from the project. However, at airports the FAA has established restrictions under Advisory Circular AC 150/5200-33B regarding the creation of un-drained water features such as storm water ponds or the restoration of habitat that could attract wildlife that is hazardous to aircraft movements. Specifically, the FAA recommends a separation distance of 10,000 feet, at airports serving turbine-powered aircraft, for wetland mitigation projects under the Clean Water Act.

The FAA may consider exceptions to locating mitigation projects within the separation distance if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or groundwater recharge, which cannot be replicated when moved to a different location. However, mitigation cannot inhibit the airport operator's ability to effectively control hazardous wildlife on or near the mitigation site or effectively maintain other aspects of safe airport operations. Wetland features, including open water, that can attract hazardous wildlife must be avoided. The FAA reviews any onsite mitigation proposals to determine compatibility with safe airport operations and requires that a wildlife damage management biologist evaluate any wetland mitigation projects that are needed to protect unique wetland functions and that must be located within the separation distance. Development of a Wildlife Hazard Management Plan to reduce any possible wildlife hazards is also required.

In the absence of local, project-specific mitigation, sequenced project impacts are mitigated under the WisDOT Technical Guideline which is based on watersheds, floristic provinces and wetland types to derive compensation ratios for credit withdrawals from any suitable wetland bank. The WisDOT is responsible for bank site purchase, restoration, management, monitoring, debiting and reporting in coordination with state and federal agencies. From a floor debit ratio of 1:1, higher debit ratios may be assigned for projects whose impacts are outside of the watershed or floristic province of the wetland bank, for debits that are of a different wetland type than those lost, or for wetlands of special natural resource status or interest.

A final mitigation approach involves payment of impact fees in-lieu of wetland restoration, creation or banking (known as “in-lieu fee”). An in–lieu fee program involves the restoration, establishment, enhancement and/or preservation of aquatic resources through funds paid to a government or non–profit natural resources management entity to satisfy compensatory mitigation requirements for Section 404 permits. An in–lieu fee program sells credits to permittees whose legal obligation to provide compensatory mitigation is then transferred to the sponsor of the in–lieu fee program upon receipt of an associated credit fee.
In–lieu fee programs are regulated by the U.S. Army Corps of Engineers under the 2008 Federal Rule (33 CFR part 332) as well as a legal agreement termed the Final Instrument that describes how the program will function.

In November, 2014, the Wisconsin Department of Natural Resources published their Final Instrument for a statewide in-lieu fee program and began selling credits within 12 separate watershed service areas across the state. The in-lieu fee program is significantly more costly than the per-acre statewide expense for the WisDOT mitigation banks.

B. Direct impact mitigation

(1) Site-specific mitigation

An on-site wetland restoration project could be executed by removing the 1.01 acres of un-needed Silvernail Road fill that will remain off the north side of the Runway 10 RSA fill slope (see Figure 2). Besides restoring a filled wetland, the recovered fill material would likely be suitable for use in the RSA grading project. The elevation of buried hydric soils would have to be verified by road borings, with soil amendments upon recovery to match existing wetland grades on either side of the fill and prevent the pooling of water that could attract wildlife hazardous to aircraft operations. With wetlands on either side of the area, the restoration would have a high probability of hydrologic success.

This restoration would compensate for about 80% of the area of ADID Wetland 3 lost to the proposed Silvernail Road relocation. The compensation would occur gradually over several years as wetland vegetation is restored. However, functional restoration could easily be less than 80% because the restored wetland area would not be allowed to have detention capabilities under the strictures of FAA Advisory Circular (AC) 150/5200-33B, and its flood storage and water quality functions could be less than the impacted area. From the perspective of the total mitigation (Section C. below), this effort would only fulfill about 11% of the need.

Prior to a restoration commitment, the project would have to be reviewed and approved by the FAA. The control of hazardous wildlife on or near airports follows FAA AC 150/5200-33B, which recommends against the establishment of wetlands or other habitats that might present potential hazards to aviation if they encourage wildlife to enter an airport's approach or departure airspace. The position of the wetland mitigation within the Runway Protection Zone makes this especially important. Such wetland mitigation projects near airports are usually only considered as necessary to protect unique wetland functions.

If deemed necessary for evaluation under inter-agency coordination, the FAA normally reviews onsite mitigation proposals for air safety compatibility via an agreement with the U.S. Department of Agriculture (USDA), which agency assigns wildlife damage management biologists from their Animal Plant Health Inspection Service (APHIS). After reducing the potential for hazardous wildlife attraction through design measures, a Wildlife Hazard Management Plan is drafted to reduce any remaining wildlife hazards. In this instance, a uniform, monotypic vegetative cover and suppression of water detention capabilities would likely be required. The wildlife value of such mitigation would have to be compared to alternative scenarios, such as leaving the road fill in place, combined with mowing maintenance of the fill slopes to suppress the habitat value of the remaining area.

(2) Wetland banking

The comparatively small area of proposed wetland fill and lack of whole-unit converted hydric soil areas in the Waukesha region places a premium on wetland banking for alternative habitat compensation. In any case, banking remains the preferred mitigation option under current inter-agency guidance. WisDOT has the Kmetz and Jacobsen wetland banks within the Rock River watershed that could be used for compensatory mitigation. The Kmetz site is part of the Rock River floodplain in Jefferson County, just west of the Waukesha County line, and has about 40 usable credits dispersed among riparian forest, wet meadow, shallow marsh, and scrub shrub. The Jacobsen wetland bank in Walworth County is a 360-acre wet meadow covering over a mile of riparian corridor along Turtle Creek, a tributary of the Rock River. The Jacobsen bank has approximately 70 credits remaining.

The wetland and environmental corridor functions of either of these bank sites are superior to the impacted wetland because they are larger and are riparian to waterways with significant fisheries. Both banks are within the same floristic province and watershed as the ADID impacts. Nevertheless, when banking ADID wetland impacts, an additional half a credit is typically added to the banking ratio for a ratio of 1.5:1.0 for this type of compensatory mitigation. Actual mitigation ratios would be determined in consultation with the regulatory agencies.

Aside from the acre of road fill removal, no other practicable on-site mitigation options exist and the majority of the impact would likely be banked as described above. As all of the impacted wetlands are of shallow marsh (SM) or wet meadow (M) bank types which are common to the Kmetz and Jacobsen sites, likely debit ratios are 1:1 for non-ADID wetlands and 1.5:1 for ADID wetlands. This yields a need for 8.74 bank credits, or about 7.74 credits if the acre of on-site mitigation proves possible.

Even though both banking options appear to offer mitigation acreage superior to the ADID wetlands impacted, the ADID wetland system associated with the Pewaukee River floodplain would remain permanently degraded to the extent detailed in this assessment, mostly due to the lack of onsite mitigation options.

C. Secondary Impact Mitigation

(1) Wildlife culverts

Wildlife culverts or passes are structures intended to make otherwise hostile landscape features such as roads permeable to wildlife. Each pass must often be configured for the most critical species or species guild subject to road kill or adverse behavioral effects. Successful wildlife crossings accommodate the requirements of multiple species, or are tuned to the requirements of a single important species or group of related species at locations having the maximum practical effect.

In our case, the guild of most concern is amphibians, specifically frogs, and reptiles including snakes and turtles because of the deep penetration into ADID wetlands by the relocated Silvernail Road. The highest rates of road mortality for amphibians occur where roads in wetlands disrupt the environmental corridor attributes of the habitat (Andrews and Jochimson, 2007). For amphibians, this mortality peaks on wet spring and summer nights, while turtles are more prone to cross during breeding season, when females search for nesting sites, or during times of drought when they seek alternate habitats. Research shows that animal collisions tended to occur where animals found it easier to cross roads in the absence of human habitation. Habitat availability on either side of the road is another factor determining where animals choose to cross (Malo, et.al., 2004; Kramer-Schadt, et.al., 2004). All of the above features apply to the Silvernail Road relocation.

