



Airport Master Plan
Windom Municipal Airport
Windom, Minnesota

WINDOM 138969 | July 9, 2019

DRAFT



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FINAL

Executive Summary

The Windom Municipal Airport (MWM) in Windom, MN serves the general aviation air transportation needs of southern Minnesota. MWM is home to 17 based aircraft: 15 single-engine, one multi-engine, and one jet. The Airport is currently served by a single runway, Runway 17/35. Runway 17/35 is a non-precision runway, 3,599 feet long and 75 feet wide, constructed of concrete pavement, and is lit. MWM hangar area consists of two 4-unit buildings, an eight-unit t-hangar building, and a single-unit building, as well as three tiedowns positions on the apron.

The purpose of this Master Plan is to determine the facilities needed to meet the projected aviation demand in the 20-year planning period (2018-2038). As part of this study, aviation activity forecasts were prepared based on responses to user surveys, the airport's service area, and on analysis of local and national general aviation trends and socioeconomic data. The number of based aircraft at MWM is forecasted to increase from 17 in 2018 to 23 by 2038 (**Section 2.9**). Aircraft operations are expected to increase at an annual average growth rate of 0.52%, from 9,383 in 2018 to 10,417 in 2038 (**Section 2.10**).

The following are future development recommendations as outlined in the Master Plan:

Runway 17/35

- Update Runway 17/35's designation to Runway 18/36, as well as all corresponding airport marking, signage, and navigation documentation (**Sections 4.2.2 and 4.2.11**).
- Update Runway 17/35's published pavement strength to 12,500 SWG (**Section 4.2.3.1**).
- Routine maintenance, such as joint and cracking sealing, and slurry seal, should continue to be performed on a scheduled basis to extend the life of the pavement (**Section 4.2.3.2**).
- Plan for improved approaches from 1 mile to 7/8 mile (greater than ¾ mile) for both Runway 17 and 35 (**Section 4.2.6**).
- Install PAPIs on both Runway 17 and 35 (**Section 4.2.10**).
- Update MIRLS and threshold lights to non-precision runway standards (**Section 4.2.10**).
- Acquire all land, through easement or fee, within the existing and future RPZs and MnDOT Clear Zones, as well as the 20-foot BRL (**Section 4.2.7 and 4.2.7.2**).
- Show an ultimate extension to 4,400 feet to the north for Runway 17/35 (Alternative 1C, **Section 5.1.3**).

Future Runway 12/30:

- Construct turf crosswind Runway 12/30 at length of 2,500 feet by 60 feet wide (**Sections 4.2.8 and 5.2**).

Taxiway System:

- Routine maintenance, such as joint and cracking sealing, and slurry seal, should continue to be performed on a scheduled basis to extend the life of the pavement (**Section 4.2.9.1**).
- Update taxiways system to TDG 2 design and marking standards (**Section 4.2.9.2**).
- Construct parallel taxiway to Runway 17/35 (**Section 4.2.9.1**), and mitigate/minimize direct apron to runway access when possible as part of the design (**Section 4.2.9.3**).
- Install Medium Intensity Taxiway Lights (MITLs) on all taxiways, and retroreflector markers in the apron area (**Section 4.2.10**).

Building Area

- Construct additional hangar space to accommodate 95% of the forecasted 23 based aircraft by 2038 (Alternative 3C, **Section 5.3.2**).

Executive Summary (continued)

- Plan to relocate the A/D Building and Automobile Parking lot outside of the Departure Surface once they have reached the end of their useful life (**Section 4.3.2 and 4.3.4.1**).
- Install fiber optic communication cable to improve telecommunications at the Airport (**Section 4.3.2**).
- Construct a SRE/Maintenance building to house future equipment (**Section 4.3.5**).

Miscellaneous:

- Install airfield signage (**Section 4.2.11**).
- Relocate AWOS to remove hangar obstructions from the 500-foot Critical Area (**Section 4.2.12**).
- Continue to monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas (**Section 4.3.3.1**).
- Install a Chip Credit Card Reader prior to October 2020 (**Section 4.3.3.2**).
- Acquire a carrier vehicle and associated snow removal equipment attachments (**Section 4.3.5**).
- Install a wildlife perimeter fence at least 8-feet tall with 3-strand barbed wire on top (**Section 4.3.6**).
- Acquire all land within the existing and future RPZs and 20-foot BRLs (in fee or easement) to ensure these areas are kept clear of incompatible land uses (**Sections 4.2.7, 5.1.3, and 5.3.2**).
- Mitigate obstructions to MWM's existing and ultimate Part 77 and TERPS surfaces (**Sections 4.4 and 5.4**).
- Update zoning ordinance to reflect the ultimate extension of Runway 17/35 to 4,400 feet and future crosswind Runway 12/30 at a length of 2,500 feet (**Section 5.5**).

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Airport Master Plan

Windom Municipal Airport

Prepared for City of Windom, Minnesota

1 Inventory

1.1 Introduction

Effective airport planning ensures that an airport is developed in a logical manner that coincides with the demand for facilities. Typically, planning efforts are performed approximately every ten to fifteen years. An Airport Master Plan study has never been completed for Windom Municipal Airport (Airport or MWM). This Master Plan has been undertaken to ensure that the planning recommendations and alternatives are consistent with the current and future needs of the airport and community. The previous Airport Layout Plan was conditionally approved by the FAA in 2016.