The following general guidelines have been developed for wildlife culverts useful to amphibians and riparian reptiles (Cavallaro, et.al., 2005):

- The structure must be at least 1 foot high, and wider than it is deep to appear more open and encourage entry.

- For long culverts, light and moisture should be introduced by means of grates or similar openings in the road surface.

- Low-growing vegetation should be provided as cover around the structure opening. This shelter from potential predators encourages animals to enter the structure.

- The structure should have a moist substrate, but not be flooded for any significant duration.

- It should be placed at a high frequency along the road through relevant habitat. For reptiles and amphibians, structures should be placed at least every 150 to 300 feet (Puky 2003).

- Drift walls should be placed on each side of the culvert extending just beyond a natural break in the animal's ability to traverse the landscape. This funnels wildlife to the crossing and greatly increases its effectiveness.

The drift wall is a low, purpose-built barriers on each side of a wildlife passage tunnel, culvert or overpass (American Association of State Highway and Transportation Officials, n.d). A successful wildlife structure from Hungary (Miklós, et.al.) with drift walls for amphibians is shown in Figure 4.



Figure 4. The M1 Motorway in Hungary with low barrier walls to divert small fauna to the crossing structures.

The M1 Motorway wildlife structure in Figure 4 consists of three 1-meter-diameter culverts connected by a 60-centimeter-high, lipped concrete drift wall extending 50 meters on each side of the culverts. Light shafts in the middle of the passages help more natural light and moisture conditions to develop.

Providing concrete drift walls built into the embankment requires some geotechnical analysis and design to assure the embedded wall is structurally stable under the static load of the road fill. A cheaper alternative might be a PVC or galvanized steel barrier with an angled lip (see Figures 5 and 6). Such barriers have been successfully used in Europe (American Association of State Highway and Transportation Officials, n.d.). These hard barriers are superior to fabric mesh or silt fence because soft materials tear easily and let wildlife through, spoiling the effectiveness of associated underpasses (Baxter-Gilbert, et.al., 2013). To be effective over the long term, the lower edge of any barrier must be buried to prevent animals from crossing beneath the barrier.



Figure 5. A galvanized steel small wildlife drift wall used in association with a wildlife culvert.



Figure 6. A PVC plastic drift wall as a potential alternative structure.

Considering the body of knowledge concerning wildlife passage beneath roads, the following recommendations are offered for use in the Silvernail Road relocation:

- Provide culverts with natural bottoms at intervals of about 100 to 150 feet within the stretch of road bounded on each side by ADID wetlands 2 and 3.

- Minimum culvert dimensions should be 2 by 3 feet.

- Connect culverts with drift walls with a barrier lip on the wetland side, as illustrated in Figures 3 through 5. Minimum height should be 2 feet. The lower edge of the drift walls should be buried to prevent bypass by animals.

- Drift walls should extend beyond culverts into a natural topographic break or uplands, whichever is further.

These recommendations are consistent with Federal Highway Administration (FHWA) guidance for reptile/amphibian road culverts (FHWA, 2000). The culverts provide some consistency of the road alignments and design with adjacent public land-management policy (FHWA, 2002); in this case the preservation of wildlife corridor functions of regionally important wetlands. While they cannot replace the lost wetland acreage, such culverts would make an appreciable contribution to the on-site mitigation of lost wildlife and environmental corridor functions.

(2) Hydraulic Connectivity

Mitigation for the loss of hydraulic connectivity can only be fully accomplished through the use of a land bridge that would allow for free passage of water throughout the length of the Silvernail wetland alignment. This approach, however, is not practicable because of the very high costs associated with bridge construction.

A less functional alternative for hydraulic connectivity mitigation would be the installation of additional culverts, as detailed in the section above on wildlife culverts. Such extra culverts, designed solely for the free passage of water, could be optimized by using squash or elliptical profiles that provide increased water surface for any specific discharge up to 50% of culvert capacity. The theoretical performance of these culverts would have to be compared to pre-construction sheet flow for specific storm events to determine their performance in comparison to pre-construction conditions.

(3) Edge Effects

The impacts to the wetlands that will increase the adverse effects of habitat edges cannot be compensated onsite due to a physical lack of adequate mitigation opportunity, which requires whole-unit areas of converted or drained hydric soils in order to restore significant habitat integrity. The ADID wetlands are completely surrounded by developed infrastructure, including the airport and major highways, while remaining open lands are either floodplain wetlands or dedicated to airport uses.

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Appendix A. WDNR Rapid Wetland Assessment Forms

January, 2001 File or Docket Number

Wisconsin Department of Natural Resources

RAPID ASSESSMENT METHODOLOGY FOR EVALUATING WETLAND FUNCTIONAL VALUES

GENERAL INFORMATION

Name of Wetland/Owner: **Waukesha Airport ADID Wetland 1**		
Location: County: **Waukesha**		
Legal Address: ¼ __ ¼ **NW**__ Section **20**	Township:**7N**	Range: **19E**
Project Name: **Waukesha Airport Runway 10/28 Safety Area – Silvernail Road Relocation**		
Evaluator(s): **Rossa & King, Mead & Hunt**		
Date(s) of Site Visit(s): **October 18, 2013**		

Description of seasonality limitations of this inspection due to time of year of the evaluation and/or current hydrologic and climatologic conditions (e.g. after heavy rains, snow or ice cover, during drought year, during spring flood, during bird migration): **None**

WETLAND DESCRIPTION

Wisconsin Wetlands Inventory classification: **E2K, S3/E2K**					
Wetland Type:	shallow open water	deep marsh	**shallow marsh**	seasonally flooded basin	bog
	floodplain forest	alder thicket	sedge meadow	coniferous swamp	fen
	wet meadow	shrub-carr	low prairie	hardwood swamp	
Estimated size of wetland in acres: **8.0**					

SUMMARY OF FUNCTIONAL VALUES

Based on the results of the attached functional assessment, rate the significance of each of the functional values for the subject wetland and check the appropriate box. Complete the table as a summary.

FUNCTION	**SIGNIFICANCE**				
	Low	Medium	High	Exceptional	N/A
Floral Diversity	X				
Wildlife Habitat		X			
Fishery Habitat		X			
Flood/Stormwater Attenuation		X			
Water Quality Protection			X		
Shoreline Protection					X
Groundwater	X				
Aesthetics/Recreation/Education	X				

List any Special Features/"Red Flags": **ADID (Advanced Delineation and Identification Wetland mapped by SWERPC. Also mapped as secondary environmental corridor.**

SITE DESCRIPTION

I. HYDROLOGIC SETTING

A. Describe the geomorphology of the wetland:

☒Depressional (includes slopes, potholes, small lakes, kettles, etc.)
☐Riverine
☐Lake Fringe
☐Extensive Peatland

B. ☒ **Y** ☐ **N** Has the wetland hydrology been altered by **ditching**, tiles, dams, **culverts**, well pumping, **diversion of surface flow**, or **changes to runoff within the watershed** (bold those that apply)? **Ditching directs drainage to I-94 culverts, and continues north to the Pewaukee River, an Area of Special Natural Resource Interest as supporting a warm water fish community. The Pewaukee River originates from Pewaukee Lake and empties into the Fox River. The river contains a fairly decent forage and gamefish population.**

C. ☒ **Y** ☐ **N** Does the wetland have an inlet, outlet, or **both** (bold those that apply)? **Culvert inlets and outlets manage the flow of water into and out of the wetland.**

D. ☒ **Y** ☐ **N** Is there any field evidence of wetland hydrology such as buttressed tree trunks, adventitious roots, drift lines, water marks, **water stained leaves**, **soil mottling/gleying**, organic soils layer, or oxidized rhizospheres (bold those that apply)? **A high water table, saturation to the surface, hydrogen sulfide and drainage patterns were also observed during the October 18, 2013, wetland delineation.**

E. ☒ **Y** ☐ **N** Does the wetland have standing water, and if so what is the average depth in inches? __" Approximately how much of the wetland is inundated? **The estimated seasonal high water level is about three feet (central basin) to 8 inches covering about 65% of the total wetland area.**

F. How is the hydroperiod (seasonal water level pattern) of the wetland classified?

☐Permanently Flooded
☒Seasonally Flooded (water absent at end of growing season)
☐Saturated (surface water seldom present)
☐Artificially Flooded
☐Artificially Drained

G. ☐ **Y** ☒ **N** Is the wetland a navigable body of water or is a portion of the wetland below the ordinary high-water mark of a navigable water body? List any surface waters associated with the wetland or in proximity to the wetland (note approximate distance from the wetland and navigability determination). Note if there is a surface water connection to other wetlands. **The wetland drains via culverts across I-94 to ADID wetlands associated with the Pewaukee River floodplain**

II. VEGETATION

A. Identify the vegetation communities present and the dominant species.

	floating leaved community dominated by:
	submerged aquatic community dominated by:
X	emergent community dominated by:**narrow-lvd cattail, reed canary grass**
	shrub community dominated by:
	deciduous broad-leaved tree community dominated by:
	coniferous tree community dominated by:
	open sphagnum mat or bog
	sedge meadow/wet prairie community dominated by:
	other (explain)

B. Other plant species identified during site visit: **Cottonwood on south wetland boundary near fill slope.**

III. SOILS

A. NRCS Soil Map Classification:

B. Field description:

☐Organic (histosol)? If so, is it a muck or a peat?

Mineral soil?

- Mottling**,** gleying, **sulfidic materials**, iron or manganese concretions, organic streaking (circle those that apply)
- Soil Description: **Meets Criteria A4: Redox Dark Surface and A12: Thick Dark Surface**
- Depth of mottling/gleying: **>20”**
- Depth of A Horizon: **>20”**
- Munsell Color of matrix and mottles
    - Matrix below the A horizon (10"depth):
    - Mottles:

V. SURROUNDING LAND USES

A. Estimated area of the wetland watershed in acres: **300**

B. Surrounding land uses:

LAND-USE	ESTIMATED % OF WETLAND WATERSHED
Developed (Industrial/Commercial/Residential)	**50**
Agricultural/cropland	
Agricultural/grazing	
Forested	**5**
Grassed recreation areas/parks	**10**
Old field	
Highways or roads	**20**
Other (specify)	**15 (ADID marsh wetlands)**

VI. SITE SKETCH – See Exhibit A, ADID Wetland Map

FUNCTIONAL ASSESSMENT

The following assessment requires the evaluator to examine site conditions that provide evidence that a given functional value is present and to assess the significance of the wetland to perform those functions. Positive answers to questions indicate the presence of factors important for the function. The questions are not definitive and are only provided to guide the evaluation. After completing each section, the evaluator should consider the factors observed and use best professional judgment to rate the significance. The ratings should be recorded on page 1 of the assessment.

SPECIAL FEATURES/"RED FLAGS"

1. ☒ **Y** ☐ **N** Is the wetland in or adjacent to an area of special natural resource interest (NR 103.04, Wis. Adm. Code)? If so, check those that apply:

   ☐Cold water community as defined in s. NR 102.04(3)(b), Wis. Adm. Code, including trout streams, their tributaries, and trout lakes
   ☐Lakes Michigan and Superior and the Mississippi River
   ☐State or federal designated wild and scenic river
   ☐Designated state riverway
   ☐Designated state scenic urban waterway
   ☒Environmentally sensitive area or environmental corridor identified in an area-wide water quality management plan, special area management plan, special wetland inventory study, or an advanced delineation and identification study
   ☐Calcareous fen
   ☐State park, forest, trail or recreation area
   ☐State and federal fish and wildlife refuges and fish and wildlife management areas
   ☐State or federal designated wilderness area
   ☐Designated or dedicated state natural area
   ☐Wild rice water listed in ch. NR 19.09, Wis. Adm. Code
   ☐Surface water identified as an outstanding or exceptional resource water in ch. NR 102, Wis. Adm. Code

2. ☐ **Y** ☒ **N** According to the Natural Heritage Inventory (Bureau of Endangered Resources) or direct observations, are there any rare, endangered, or threatened plant or animal species in, near, or using the wetland or adjacent lands? If so, list the species of concern:

3. ☐ **Y** ☒ **N** Is the project located in an area that requires a State Coastal Zone Management Plan consistency determination?

Floral Diversity

1. ☐ **Y** ☒ **N** Does the wetland support a variety of native plant species (i.e. not a monotypic stand of cattail or giant reed grass and/or not dominated by exotic species such as reed canary grass, brome grass, buckthorn, purple loosestrife, etc.)?

2. ☐ **Y** ☒ **N** Is the wetland plant community regionally scarce or rare?

Wildlife and Fishery Habitat

1. List any species observed, evidenced (e.g. tracks, scat, nest/burrow, calls), or expected to utilize the wetland: **Crayfish, possible forage fish in drainage ditch, white-tailed deer, raccoons**

2. ☐ **Y** ☒ **N** Does the wetland contain a number of diverse vegetative cover types and a high degree of interspersion of those vegetation types?

3. ☐ **Y** ☒ **N** Is the estimated ratio of open water to cover between 30 and 70 percent? What is the estimated ratio? **5%**

4. ☐ **Y** ☒ **N** Does the surrounding upland habitat likely support a variety of animal species?

5. ☒ **Y** ☐ **N** Is the wetland part of or associated with a wildlife corridor or designated environmental corridor?

6. ☐ **Y** ☒ **N** Is the surrounding habitat and/or the wetland itself a large tract of undeveloped land important for wildlife that requires large home ranges (e.g. bear, woodland passerines)?

7. ☒ **Y** ☐ **N** Is the surrounding habitat and/or the wetland itself a relatively large tract of undeveloped land within an urbanized environment that is important for wildlife?

8. ☒ **Y** ☐ **N** Are there other wetland areas near the subject wetland that may be important to wildlife?

9. ☒ **Y** ☐ **N** Is the wetland contiguous with a permanent waterbody or periodically inundated for sufficient periods of time to provide spawning/nursery habitat for fish?

10. ☐ **Y** ☒ **N** Can the wetland provide significant food base for fish and wildlife (e.g. insects, crustaceans, voles, forage fish, amphibians, reptiles, shrews, wild rice, wild celery, duckweed, pondweeds, watermeal, bulrushes, bur reeds, arrowhead, smartweeds, millets...)?

11. ☐ **Y** ☒ **N** Is the wetland located in a priority watershed/township as identified in the Upper Mississippi and Great Lakes Joint Venture of the North American Waterfowl Management Plan?

12. ☒ **Y** ☐ **N** Is the wetland providing habitat that is scarce to the region? **Surrounding area is highly urbanized and largest areas of significant habitat are associated with the Pewaukee/Fox River environmental corridors.**

Flood and Stormwater Storage/Attenuation

1. ☒ **Y** ☐ **N** Are there **steep slopes**, **large impervious areas**, moderate slopes with row cropping, or areas with severe overgrazing within the watershed (circle those that apply)?

2. ☒ **Y** ☐ **N** Does the wetland significantly reduce run-off velocity due to its size, configuration, braided flow patterns, or vegetation type and density?

3. ☐ **Y** ☒ **N** Does the wetland show evidence of flashy water level responses to storm events (debris marks, erosion lines, stormwater inputs, channelized inflow)?