The Master Plan projects the needed facilities within the planning horizon, which is 20 years, or in this case, through the year 2038. However, when dealing with the development of facilities such as airports, an even longer-term view is often required in order to evaluate the needs of the ultimate layout of the facility. Encroachment of residences and businesses usually occurs at an airport site and can make expansion in the future difficult if actions are not taken far in advance of development to preserve land for aeronautical uses either through land purchase, easement, or land use protection.

1.2 Project Goals

This planning study is a cooperative effort between MWM, the Federal Aviation Administration, the MnDOT, Office of Aeronautics, and the consultant. Several project goals were identified during the scoping process. These goals include:

- **Aviation Forecasts** – Develop activity forecasts to better understand the existing and forecasted users of the airport and their needs;
- **Runway Length Evaluation** – Evaluate the ultimate length of 4,400 feet for Runway 17/35 (as shown on 2015 ALP) to determine if this ultimate length meets the needs of the existing and potential future forecasted user needs;
- **Crosswind Runway Evaluation** – Evaluate the ability of future crosswind runway to provide MWM a combined wind coverage of at least 95%, as well as accommodate existing and forecast user needs and their operating length requirements;
- **Approach Procedures Evaluation** – Evaluate the current instrument approach procedures and explore options to improve landing minimums;
- **Hangar Area Development** – Determine short-term and long-term hangar demand and evaluate building area alternatives to meet existing and forecasted used needs;

- **Long-term Implementation Plan and Funding Plan** – Prepare a prioritized long-term development plan for a strategic approach to accomplishing airport improvements, including development of a long-term sustainable funding plan for airport improvements;
- **Airports GIS** – Collect airport and aeronautical data to meet the standards for the FAA’s Airports Surveying Geographic Information System (Airports GIS);
- **Exhibit ‘A’ Property Map** – Develop an Exhibit A Property Map to meet standards specified in FAA Standard Operating Procedure (SOP) 3.0: FAA Review of Exhibit ‘A’ Airport Property Inventory Maps.

1.3 Airport Inventory

The intent of **Chapter 1, Inventory**, is to outline existing conditions of all of the facilities at MWM. In later chapters of this report, the ability of the Airport to meet anticipated demand and user needs will be analyzed, and any required improvements will be identified.

1.4 Airport Information

1.4.1 City and Location

The City of Windom is located in Cottonwood County in south-western Minnesota, approximately 120 miles southwest of Minneapolis, Minnesota as shown in Figure 1-1. Windom is located at the intersection of State Highway 60 and Trunk Highway 71. MWM is a city owned, public-use airport located approximately three miles north of the Windom downtown district.

1.4.2 Airport Ownership, Governance, and Management

The Airport is owned and operated by the City of Windom. The operation, management, and maintenance of MWM is the responsibility of the eight-member Airport Commission. Members of the Commission are appointed by the Windom City Council to term lengths at pleasure of the Mayor and City Council. The Commission provides the City with recommendations regarding long-range planning, land-use, and necessary improvements for the Airport. Day-to-day operations of the Airport are managed by Airport Manager, Brain Underwood.

1.4.3 Airport Use

The Airport is utilized primarily by recreational users, mostly small single-engine aircraft as well as ultra-lights. However, several local companies use the Airport for business purposes, these companies include: Oddson Underground (Piper Cherokee 6 and Cessna 414), Mainstream Holdings (Citation 510), and Fredin Bros (Piper Cherokee and Pilatus PC-12). Sanford Health (North Memorial Medical Center) also conducts emergency medical flights at MWM utilizing a King Air 200 and Augusta A109 helicopter. The Airport is also largely used in the summer month for agricultural spray operations. Flight training use of MWM was also reported.

1.5 Socioeconomic Information

1.5.1 Population

According to the United States Census, the City of Windom had a population of 4,646 in 2010. The total population of Cottonwood County was 11,687 in 2010. The City of Windom is the county seat and the largest city in Cottonwood County.

1.5.2 Employment and Income

According to the United States Census, in 2010 the median household income for the City of Windom was \$38,710, lower than both the median household income for Cottonwood County, \$47,350, and the State of Minnesota, \$60,828.

1.5.3 Local Industries

The two largest employers in Windom, MN are PM Beef, with 721 full-time employees and Toro, Co., with 600 full-time employees. Table 1-1 shows the top employers in Windom, MN.

Table 1-1 – Top Employers

Company	Number of Employees
PM Beef	721
Toro, Co.	600
Windom Public Schools	176
Fortune Transportation	175
Sogge Memorial Good Samaritan	165
Cottonwood County	132
Windom Area Hospital	115
Hy-Vee Feed Stores	105
Preferred Residential Services	101
McDonalds	71
MN Dept of Transportation	65
Habilitative Services (HIS)	51

Source: City of Windom

1.6 Airport Role and Classification

1.6.1 FAA National Plan of Integrated Airport Systems

MWM is included in the FAA's 2015-2019 *National Plan of Integrated Airport Systems (NPIAS)*, which classifies the Airport as a General Aviation (GA) Airport¹. General Aviation Airports are civilian airports open to the public that do not have scheduled passenger service and usually serve private aircraft and small aircraft charter operations. FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, states that to be included in the NPIAS, an airport must have at least 10 based aircraft and are at least 20 miles from the nearest NPAIS airport. Inclusion in the NPIAS is a requirement to receive federal grants for airport improvement projects.