4. ☒ **Y** ☐ **N** Is there a natural feature or human-made structure impeding drainage from the wetland that causes backwater conditions? **Culverts beneath I-94 may cause backwater during extreme weather events.**

5. ☐ **Y** ☒ **N** Considering the size of the wetland area in relation to the size of its watershed, at any time during the year is water likely to reach the wetland's storage capacity (i.e. the level of easily observable wetland vegetation)? [For some cases where greater documentation is required, one should determine if the wetland has capacity to hold 25% of the run-off from a 2 year-24 hour storm event.]

6. ☒ **Y** ☐ **N** Considering the location of the wetland in relation to the associated surface water watershed, is the wetland important for attenuating or storing flood or stormwater peaks (i.e. is the wetland located in the mid or lower reaches of the watershed)? **Central basin retains water for long periods and is not drained by ditches; this basin may detain water from flood events over longer periods.**

Water Quality Protection

1. ☒ **Y** ☐ **N** Does the wetland receive overland flow or direct discharge of stormwater as a primary source of water (circle that which applies)?

2. ☒ **Y** ☐ **N** Do the surrounding land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?

3. ☒ **Y** ☐ **N** Based on your answers to the flood/stormwater section above, does the wetland perform significant flood/stormwater attenuation (residence time to allow settling)?

4. ☒ **Y** ☐ **N** Does the wetland have significant vegetative density to decrease water energy and allow settling of suspended materials?

5. ☒ **Y** ☐ **N** Is the position of the wetland in the landscape such that run-off is held or filtered before entering a surface water?

6. ☐ **Y** ☒ **N** Are algal blooms, heavy macrophyte growth, or other signs of excess nutrient loading to the wetland apparent (or historically reported)?

Shoreline Protection

1. ☐ **Y** ☒ **N** Is the wetland in a lake fringe or riverine setting? If NO, STOP and enter "not applicable" for this function. If YES, then answer the applicable questions. **Not Applicable.**

2. ☐ **Y** ☐ **N** Is the shoreline exposed to constant wave action caused by long wind fetch or boat traffic?

3. ☐ **Y** ☐ **N** Is the shoreline and shallow littoral zone vegetated with submerged or emergent vegetation in the swash zone that decrease wave energy or perennial wetland species that form dense root mats and/or species that have strong stems that are resistant to erosive forces?

4. ☐ **Y** ☐ **N** Is the stream bank prone to erosion due to unstable soils, land uses, or ice floes?

5. ☐ **Y** ☐ **N** Is the stream bank vegetated with densely rooted shrubs that provide upper bank stability?

Groundwater Recharge and Discharge

1. ☐ **Y** ☒ **N** Related to discharge, are there observable (or reported) springs located in the wetland, physical indicators of springs such as marl soil, or vegetation indicators such as watercress or marsh marigold present that tend to indicate the presence of groundwater springs?

2. ☒ **Y** ☐ **N** Related to discharge, may the wetland contribute to the maintenance of base flow in a stream?

3. ☐ **Y** ☒ **N** Related to recharge, is the wetland located on or near a groundwater divide (e.g. a topographic high)?

Aesthetics/Recreation/Education and Science

1. ☒ **Y** ☐ **N** Is the wetland visible from any of the following kinds of vantage points: roads, public lands, houses, and/or businesses? (Circle all that apply.)

2. ☒ **Y** ☐ **N** Is the wetland in or near any population centers?

3. ☐ **Y** ☒ **N** Is any part of the wetland is in public or conservation ownership?

4. ☐ **Y** ☒ **N** Does the public have direct access to the wetland from public roads or waterways? (Circle those that apply.)

5. Is the wetland itself relatively free of obvious human influences, such as:

   a. ☒ **Y** ☐ **N** Buildings?
   b. ☐ **Y** ☒ **N** Roads?
   c. ☐ **Y** ☒ **N** Other structures?
   d. ☒ **Y** ☐ **N** Trash?
   e. ☒ **Y** ☐ **N** Pollution?
   f. ☐ **Y** ☒ **N** Filling?
   g. ☐ **Y** ☒ **N** Dredging/draining?
   h. ☐ **Y** ☒ **N** Domination by non-native vegetation?

6. Is the surrounding viewshed relatively free of obvious human influences, such as:
   a. ☐ **Y** ☒ **N** Buildings?
   b. ☐ **Y** ☒ **N** Roads?
   c. ☐ **Y** ☒ **N** Other structures?

7. ☐ **Y** ☒ **N** Is the wetland organized into a variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water)?

8. ☐ **Y** ☒ **N** Does the wetland add to the variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water) within the landscape as a whole?

9. Does the wetland encourage exploration because any of the following factors are present:
   a. ☐ **Y** ☒ **N** Long views within the wetland?
   b. ☒ **Y** ☐ **N** Long views in the viewshed adjacent to the wetland?
   c. ☐ **Y** ☒ **N** Convoluted edges within and/or around the wetland border?
   d. ☒ **Y** ☐ **N** The wetland provides a different (and perhaps more natural/complex) kind of environment from the surrounding land covers?

10. ☐ **Y** ☒ **N** Is the wetland currently being used for (or does it have the potential to be used for) the following recreational activities? (Check all that apply.)

ACTIVITY	CURRENT USE	POTENTIAL USE
Nature study/photography	N	N
Hiking/biking/skiing	N	N
Hunting/fishing/trapping	N	N
Boating/canoeing	N	N
Food harvesting	N	N
Others (list)		

11. ☐ **Y** ☒ **N** Is the wetland currently being used, and/or does it have the potential for use for educational or scientific study purposes (circle that which applies)?

January, 2001 File or Docket Number

Wisconsin Department of Natural Resources

RAPID ASSESSMENT METHODOLOGY FOR EVALUATING WETLAND FUNCTIONAL VALUES

GENERAL INFORMATION

Name of Wetland/Owner: **Waukesha Airport ADID Wetland 2**		
Location: County: **Waukesha**		
Legal Address: ¼ __ ¼ **NW**__ Section **20**	Township:**7N**	Range: **19E**
Project Name: **Waukesha Airport Runway 10/28 Safety Area – Silvernail Road Relocation**		
Evaluator(s): **Rossa & King, Mead & Hunt**		
Date(s) of Site Visit(s): **Multiple, 2003-2013**		

Description of seasonality limitations of this inspection due to time of year of the evaluation and/or current hydrologic and climatologic conditions (e.g. after heavy rains, snow or ice cover, during drought year, during spring flood, during bird migration): **None**

WETLAND DESCRIPTION

Wisconsin Wetlands Inventory classification: **E2K, S3/E2K**					
Wetland Type:	shallow open water	deep marsh	**shallow marsh**	seasonally flooded basin	bog
	floodplain forest	alder thicket	sedge meadow	coniferous swamp	fen
	wet meadow	**shrub-carr**	low prairie	hardwood swamp	
Estimated size of wetland in acres: **17.23**					

SUMMARY OF FUNCTIONAL VALUES

Based on the results of the attached functional assessment, rate the significance of each of the functional values for the subject wetland and check the appropriate box. Complete the table as a summary.

FUNCTION	**SIGNIFICANCE**				
	Low	Medium	High	Exceptional	N/A
Floral Diversity	X				
Wildlife Habitat		X			
Fishery Habitat	X				
Flood/Stormwater Attenuation		X			
Water Quality Protection			X		
Shoreline Protection					X
Groundwater	X				
Aesthetics/Recreation/Education		X			

List any Special Features/"Red Flags": **ADID (Advanced Delineation and Identification Wetland mapped by SWERPC. Also mapped as secondary environmental corridor.**

SITE DESCRIPTION

I. HYDROLOGIC SETTING

A. Describe the geomorphology of the wetland:

☒Depressional (includes slopes, potholes, small lakes, kettles, etc.)
☐Riverine
☐Lake Fringe
☐Extensive Peatland

B. ☒ **Y** ☐ **N** Has the wetland hydrology been altered by ditching, tiles, dams, culverts, well pumping, diversion of surface flow, or changes to runoff within the watershed (bold those that apply)? **Ditching provides drainage north across I-94 to the Pewaukee River, an Area of Special Natural Resource Interest as supporting a warm water fish community. The Pewaukee River originates from Pewaukee Lake and empties into the Fox River. The river contains a fairly decent forage and gamefish population.**

C. ☒ **Y** ☐ **N** Does the wetland have an inlet, outlet, or **both** (bold those that apply)? **Culvert inlets and outlets manage the flow of water into and out of the wetland.**

D. ☒ **Y** ☐ **N** Is there any field evidence of wetland hydrology such as buttressed tree trunks, adventitious roots, drift lines, water marks, **water stained leaves**, **soil mottling/gleying**, organic soils layer, or **oxidized rhizospheres** (bold those that apply)? **A high water table, saturation to the surface and crayfish burrows were also observed during an October 18, 2013, wetland delineation.**

E. ☒ **Y** ☐ **N** Does the wetland have standing water, and if so what is the average depth in inches? __" Approximately how much of the wetland is inundated? **80% estimated coverage of seasonal high water.**

F. How is the hydroperiod (seasonal water level pattern) of the wetland classified?

☐Permanently Flooded
☒Seasonally Flooded (water absent at end of growing season)
☐Saturated (surface water seldom present)
☐Artificially Flooded
☐Artificially Drained

G. ☒ **Y** ☐ **N** Is the wetland a navigable body of water or is a portion of the wetland below the ordinary high-water mark of a navigable water body? List any surface waters associated with the wetland or in proximity to the wetland (note approximate distance from the wetland and navigability determination). Note if there is a surface water connection to other wetlands. **The main drainage ditch trending northwest through the west side of the wetland appears to be a navigable at least to the I-94 fill slope, with an average width of about 12 feet. The ditch is an un-named tributary of the Pewaukee River and it appears flooded in all available aerial photographs.**

II. VEGETATION

A. Identify the vegetation communities present and the dominant species.

	floating leaved community dominated by:
	submerged aquatic community dominated by:
X	emergent community dominated by:**narrow-lvd cattail, reed canary grass**
X	shrub community dominated by: **sandbar willow, buckthorn, red osier**
	deciduous broad-leaved tree community dominated by:
	coniferous tree community dominated by:
	open sphagnum mat or bog
	sedge meadow/wet prairie community dominated by:
	other (explain)

B. Other plant species identified during site visit:

III. SOILS

A. NRCS Soil Map Classification:

B. Field description:

☐Organic (histosol)? If so, is it a muck or a peat?

Mineral soil?

- **Mottling,** gleying, sulfidic materials, iron or manganese concretions, organic streaking (circle those that apply)
- Soil Description: **Meets Criteria F6: Redox Dark Surface**
- Depth of mottling/gleying: **4”-20”**
- Depth of A Horizon: **12”**
- Munsell Color of matrix and mottles
    - Matrix below the A horizon (10"depth): **10YR 3/1**
    - Mottles: **10YR 5/8**

V. SURROUNDING LAND USES

A. Estimated area of the wetland watershed in acres: **130**

B. Surrounding land uses:

LAND-USE	ESTIMATED % OF WETLAND WATERSHED
Developed (Industrial/Commercial/Residential)	**15**
Agricultural/cropland	
Agricultural/grazing	
Forested	**5**
Grassed recreation areas/parks	
Old field	
Highways or roads	**15**
Other (specify)	**65 (turf & other wetland)**

VI. SITE SKETCH – See Exhibit A, ADID Wetland Map

FUNCTIONAL ASSESSMENT

The following assessment requires the evaluator to examine site conditions that provide evidence that a given functional value is present and to assess the significance of the wetland to perform those functions. Positive answers to questions indicate the presence of factors important for the function. The questions are not definitive and are only provided to guide the evaluation. After completing each section, the evaluator should consider the factors observed and use best professional judgment to rate the significance. The ratings should be recorded on page 1 of the assessment.

SPECIAL FEATURES/"RED FLAGS"

1. ☒ **Y** ☐ **N** Is the wetland in or adjacent to an area of special natural resource interest (NR 103.04, Wis. Adm. Code)? If so, check those that apply:

   ☐Cold water community as defined in s. NR 102.04(3)(b), Wis. Adm. Code, including trout streams, their tributaries, and trout lakes
   ☐Lakes Michigan and Superior and the Mississippi River
   ☐State or federal designated wild and scenic river
   ☐Designated state riverway
   ☐Designated state scenic urban waterway
   ☒Environmentally sensitive area or environmental corridor identified in an area-wide water quality management plan, special area management plan, special wetland inventory study, or an advanced delineation and identification study
   ☐Calcareous fen
   ☐State park, forest, trail or recreation area
   ☐State and federal fish and wildlife refuges and fish and wildlife management areas
   ☐State or federal designated wilderness area
   ☐Designated or dedicated state natural area
   ☐Wild rice water listed in ch. NR 19.09, Wis. Adm. Code
   ☐Surface water identified as an outstanding or exceptional resource water in ch. NR 102, Wis. Adm. Code

2. ☐ **Y** ☒ **N** According to the Natural Heritage Inventory (Bureau of Endangered Resources) or direct observations, are there any rare, endangered, or threatened plant or animal species in, near, or using the wetland or adjacent lands? If so, list the species of concern:

3. ☐ **Y** ☒ **N** Is the project located in an area that requires a State Coastal Zone Management Plan consistency determination?

Floral Diversity

1. ☐ **Y** ☒ **N** Does the wetland support a variety of native plant species (i.e. not a monotypic stand of cattail or giant reed grass and/or not dominated by exotic species such as reed canary grass, brome grass, buckthorn, purple loosestrife, etc.)?

2. ☐ **Y** ☒ **N** Is the wetland plant community regionally scarce or rare?

Wildlife and Fishery Habitat

1. List any species observed, evidenced (e.g. tracks, scat, nest/burrow, calls), or expected to utilize the wetland: **crayfish, possible forage fish in drainage ditch, white-tailed deer, raccoons**

2. ☐ **Y** ☒ **N** Does the wetland contain a number of diverse vegetative cover types and a high degree of interspersion of those vegetation types?

3. ☐ **Y** ☒ **N** Is the estimated ratio of open water to cover between 30 and 70 percent? What is the estimated ratio? **5%**

4. ☐ **Y** ☒ **N** Does the surrounding upland habitat likely support a variety of animal species?

5. ☒ **Y** ☐ **N** Is the wetland part of or associated with a wildlife corridor or designated environmental corridor?

6. ☐ **Y** ☒ **N** Is the surrounding habitat and/or the wetland itself a large tract of undeveloped land important for wildlife that requires large home ranges (e.g. bear, woodland passerines)?

7. ☒ **Y** ☐ **N** Is the surrounding habitat and/or the wetland itself a relatively large tract of undeveloped land within an urbanized environment that is important for wildlife?

8. ☒ **Y** ☐ **N** Are there other wetland areas near the subject wetland that may be important to wildlife?

9. ☒ **Y** ☐ **N** Is the wetland contiguous with a permanent waterbody or periodically inundated for sufficient periods of time to provide spawning/nursery habitat for fish?

10. ☒ **Y** ☐ **N** Can the wetland provide significant food base for fish and wildlife (e.g. insects, crustaceans, voles, forage fish, amphibians, reptiles, shrews, wild rice, wild celery, duckweed, pondweeds, watermeal, bulrushes, bur reeds, arrowhead, smartweeds, millets...)?

11. ☐ **Y** ☒ **N** Is the wetland located in a priority watershed/township as identified in the Upper Mississippi and Great Lakes Joint Venture of the North American Waterfowl Management Plan?