¹ 2015-2019 National Plan of Integrated Airport Systems, submitted to Congress on September 27, 2012.

1.6.1.1 FAA Asset Study

In May 2012, the FAA released a study² of the nearly 3,000 GA airports in the federal system. The goal of this study was to more accurately define the roles of the airports in the GA service level and develop a new way to categorize the GA airports within the national system. The following service level categories of general airports were developed.

National – National airports support the national and state system by providing communities with access to national and international markets in multiple states and throughout the United States. These airports are located in metropolitan areas near major business centers and support flying throughout the nation and the world. Currently, 84 airports are categorized as national airports and account for 13 percent of the total flying studied in the study as well as 35 percent of flight plans filed to studied airports.

Regional – Regional airports support regional economies by connecting communities to statewide and interstate markets. These airports are located in metropolitan areas, serve relatively large populations and support interstate and some cross country flying. Regional airports account for 37 percent of the total flying at the studied airports and 42 percent of the total flight plans filed to studied airports.

Local – Local airports supplement local communities by providing access primarily to intrastate and some interstate markets. These airports are also defined as the backbone of the GA system and are typically located near larger population centers. Most users of these airports are piston aircraft supporting business and personal needs. Flights to and from local airports are typically intrastate or regional.

Basic – Basic airports support GA activities such as emergency service, charter or critical passenger service, cargo operations, flight training, and personal flying. These airports provide a community airport that allows for private GA flying and links the community to the national airport system.

There are 497 airports in the NPIAS that were not classified into one of the above classifications. The FAA will continue to assess and potentially classify these airports.

WMW is classified as a Local Airport in the Asset Study.

1.6.2 Minnesota State Airport System Plan

The 2012 Update to the *Minnesota State Airport System Plan* (SASP) classifies MWM as an Intermediate Airport. The definition of an Intermediate Airport is as follows:

“Intermediate Airports have a paved and lighted primary runway that is less than 5,000 feet in length. These airports are capable of accommodating all single-engine aircraft, some multi-engine aircraft, and some business jets. Intermediate Airports serve as landing facilities for flight training, aircraft maintenance, and general aviation aircraft up to the smaller business jet size. Intermediate airports serve many roles in communities ranging from emergency medical

² General Aviation Airports: A National Asset. May 2012. U.S. Department of Transportation Federal Aviation Administration.

transports to manufactured parts distribution. Intermediate Airports enable direct connections across Minnesota and the Central US region.”³

1.7 Based Aircraft and Aircraft Operations

Based aircraft are aircraft that reside at an airport. An aircraft operation is a takeoff or a landing at an airport. Based aircraft and aircraft operation are activity metrics used to determine facilities needs at an airport. The various sources of based aircraft and operations data are summarized in **Table 1-2**.

There are currently three interested parties on the Hangar Waiting List for MWM for four hangars. Discussions with Airport Management indicated two of these individuals are either ready to build hangars or occupy City/Airport managed hangars as soon hangars or development space becomes available.

Note to Reviewer: In 2018 the City is pursuing Federal and State grants for the development of two hangar expansions, and design for the extension and widening of a taxiway to accommodate a proposed 4-unit hangar. The hangar additions are anticipated to be completed by Spring of 2020. Once these improvements are completed, the Master Plan will be updated with the as-built conditions.

Table 1-2 – Summary of Based Aircraft and Operations

Source	Based Aircraft	Aircraft Operations
FAA Form 5010	16 (14 single-engine, 2 multi-engine)	8,300
FAA Terminal Area Forecasts (TAF)	16	8,300
MnDOT Aeronautics	12	N/A
Minnesota State Airport System Plan	18 (17 single-engine, 1 multi-engine)	8,962 (2015 estimate)
BasedAircraft.com	17 (15 single-engine, 1 multi-engine, 1 jet)	N/A
Airport Management	17 (15 single-engine, 1 multi-engine, 1 jet)	N/A

Notes: MnDOT Aeronautics does not collect aircraft operations data. Airport management does not track or maintain historic records of aircraft operations.

Source: FAA Form 5010 (July 2016), TAF (2015), MnDOT Aeronautics Based Aircraft Records (July 2016), MN SASP (2012), BasedAircraft.com (12/21/17), and Airport Management

1.8 Runway Design Code

The FAA classifies airports by the type of aircraft traffic they experience. This classification is known as the Runway Design Code (RDC). This classification is based on two components: approach speed and wingspan or tail height of the aircraft. The Aircraft Approach Category, representing the approach speed, is an alphabetical classification denoted with letters A through

³ Minnesota State Airport System Plan, MnDOT, 2012

E (A being the slowest and E being the fastest), as shown in Table 1-3. The Airport Design Group (ADG), representing the wingspan or tail height, is a numerical classification denoted with roman numerals I through VI (I being the smallest and VI being the largest), as shown in Table 1-4. The RDC classification of a specific airport and its facilities are based on the RDC of its Critical Aircraft. Critical Aircraft is defined as the most demanding airplane, or family of airplanes, that have a minimum of 500 annual operations forecasted to use an airport.