12. ☒ **Y** ☐ **N** Is the wetland providing habitat that is scarce to the region? **Surrounding area is highly urbanized and largest areas of significant habitat are associated with the Pewaukee/Fox River environmental corridors.**

Flood and Stormwater Storage/Attenuation

1. ☒ **Y** ☐ **N** Are there **steep slopes, large impervious areas**, moderate slopes with row cropping, or areas with severe overgrazing within the watershed (circle those that apply)?

2. ☒ **Y** ☐ **N** Does the wetland significantly reduce run-off velocity due to its size, configuration, braided flow patterns, or vegetation type and density?

3. ☐ **Y** ☒ **N** Does the wetland show evidence of flashy water level responses to storm events (debris marks, erosion lines, stormwater inputs, channelized inflow)?

4. ☒ **Y** ☐ **N** Is there a natural feature or human-made structure impeding drainage from the wetland that causes backwater conditions? **Culverts beneath I-94 may cause backwater during extreme weather events.**

5. ☐ **Y** ☒ **N** Considering the size of the wetland area in relation to the size of its watershed, at any time during the year is water likely to reach the wetland's storage capacity (i.e. the level of easily observable wetland vegetation)? [For some cases where greater documentation is required, one should determine if the wetland has capacity to hold 25% of the run-off from a 2 year-24 hour storm event.] **Storage potential is compromised by ditch configuration, with two ditches penetrating the wetland interior and joining about 50 south of the I-94 culvert.**

6. ☒ **Y** ☐ **N** Considering the location of the wetland in relation to the associated surface water watershed, is the wetland important for attenuating or storing flood or stormwater peaks (i.e. is the wetland located in the mid or lower reaches of the watershed)?

Water Quality Protection

1. ☒ **Y** ☐ **N** Does the wetland receive overland flow or direct discharge of stormwater as a primary source of water (circle that which applies)?

2. ☒ **Y** ☐ **N** Do the surrounding land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?

3. ☒ **Y** ☐ **N** Based on your answers to the flood/stormwater section above, does the wetland perform significant flood/stormwater attenuation (residence time to allow settling)?

4. ☒ **Y** ☐ **N** Does the wetland have significant vegetative density to decrease water energy and allow settling of suspended materials?

5. ☒ **Y** ☐ **N** Is the position of the wetland in the landscape such that run-off is held or filtered before entering a surface water?

6. ☐ **Y** ☒ **N** Are algal blooms, heavy macrophyte growth, or other signs of excess nutrient loading to the wetland apparent (or historically reported)?

Shoreline Protection

1. ☐ **Y** ☒ **N** Is the wetland in a lake fringe or riverine setting? If NO, STOP and enter "not applicable" for this function. If YES, then answer the applicable questions. **Not applicable.**

2. ☐ **Y** ☐ **N** Is the shoreline exposed to constant wave action caused by long wind fetch or boat traffic?

3. ☐ **Y** ☐ **N** Is the shoreline and shallow littoral zone vegetated with submerged or emergent vegetation in the swash zone that decrease wave energy or perennial wetland species that form dense root mats and/or species that have strong stems that are resistant to erosive forces?

4. ☐ **Y** ☐ **N** Is the stream bank prone to erosion due to unstable soils, land uses, or ice floes?

5. ☐ **Y** ☐ **N** Is the stream bank vegetated with densely rooted shrubs that provide upper bank stability?

Groundwater Recharge and Discharge

1. ☐ **Y** ☒ **N** Related to discharge, are there observable (or reported) springs located in the wetland, physical indicators of springs such as marl soil, or vegetation indicators such as watercress or marsh marigold present that tend to indicate the presence of groundwater springs?

2. ☒ **Y** ☐ **N** Related to discharge, may the wetland contribute to the maintenance of base flow in a stream?

3. ☐ **Y** ☒ **N** Related to recharge, is the wetland located on or near a groundwater divide (e.g. a topographic high)?

Aesthetics/Recreation/Education and Science

1. ☒ **Y** ☐ **N** Is the wetland visible from any of the following kinds of vantage points: roads, public lands, houses, and/or businesses? (Circle all that apply.)

2. ☒ **Y** ☐ **N** Is the wetland in or near any population centers?

3. ☐ **Y** ☒ **N** Is any part of the wetland is in public or conservation ownership?

4. ☒ **Y** ☐ **N** Does the public have direct access to the wetland from public roads or waterways? (Circle those that apply.)

5. Is the wetland itself relatively free of obvious human influences, such as:

   a. ☒ **Y** ☐ **N** Buildings?
   b. ☒ **Y** ☐ **N** Roads?
   c. ☒ **Y** ☐ **N** Other structures?
   d. ☒ **Y** ☐ **N** Trash?
   e. ☒ **Y** ☐ **N** Pollution?
   f. ☐ **Y** ☒ **N** Filling?
   g. ☐ **Y** ☒ **N** Dredging/draining?
   h. ☐ **Y** ☒ **N** Domination by non-native vegetation?

6. Is the surrounding viewshed relatively free of obvious human influences, such as:
   a. ☐ **Y** ☒ **N** Buildings?
   b. ☐ **Y** ☒ **N** Roads?
   c. ☒ **Y** ☐ **N** Other structures?

7. ☒ **Y** ☐ **N** Is the wetland organized into a variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water)?

8. ☒ **Y** ☐ **N** Does the wetland add to the variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water) within the landscape as a whole?

9. Does the wetland encourage exploration because any of the following factors are present:
   a. ☒ **Y** ☐ **N** Long views within the wetland?
   b. ☒ **Y** ☐ **N** Long views in the viewshed adjacent to the wetland?
   c. ☐ **Y** ☒ **N** Convoluted edges within and/or around the wetland border?
   d. ☒ **Y** ☐ **N** The wetland provides a different (and perhaps more natural/complex) kind of environment from the surrounding land covers?

10. ☐ **Y** ☒ **N** Is the wetland currently being used for (or does it have the potential to be used for) the following recreational activities? (Check all that apply.)

ACTIVITY	CURRENT USE	POTENTIAL USE
Nature study/photography	N	Y
Hiking/biking/skiing	N	N
Hunting/fishing/trapping	N	N
Boating/canoeing	N	N
Food harvesting	N	N
Others (list)		

11. ☐ **Y** ☒ **N** Is the wetland currently being used, and/or does it have the potential for use for educational or scientific study purposes (circle that which applies)?

January, 2001 File or Docket Number

Wisconsin Department of Natural Resources

RAPID ASSESSMENT METHODOLOGY FOR EVALUATING WETLAND FUNCTIONAL VALUES

GENERAL INFORMATION

Name of Wetland/Owner: **Waukesha Airport ADID Wetland 3**		
Location: County: **Waukesha**		
Legal Address: ¼ __ ¼ **NW**__ Section **20**	Township:**7N**	Range: **19E**
Project Name: **Waukesha Airport Runway 10/28 Safety Area – Silvernail Road Relocation**		
Evaluator(s): **Rossa & King, Mead & Hunt**		
Date(s) of Site Visit(s): **Multiple, 2003-2013**		

Description of seasonality limitations of this inspection due to time of year of the evaluation and/or current hydrologic and climatologic conditions (e.g. after heavy rains, snow or ice cover, during drought year, during spring flood, during bird migration): **None**

WETLAND DESCRIPTION

Wisconsin Wetlands Inventory classification: **E2K, S3/E2K**					
Wetland Type:	shallow open water	deep marsh	**shallow marsh**	seasonally flooded basin	bog
	floodplain forest	alder thicket	sedge meadow	coniferous swamp	fen
	wet meadow	**shrub-carr**	low prairie	hardwood swamp	
Estimated size of wetland in acres: **4.51**					

SUMMARY OF FUNCTIONAL VALUES

Based on the results of the attached functional assessment, rate the significance of each of the functional values for the subject wetland and check the appropriate box. Complete the table as a summary.

FUNCTION	**SIGNIFICANCE**				
	Low	Medium	High	Exceptional	N/A
Floral Diversity	X				
Wildlife Habitat	X				
Fishery Habitat	X				
Flood/Stormwater Attenuation	X				
Water Quality Protection		X			
Shoreline Protection					X
Groundwater	X				
Aesthetics/Recreation/Education	X				

List any Special Features/"Red Flags": **ADID (Advanced Delineation and Identification Wetland mapped by SWERPC. Also mapped as secondary environmental corridor.**

SITE DESCRIPTION

I. HYDROLOGIC SETTING

A. Describe the geomorphology of the wetland:

☒Depressional (includes slopes, potholes, small lakes, kettles, etc.)
☐Riverine
☐Lake Fringe
☐Extensive Peatland

B. ☒ **Y** ☐ **N** Has the wetland hydrology been altered by **ditching**, tiles, dams, **culverts**, well pumping, diversion of surface flow, or **changes to runoff within the watershed** (bold those that apply)? **Ditching collects runoff from Silvernail Road and the north side of Runway 10/28 of Waukesha Airport. Two culverts supply water to the wetland and two culverts beneath Silvernail Road connect the wetland to ADID Wetland 2 to the north. Wetland 2 drains across I-94 to the Pewaukee River, an Area of Special Natural Resource Interest as supporting a warm water fish community. The Pewaukee River originates from Pewaukee Lake and empties into the Fox River. The river contains a fairly decent forage and gamefish population.**

C. ☒ **Y** ☐ **N** Does the wetland have an inlet, outlet, or **both** (bold those that apply)? **There are two inlet and two outlet culverts.**

D. ☒ **Y** ☐ **N** Is there any field evidence of wetland hydrology such as buttressed tree trunks, adventitious roots, drift lines, water marks, water stained leaves, **soil mottling/gleying**, organic soils layer, or **oxidized rhizospheres** (bold those that apply)? **A high water table, saturation to the surface, hydrogen sulfide and stunted plants were also observed during an October 4, 2011 wetland delineation.**

E. ☒ **Y** ☐ **N** Does the wetland have standing water, and if so what is the average depth in inches? __" Approximately how much of the wetland is inundated? **The estimated depth of seasonal high water is 6 inches covering an estimated 50% of the wetland.**

F. How is the hydroperiod (seasonal water level pattern) of the wetland classified?

☐Permanently Flooded
☒Seasonally Flooded (water absent at end of growing season)
☐Saturated (surface water seldom present)
☐Artificially Flooded
☐Artificially Drained

G. ☐ **Y** ☒ **N** Is the wetland a navigable body of water or is a portion of the wetland below the ordinary high-water mark of a navigable water body? List any surface waters associated with the wetland or in proximity to the wetland (note approximate distance from the wetland and navigability determination). Note if there is a surface water connection to other wetlands. **The wetland is connected to ADID Wetland 2 via two road culverts. Wetland 2 is riparian to a ditched tributary of the Pewaukee River that is probably navigable.**

II. VEGETATION

A. Identify the vegetation communities present and the dominant species.

	floating leaved community dominated by:
	submerged aquatic community dominated by:
X	emergent community dominated by:**narrow-lvd cattail, reed canary grass**
X	shrub community dominated by: **sandbar willow, buckthorn**
	deciduous broad-leaved tree community dominated by:
	coniferous tree community dominated by:
	open sphagnum mat or bog
	sedge meadow/wet prairie community dominated by:
	other (explain)

B. Other plant species identified during site visit:

III. SOILS

A. NRCS Soil Map Classification:

B. Field description:

☐Organic (histosol)? If so, is it a muck or a peat?

Mineral soil?

- **Mottling, gleying**, sulfidic materials, iron or manganese concretions, organic streaking (circle those that apply)
- Soil Description: **Meets Criteria A12: Thick Dark Surface**
- Depth of mottling/gleying: **0-18”**
- Depth of A Horizon: **15”**
- Munsell Color of matrix and mottles **10YR 2/1; 10YR 5/8**
    - Matrix below the A horizon (10"depth): **Gley 1 5/5G**
    - Mottles: **10YR 5/8**

V. SURROUNDING LAND USES

A. Estimated area of the wetland watershed in acres: **60**

B. Surrounding land uses:

LAND-USE	ESTIMATED % OF WETLAND WATERSHED
Developed (Industrial/Commercial/Residential)	**50**
Agricultural/cropland	
Agricultural/grazing	
Forested	
Grassed recreation areas/parks	
Old field	
Highways or roads	**20 (runway/taxiway)**
Other (specify)	**30 (airport and roadside turf)**

VI. SITE SKETCH – See Exhibit A, ADID Wetland Map

FUNCTIONAL ASSESSMENT

The following assessment requires the evaluator to examine site conditions that provide evidence that a given functional value is present and to assess the significance of the wetland to perform those functions. Positive answers to questions indicate the presence of factors important for the function. The questions are not definitive and are only provided to guide the evaluation. After completing each section, the evaluator should consider the factors observed and use best professional judgment to rate the significance. The ratings should be recorded on page 1 of the assessment.

SPECIAL FEATURES/"RED FLAGS"

1. ☒ **Y** ☐ **N** Is the wetland in or adjacent to an area of special natural resource interest (NR 103.04, Wis. Adm. Code)? If so, check those that apply:

   ☐Cold water community as defined in s. NR 102.04(3)(b), Wis. Adm. Code, including trout streams, their tributaries, and trout lakes
   ☐Lakes Michigan and Superior and the Mississippi River
   ☐State or federal designated wild and scenic river
   ☐Designated state riverway
   ☐Designated state scenic urban waterway
   ☒Environmentally sensitive area or environmental corridor identified in an area-wide water quality management plan, special area management plan, special wetland inventory study, or an advanced delineation and identification study
   ☐Calcareous fen
   ☐State park, forest, trail or recreation area
   ☐State and federal fish and wildlife refuges and fish and wildlife management areas
   ☐State or federal designated wilderness area
   ☐Designated or dedicated state natural area
   ☐Wild rice water listed in ch. NR 19.09, Wis. Adm. Code
   ☐Surface water identified as an outstanding or exceptional resource water in ch. NR 102, Wis. Adm. Code

2. ☐ **Y** ☒ **N** According to the Natural Heritage Inventory (Bureau of Endangered Resources) or direct observations, are there any rare, endangered, or threatened plant or animal species in, near, or using the wetland or adjacent lands? If so, list the species of concern:

3. ☐ **Y** ☒ **N** Is the project located in an area that requires a State Coastal Zone Management Plan consistency determination?

Floral Diversity

1. ☐ **Y** ☒ **N** Does the wetland support a variety of native plant species (i.e. not a monotypic stand of cattail or giant reed grass and/or not dominated by exotic species such as reed canary grass, brome grass, buckthorn, purple loosestrife, etc.)?

2. ☐ **Y** ☒ **N** Is the wetland plant community regionally scarce or rare?

Wildlife and Fishery Habitat

1. List any species observed, evidenced (e.g. tracks, scat, nest/burrow, calls), or expected to utilize the wetland: **crayfish, possible forage fish in drainage ditch, white-tailed deer, raccoons**

2. ☐ **Y** ☒ **N** Does the wetland contain a number of diverse vegetative cover types and a high degree of interspersion of those vegetation types?

3. ☐ **Y** ☒ **N** Is the estimated ratio of open water to cover between 30 and 70 percent? What is the estimated ratio? **5%**

4. ☐ **Y** ☒ **N** Does the surrounding upland habitat likely support a variety of animal species?