Table 1-3 – Aircraft Approach Category

Aircraft Approach Category	Approach Speed
A	Approach speed < 91 knots
B	Approach speed ≥ 91 knots < 121 knots
C	Approach speed ≥ 121 knots < 141 knots
D	Approach speed ≥ 141 knots < 166 knots
E	Approach speed ≥ 166 knots

Source: FAA Advisory Circular (AC) 150/5300-13A, Airport Design

Table 1-4 – Airplane Design Group (ADG)

Group Numbers	Description	
	Wing Span (feet)	Tail Height (feet)
I	< 49'	< 20'
II	≥ 49' < 79'	≥ 20' < 30'
III	≥ 79' < 118'	≥ 30' < 45'
IV	≥ 118' < 171'	≥ 45' < 60'
V	≥ 171' < 214'	≥ 60' < 66'
VI	≥ 214' < 262'	≥ 66' < 80'

Source: FAA Advisory Circular (AC) 150/5300-13A, Airport Design

For comparison purposes, the following depicts examples of the various RDC categories for general aviation and commercial service aircraft.

<p>A-I</p> <p>Beech Barron 55 Cessna 150 Beech Bonanza Cirrus SR-20/22 Piper Warrior</p> 	<p>B-I</p> <p>King Air 90/100 Piper Navajo, Cheyenne Cessna Citation I Beech Barron 58 Cessna 402 Cessna 421</p> 
<p>A-II and B-II</p> <p>DHC Twin Otter Cessna Caravan Cessna Citation III King Air C90 Super King Air 200, 300, 350 Beech 1900 Falcon 20</p> 	<p>A-III and B-III</p> <p>Fokker F28 DHC Dash 7 DHC Dash 8 DC-3 Convair 580</p> 
<p>C-II and D-II</p> <p>Gulfstream III Cessna 650 Gulfstream IV Canadair 600 Cessna Citation X Cessna Citation Sovereign Hawker 800XP</p> 	<p>C-III and D-III</p> <p>Boeing 737 Bombardier CRJ-700 Gulfstream V Global Express MD-80 DC-9</p> 
<p>C-IV and D-IV</p> <p>Boeing 757-200 DC-10 Boeing 767 MD-11</p> 	<p>D-V</p> <p>Boeing 747 Series Boeing 777 Series</p> 

According to the conditionally approved 2016 ALP, Runway 17/35 is designed to an RDC of B-II. Through this Master Plan process and the included aviation forecasting (**Chapter 2**), the current and forecasted Critical Aircraft and RDC for each runway facility will be determined

1.9 Airfield Facilities

The geographic location of MWM, known as the Airport Reference Point (ARP), is at latitude of 43°54'48.291" north and a longitude of 95°06'33.841" west at an elevation of 1,410.8 feet above Mean Sea Level (MSL).

1.9.1 Runway 17/35

Runway 17/35 is the primary runway at MWM, designed to RDC B-II standards, as shown in **Figure 1-3**. The runway is 3,599 feet long by 75 feet wide, and is constructed of concrete pavement. According to MWM's Airport Master Record (Form 5010), dated December 7, 2017, Runway 17/35 has a weight bearing capacity of 15,000 pounds for Single Wheel Gear (SWG) equipped aircraft and 20,000 pounds for Dual Wheel Gear (DWG) equipped aircraft. Runways 17 and 35 are non-precision instrument runways with non-precision markings, which consist of centerline, threshold, and aiming point markings. Runway 17/35 has an effective gradient of 0.13%⁴, which meets the FAA's 2.0% longitudinal gradient standards.

1.9.2 Lighting and Approach Aids

Runway 17/35 is a non-precision runway and is equipped with Medium Intensity Runway Lights (MIRLs).

Both ends of Runway 17/35 are also equipped with flashing Runway End Identifier Lights (REILs)⁵ and threshold lights are also installed on each runway end.

Additional pilot aids on the airfield include a rotating airport beacon located east of the building area and a lighted wind cone located north of the building area.

MWM NAVAIDs and ownership are shown in Table 1-5.

Table 1-5 – Navigational Aids and Ownership

NAVAID	Owning Entity
RW 17/35 MIRLs	City of Windom
RW 17 and 35 REILs	City of Windom
Rotating Beacon	City of Windom
AWOS	MnDOT

1.9.3 Instrument Approach Procedures

In order for an aircraft to land in inclement weather conditions, the FAA publishes instrument approach procedures to provide directional and/or vertical guidance to pilots. By allowing landings during inclement weather conditions, either obscured cloud ceiling and/or forward-looking visibility, instrument approach procedures increase operational reliability to an airport. A non-precision approach only provides horizontal guidance, while a precision approach provides horizontal and vertical guidance.

MWM is currently served by two non-precision approaches via enroute area navigation (RNAV/GPS) to Runways 17 and 35, and a VOR approach to Runway 17. The existing approaches and their associated visibility and ceiling minimums at MWM are summarized in Table 1-6. Both Runway 17 and 35's RNAV(GPS) approaches have a LPV approach procedures.