5. ☒ **Y** ☐ **N** Is the wetland part of or associated with a wildlife corridor or designated environmental corridor?

6. ☐ **Y** ☒ **N** Is the surrounding habitat and/or the wetland itself a large tract of undeveloped land important for wildlife that requires large home ranges (e.g. bear, woodland passerines)?

7. ☐ **Y** ☒ **N** Is the surrounding habitat and/or the wetland itself a relatively large tract of undeveloped land within an urbanized environment that is important for wildlife?

8. ☒ **Y** ☐ **N** Are there other wetland areas near the subject wetland that may be important to wildlife?

9. ☐ **Y** ☒ **N** Is the wetland contiguous with a permanent waterbody or periodically inundated for sufficient periods of time to provide spawning/nursery habitat for fish?

10. ☐ **Y** ☒ **N** Can the wetland provide significant food base for fish and wildlife (e.g. insects, crustaceans, voles, forage fish, amphibians, reptiles, shrews, wild rice, wild celery, duckweed, pondweeds, watermeal, bulrushes, bur reeds, arrowhead, smartweeds, millets...)?

11. ☐ **Y** ☒ **N** Is the wetland located in a priority watershed/township as identified in the Upper Mississippi and Great Lakes Joint Venture of the North American Waterfowl Management Plan?

12. ☒ **Y** ☐ **N** Is the wetland providing habitat that is scarce to the region? **Surrounding area is highly urbanized and largest areas of significant habitat are associated with the Pewaukee/Fox River environmental corridors.**

Flood and Stormwater Storage/Attenuation

1. ☒ **Y** ☐ **N** Are there **steep slopes, large impervious areas**, moderate slopes with row cropping, or areas with severe overgrazing within the watershed (circle those that apply)?

2. ☒ **Y** ☐ **N** Does the wetland significantly reduce run-off velocity due to its size, configuration, braided flow patterns, or vegetation type and density?

3. ☐ **Y** ☒ **N** Does the wetland show evidence of flashy water level responses to storm events (debris marks, erosion lines, stormwater inputs, channelized inflow)?

4. ☐ **Y** ☒ **N** Is there a natural feature or human-made structure impeding drainage from the wetland that causes backwater conditions? **Culverts beneath Silvernail Road appear adequate to prevent backwater conditions even during large storm events.**

5. ☐ **Y** ☒ **N** Considering the size of the wetland area in relation to the size of its watershed, at any time during the year is water likely to reach the wetland's storage capacity (i.e. the level of easily observable wetland vegetation)? [For some cases where greater documentation is required, one should determine if the wetland has capacity to hold 25% of the run-off from a 2 year-24 hour storm event.]

6. ☒ **Y** ☐ **N** Considering the location of the wetland in relation to the associated surface water watershed, is the wetland important for attenuating or storing flood or stormwater peaks (i.e. is the wetland located in the mid or lower reaches of the watershed)? **Wetland is at the bottom of the Silvernail/north airport subwatershed and performs some minor water storage before discharging to ADID Wetland 2.**

Water Quality Protection

1. ☒ **Y** ☐ **N** Does the wetland receive overland flow or direct discharge of stormwater as a primary source of water (circle that which applies)?

2. ☒ **Y** ☐ **N** Do the surrounding land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?

3. ☐ **Y** ☒ **N** Based on your answers to the flood/stormwater section above, does the wetland perform significant flood/stormwater attenuation (residence time to allow settling)?

4. ☒ **Y** ☐ **N** Does the wetland have significant vegetative density to decrease water energy and allow settling of suspended materials?

5. ☒ **Y** ☐ **N** Is the position of the wetland in the landscape such that run-off is held or filtered before entering a surface water? **Wetland ditch portion over 2,000 feet long also offers some filtration benefits.**

6. ☐ **Y** ☒ **N** Are algal blooms, heavy macrophyte growth, or other signs of excess nutrient loading to the wetland apparent (or historically reported)?

Shoreline Protection

1. ☐ **Y** ☒ **N** Is the wetland in a lake fringe or riverine setting? If NO, STOP and enter "not applicable" for this function. If YES, then answer the applicable questions. **Not Applicable.**

2. ☐ **Y** ☐ **N** Is the shoreline exposed to constant wave action caused by long wind fetch or boat traffic?

3. ☐ **Y** ☐ **N** Is the shoreline and shallow littoral zone vegetated with submerged or emergent vegetation in the swash zone that decrease wave energy or perennial wetland species that form dense root mats and/or species that have strong stems that are resistant to erosive forces?

4. ☐ **Y** ☐ **N** Is the stream bank prone to erosion due to unstable soils, land uses, or ice floes?

5. ☐ **Y** ☐ **N** Is the stream bank vegetated with densely rooted shrubs that provide upper bank stability?

Groundwater Recharge and Discharge

1. ☐ **Y** ☒ **N** Related to discharge, are there observable (or reported) springs located in the wetland, physical indicators of springs such as marl soil, or vegetation indicators such as watercress or marsh marigold present that tend to indicate the presence of groundwater springs?

2. ☒ **Y** ☐ **N** Related to discharge, may the wetland contribute to the maintenance of base flow in a stream?

3. ☐ **Y** ☒ **N** Related to recharge, is the wetland located on or near a groundwater divide (e.g. a topographic high)?

Aesthetics/Recreation/Education and Science

1. ☒ **Y** ☐ **N** Is the wetland visible from any of the following kinds of vantage points: roads, public lands, houses, and/or businesses? (Circle all that apply.)

2. ☒ **Y** ☐ **N** Is the wetland in or near any population centers?

3. ☐ **Y** ☒ **N** Is any part of the wetland in public or conservation ownership?

4. ☒ **Y** ☐ **N** Does the public have direct access to the wetland from public roads or waterways? (Circle those that apply.)

5. Is the wetland itself relatively free of obvious human influences, such as:

   a. ☒ **Y** ☐ **N** Buildings?
   b. ☐ **Y** ☒ **N** Roads?
   c. ☐ **Y** ☒ **N** Other structures?
   d. ☒ **Y** ☐ **N** Trash?
   e. ☒ **Y** ☐ **N** Pollution?
   f. ☐ **Y** ☒ **N** Filling?
   g. ☐ **Y** ☒ **N** Dredging/draining?
   h. ☐ **Y** ☒ **N** Domination by non-native vegetation?

6. Is the surrounding viewshed relatively free of obvious human influences, such as:
   a. ☐ **Y** ☒ **N** Buildings?
   b. ☐ **Y** ☒ **N** Roads?
   c. ☐ **Y** ☒ **N** Other structures?

7. ☐ **Y** ☒ **N** Is the wetland organized into a variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water)?

8. ☒ **Y** ☐ **N** Does the wetland add to the variety of visibly separate areas of similar vegetation, color, and/or texture (including areas of open water) within the landscape as a whole?

9. Does the wetland encourage exploration because any of the following factors are present:
   a. ☐ **Y** ☒ **N** Long views within the wetland?
   b. ☒ **Y** ☐ **N** Long views in the viewshed adjacent to the wetland?
   c. ☐ **Y** ☒ **N** Convoluted edges within and/or around the wetland border?
   d. ☒ **Y** ☐ **N** The wetland provides a different (and perhaps more natural/complex) kind of environment from the surrounding land covers?

10. ☐ **Y** ☒ **N** Is the wetland currently being used for (or does it have the potential to be used for) the following recreational activities? (Check all that apply.)

ACTIVITY	CURRENT USE	POTENTIAL USE
Nature study/photography	N	N
Hiking/biking/skiing	N	N
Hunting/fishing/trapping	N	N
Boating/canoeing	N	N
Food harvesting	N	N
Others (list)		

11. ☐ **Y** ☒ **N** Is the wetland currently being used, and/or does it have the potential for use for educational or scientific study purposes (circle that which applies)?