⁴ Effective gradient is the difference in elevation of the two runway ends divided by the length of the runway.

⁵ REILs are synchronized flashing lights that identify the beginning of the useable runway.

Table 1-6 – Instrument Approach Procedures

Runway	Approach	Visibility Minimums	Ceiling Minimums (Above Ground Level – AGL)
17	RNAV(GPS)	1 Mile	449' (500')
35	RNAV(GPS)	1 Mile	429' (500')

Note: All approaches have a circling option

Source: U.S. Terminal Procedures, December 7, 2017

1.9.4 Communications

MWM has Common Traffic Advisory Frequency (CTAF) of 122.9 MHz for radio communication between aircraft while transitioning into and out of MWM's airspace. The runway's Pilot Controlled Lighting (PCL) can also be activated by keying the aircraft's radio on the CTAF frequency.

1.9.5 Taxiways and Apron System

The existing taxiway and apron system is shown in **Figure 1-3**. The primary Runway 17/35 is served by partial parallel Taxiway A, and two connector taxiways: Taxiways B and C, as shown in Figure 1-3. All taxiways are 40 feet wide.

The apron area is comprised of approximately 68,000 square yards with three aircraft tiedown positions.

1.9.6 Airspace

MWM is in Class E Airspace, which is the least restrictive classification of controlled airspace⁶. The airspace for MWM is circle shaped, beginning at 700 feet above the surface extending upward to 16,000 feet above mean sea level. Pilots communicate in MWM airspace on a Common Traffic Advisory Frequency (CTAF) of 122.9 MHz.

Air traffic control services, including instrument approaches, are handled by Minneapolis Air Route Traffic Control Center (ARTCC) located in Farmington, MN and by FAA Flight Service.

1.9.7 Weather Reporting and Meteorological Data

There is an Automated Weather Observation System (AWOS) located at the Airport. The AWOS was connected to the FAA network in 2006, is MnDOT owned, and is located north of the apron area. The AWOS provides up to date weather observations and generates routine aviation weather reports. Information typically provided by an AWOS includes wind direction and speed, sky condition visibility, temperature, and dew point. The AWOS is MnDOT owned and maintained.

⁶ Controlled airspace is a portion of airspace that may be subject to air traffic control when operating under Instrument Flight Rules (IFR). There are no communication requirements to operate within Class E Airspace, but a pilot can request traffic advisory services from ATC.

1.9.7.1 Temperature

Windom, Minnesota has a typical continental climate with hot summer and cold, often frigid, winters. The FAA requires temperature data used for determining airport facilities (e.g. runway lengths, etc.) be obtained from “Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree-Days (Climatology of the United States No. 81)”.⁷ Using data obtained from this source, the mean daily maximum for Windom is 85.3° Fahrenheit normally occurring in July, while the mean daily minimum temperature is 7.3° Fahrenheit normally occurring in January, shown in Table 1-7.

Table 1-7 – Temperature Summary

Temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Ann*
Mean Daily Max. °F	26.6	31.8	43.5	59.7	72.1	81.4	85.3	82.2	74.5	61.0	43.2	29.4	57.6
Mean °F	17.0	21.9	33.5	47.3	59.4	69.3	73.5	70.8	62.2	49.2	33.6	20.2	46.5
Mean Daily Min. °F	7.3	11.9	23.5	34.9	46.7	57.2	61.7	59.3	49.9	37.3	24.1	11.0	35.4

*Ann = Annual Average

Source: U.S. Department of Commerce, NOAA. Station WINDOM, MN US GHCND:USC00219033
<http://www.ncdc.noaa.gov/cdo-web>

1.9.7.2 Precipitation

The maximum average precipitation for the Windom area occurs in the month of June with an average of 4.56 inches of rainfall. The average annual snowfall is 8.9 inches, with the most snowfall occurring in December, shown in Table 1-8.

Table 1-8 – Precipitation Summary

Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Ann*
Av. Rain (in.)	0.90	0.71	1.97	3.24	3.55	4.56	4.05	3.52	3.29	2.18	1.67	0.98	30.62
Av. Snow (in.)	8.4	7.0	8.6	3.4	0.0	0.0	0.0	0.0	0.0	0.7	6.0	8.9	43.0

*Ann = Annual Average

Source: U.S. Department of Commerce, NOAA. Station WINDOM, MN US GHCND:USC00219033
<http://www.ncdc.noaa.gov/cdo-web>

1.9.7.3 Wind Data Analysis

Prevailing wind is a major factor influencing runway orientation. Wind conditions affect all aircraft to some degree. Generally, the smaller the aircraft, the more it is affected by wind. Therefore,

⁷ AC 150/5325-4B, *Runway Length Recommendations for Airport Design*, Paragraph 103.

orienting the runway such that it is aligned with the prevailing wind the greatest percentage of time will add substantially to the safety and usefulness of an airport.

The crosswind component of wind direction and velocity is defined as the resultant vector that acts at a right angle to the runway centerline, and is equal to the wind velocity multiplied by the sine of the angle between the wind direction and the runway direction. Wind coverage is defined as the percentage of time that crosswind components are below an acceptable velocity. The most desirable runway orientation based on wind is one that has the greatest percentage of wind coverage. The minimum recommended wind coverage for an airport is 95%. The 95% coverage is computed on the basis of the crosswind not exceeding **10.5 knots for A-I and B-I, 13 knots for A-II and B-II**, 16 knots for A-III, B-III, and C-I through D-III, and 20 knots for A-IV through D-VI.

Wind data collected through the National Oceanic and Atmospheric Administration (NOAA) at the actual airport site is the best source of information. NOAA collects wind data at MWM. The FAA requires wind data analysis to be completed with at least 10 years of consecutive data from the airport site or the closest available site. Wind data analysis was completed using data from MWM's AWOS for the period 2006 to 2015. **Table 1-9** shows the wind coverage for the existing runways at MWM.

Table 1-9 – Wind Coverage – Runway 17/35

		10.5 knots	13 knots	16 knots
Runway 17/35	All	85.23%	91.12%	96.01%
	VFR	85.97%	91.59%	96.25%
	IFR	79.59%	87.64%	94.39%

Note¹: Calculated based on Runway 17/35 with True Bearing of 180.36°.

Source: Windom Municipal Airport AWOS. 2007 to 2016. Obtained from the National Climatic Data Center.

Since MWM is designed as a B-II airport, the crosswind component should not exceed 13 knots. Primary Runway 17/35 does not meet the recommended 95% coverage for 13 knots (91.12%; B-II aircraft).

1.9.8 Pavement Condition Index (PCI)

The most recent pavement ratings were taken from the 2015 MnDOT Airport Pavement Management Study Update. The 2015 study found that Runway 17/35's pavement was in "Excellent" condition, with a 97 PCI. The connecting taxiways and Taxilane A, were all either rated "Excellent" or "Very Good" condition. The Apron was in "Good" condition with a PCI rating of 68. Figure 1-5 graphically depicts the pavement conditions index at MWM per the 2015 MnDOT Airport Pavement Management Study Update.

1.9.9 Airside Facilities Condition Index

Each existing airport facility has been assigned a general rating of "Excellent", "Very Good", "Good", "Fair", "Poor", "Very Poor", or "Failed". A facility rated as "Excellent", "Very Good", or "Good" may be assumed to be substantially adequate throughout the 20-year planning period, with normal maintenance. A rating of "Fair" means that the item will probably require major upgrades or replacement at some time during the planning period. A rating of "Poor", "Very Poor", or "Failed" indicates that the item is not adequate for its intended use at the present time. Table

1-10 depicts the existing airport facilities and the associated condition rating. Facility ratings shown in Table 1-10 were determined through consultation with the MnDOT Pavement Management Study and through discussions with the Airport Sponsor and consultant experience.

Table 1-10 – Airside Facilities Condition Index

Facility	Condition
Runway 17/35	
Pavement	Excellent
REILS	Good
Edge Lighting (MIRLS)	Good
Pavement Markings	Good
Taxiways	
Pavement	Very Good - Excellent
Guidance Signs	Excellent
Apron	
Pavement	Good
Tiedowns	Good
Miscellaneous Facilities	
AWOS	Good
Beacon	Good
Lighted Windcone	Good

1.10 Landside Facilities

1.10.1 Aircraft Storage

The Building Area consists of four hangar buildings providing 17 total hangar spaces. These include two 4-unit buildings, an eight-unit t-hangar building, and a single-unit building. The hangar layout is included in **Figure 1-4**. Additionally, there are three tiedowns available on the apron for short-term and long-term aircraft parking.

Note to Reviewer: In 2018 the City is pursuing Federal and State grants for the development of two hangar expansions, and design for the extension and widening of a taxilane to accommodate a proposed 4-unit hangar. The hangar additions are anticipated to be completed by Spring of 2020. Once these improvements are completed, the Master Plan will be updated with the as-built conditions.

1.10.2 Arrival/Departure (A/D) Building

The existing A/D building was completed in 2005, and is located south of the apron **Figure 1-4**. The A/D building offers restroom facilities, vending machines, a pilot lounge and a meeting room. A courtesy car is available for airport users. The A/D Building is in good condition.

1.10.3 Fixed Base Operator (FBO)

A fixed based operator (FBO) is a provider of fueling and maintenances services to airport users. MWM does not have an FBO on the airfield, nor does the Airport provide any aircraft maintenance type services.

1.10.4 Fueling

MWM has a self-service fuel system located south of the apron. The fueling system consists of a 10,000 gallon underground tank containing Aviation Gas (AvGas, 100LL) and a 6,000 gallon underground tank containing Jet Fuel (Jet A). The AvGas tank was installed in 2005, and the Jet A tank was installed in 2014. The fuel tanks are in excellent condition. The fuel tanks are both registered with the Minnesota Pollution Control Agency (MPCA). The 10,000 gallon tank was registered in 2006 and the 6,000 gallon tank was registered in 2014. The City and County own the fuel tank and manage the fueling operations. The Airport does not own a fuel truck.

1.10.4.1 Chip Credit Card Reader

EMV⁸ credit cards are smart cards which store data on computer chips versus magnetic strips. Due to recent and numerous large-scale data breaches and increasing rates of counterfeit card fraud, U.S. card issuers are migrating to this new EMV technology to protect consumers and reduce the costs of fraud. As of October 1, 2015, due to the implementation of the EMV, the fraud liability shifted from the financial institutions to the merchants (except automated fuel dispensers). On October 1, 2020 the fraud liability shift will take effect for transaction generated from automated fuel dispensers.

1.10.5 SRE & Maintenance Equipment

The Airport owns and operates one piece of large equipment for airfield snow removal. **Table 1-11** shows the existing airport equipment and their condition. MWM's currently does not have SRE storage building, as a result the plow truck is currently housed at the City Street Shop. City Street crew provide personnel for snow removal and maintenance (e.g. mowing) at the Airport.

Table 1-11 – Airport Maintenance and SRE Equipment

Equip. Year	Equipment Make & Model	Condition	Funding
2009	John Deere 2755 Tractor/Mower	Fair	FAA AIP

1.10.6 Fencing

There is currently no fencing on or surrounding the Airport.

1.10.7 Landside Facilities Conditions

As with airside facilities, each existing landside airport facility has been assigned with a general rating of “Excellent”, “Very Good”, “Good”, “Fair”, “Poor”, “Very Poor”, or “Failed”. Table 1-12

⁸ EMV stands for Europay, MasterCard and Visa, the three companies that originally created the standard.

depicts the existing airport facilities and the associated condition rating. Facility ratings were determined by discussions with airport users, the Airport Sponsor, and consultant experience.

Table 1-12 – Landside Facilities Condition Index

Facility	Condition
Fueling System - 100LL	Good
Fueling System – Jet A	Good
Auto Parking Facilities	
Pavement	Good
Buildings	
A/D Building	Good
Hangars	Good - Excellent
Fencing	N/A

1.11 Airport User Survey

To better define the volume and character of the users of MWM, two Airport User Surveys were developed. The Pilot User Survey was sent to based aircraft pilots at MWM and registered aircraft pilots within the 60-minute drive time service area as defined above. The second survey was a Business User Survey sent to businesses that might use or already use the Airport. Surveys were distributed in January of 2017. A copy of the Pilot User Survey and the Business User Survey are included in **Appendix A**.

Of the 95 Pilot User Surveys sent, 32 responded (33.7% response rate), 11 from based aircraft owners, and 21 from users who base their aircraft at another airport. Of the 76 Business User Surveys sent, 25 businesses responded (32.9% response rate). The typical response rate results for airports of similar size to MWM are between 10% and 20%.

1.11.1 Pilot User Survey

The Pilot User Survey asked recipients about the type of aircraft they use, the number and type of operations they fly annually, facility and service needs, current and planned aircraft ownership, subjective facility ratings of MWM, and preferences for future development.

1.11.1.1 Reported Based Aircraft Activity

Survey results were tabulated to help determine the number of based aircraft operations at MWM. Eleven based aircraft owners responded to the survey. Only surveys that had complete numerical operations information and/or registration numbers were included in the analysis. The total estimated annual operations at MWM by the 10 based aircraft that reported operations data are 638 (one did not report operations data). This represents approximately 64 annual aircraft operations per based aircraft for that sample. Table 1-13 provides a summary of the reported based aircraft activity.

Table 1-13 – Survey Summary of Annual Based Aircraft Operations

Aircraft Model (RDC)	Annual Operations						Total
	Pleasure	Agricultural	Business	Flight Training	Medical	Other	
Piper 28 (A-I)	40		60				100
Zodiac 601 (A-I)	20						20
Piper 28 (A-I)	50						50
Besen Mercado (A-I)	No Data Provided						
Luscombe 8A (A-I)	100						100
Piper 23 (A-I)	100	50	50				200
Cessna 414 (B-I)	1		1				2
Drone	20		20				40
Piper 140 (A-I)	25	25					50
Piper Cub (A-I)	20	6					26
Cirrus (A-I)	50						50
Total	426	81	131	0	0	0	638

1.11.1.2 Reported Transient Aircraft Activity

Survey results were also tabulated to help determine the number of transient operations at MWM. Twenty-one transient aircraft owners responded to the survey. Only surveys that had complete numerical operations information and/or registration numbers were included in the analysis. The total estimated annual operations at MWM by 17 transient aircraft owners reported a total of 960 operations (four did not report operations data). This represents approximately 57 annual aircraft operations per transient aircraft for this data sample. Table 1-14 provides a summary of the reported based aircraft activity.

Table 1-14 – Survey Summary of Annual Transient Operations

Aircraft Model (RDC)	Annual Operations						Total
	Pleasure	Agricultural	Business	Flight Training	Medical	Other	
Cessna 177 (A-I)	10						10
Piper 18 (A-I)	10						10
Cirrus SR22 (A-I)				4			4
Cessna 177 (A-I)			144				144
Cessna 172 (A-I)	6						6
Unknown*	12						12
North American Navion (A-I)	15		8				23
Grumman G-164A (A-I)	20	600					620
Cessna 150 (Z-I)	15						15
Cessna 172 (A-I)	6		6				12
Piper 32 (A-I)	40		40				80
Cessna 172 (A-I)	0	0	0	0			0
Unknown*	No Data Provided						
Cessna 120 (A-I)	2						2
Socata TB-20 (A-I)	0						0
Cessna 510 (B-I)	No Data Provided						
Mooney M20J (A-I)	1						1
Cessna 182 (B-I)	5						5
Cessna 172 (A-I)	No Data Provided						
Unknown*	No Data Provided						
Mooney M20J (A-I)	10		6				16
Total	152	600	204	4	0	0	960

*Specific aircraft type not provided.

1.11.1.3 Subjective Facility Ratings

As a part of the Pilot User Survey, all respondents were asked to provide a rating of 12 basic facilities at MWM. The respondents were asked to rate each facility on a scale of zero through ten, with ten representing “adequate”, five representing “marginal”, and zero indicating “inadequate”. As a means to facilitate comparison of the subjective ratings, a comparison index, or perceived average rating, was derived by computing an average and mode⁹ of all ratings for each facility by the total number of responses for that facility. The perceived averages and mode include only actual scores given; it does not average in non-responses. The results of the facilities ratings are listed in **Table 1-15**.

⁹ Mode is the value that appears most often in a data set.

Table 1-15 – Summary of Existing Airport Facilities Ratings

Facility	Perceived Average	Mode
Runway 17/35	8.2	10
Runway Lighting	8.2	10
Approach Procedures	8.1	10
Tiedown Availability	8.4	10
Based Aircraft Hangar Availability	6.1	6
Transient Aircraft Hangar Availability	4.7	1
Arrival/Departure (A/D) Building	8.3	8
Pilot Services/Assistance	7.7	10
Fuel Service/Availability	9.0	10
Ground Transportation	8.2	8
Automobile Parking	8.9	10
Airport Ground Access	8.9	10

Based on consultant experience, a rating of less than 7.0 requires some type of improvement to the facility. Examination of the responses and the comparison totals presented in the table above indicate that users of the airport perceive two of the facilities to be rated below 7.0: Based and Transient Hangar Availability, as shown in **Table 1-15**. Moreover, from the returned surveys, the respondents overwhelmingly indicated the desire for additional hangar space in the comment sections provided. The remaining facilities are perceived to be satisfactory by the current airport users. Facilities are examined further in **Chapter 4**.

1.11.1.4 Additional Pilot Survey Questions

Several questions on the Pilot User Survey addressed specific issues at the airport. The questions and responses are summarized in Table 1-16.

Table 1-16 – Additional Pilot User Survey Questions

Question	Airport Users	
	Yes	No
If you are not currently based at MWM, would you consider basing at MWM if facilities were improved?	6	14
Do you purchase fuel at MWM?	17	14
Do you use the existing instrument approaches?	8	21
Does your company, business or clientele use MWM?	8	4

Additional targeted questions were also asked on the survey. Users were asked the most common reason they are unable to use MWM. The responses are summarized in Table 1-17.

Table 1-17 – Most Common Reason Users Report Being Unable to Use MWM

Reason	Number of Responses
Longer Runway 17/35	6
Improved Runway Lighting	3
Lower Approach Minimums	3
Based Aircraft Storage	5
Transient Aircraft Storage	2
Crosswind Runway Needed	6

Users were asked to indicate the runway length necessary for their operation at MWM, 17 users responded to this question. The minimum runway length requirements ranged from 500 to 5,000 feet, with the response averaged to 2,600 feet and the most common response (mode) was 2,000 feet. Users were also asked if they intended to purchase or utilize a new or different aircraft in the future. Ten responded indicating they might change aircraft. Those users were also asked the runway length required for their new aircraft, only eight responded. The eight users indicated they would a runway length ranging from 300 to 4,500 feet, with the response averaged to 2,700 feet

1.11.1.5 Additional Comments

Users were also given additional space for comments on previously asked questions or topics not previously discussed. The list below summarizes the comments received.

- “2nd Runway for less crosswind”
- “The installation of a crosswind runway would make landing with any wind direction possible”
- “Additional hangar space for both based and transient aircraft.”
- “Mechanic at FBO plus an active FBO.”
- “Transient Aircraft Hangar availability. (Many times aircraft hangar availability was not available for pipeline patrol, so I would overnight in Springfield.) Services were always available for me on my stops.”
- “Flight instruction should be offered. I know people who would take flight lessons if they didn't have to drive to KOTG or KMKT. Let's get more people flying!”
- “A longer runway 17/35 as well as an added crosswind runway.”
- “Runway/Approach Lighting, Longer Runway needed, E-W Runway Option”
- “There is not enough hangar space at MWM. Build more hangars instead of adding on to the runway to gain a few operations per year. By adding hangars our business would be able to base at MWM full time and greatly increase the use of the airport. In return MWM would benefit from the increased fuel sales. Due to the lack of hangars at MWM we will no longer be purchasing fuel from MWM airport and are moving our operation full time to a PVT strip until MWM can provide storage for our aircraft. We will continue to use the airport on a very limited basis. This move will cause the loss of over \$100,000 in fuel sales per year to the MWM airport. Please take that into consideration.”
- “Although my company does not use Windom's Airport, business aviation will continue to migrate to turboprop and jet aircraft in the future. If you wish to accommodate these aircraft for business needs, longer runways are needed at these smaller community.”

- “Stronger AWOS signal. When I am coming in from the south, I cannot pick it up until I am almost at KMWM. It is the same frequency as the AWOS at KSLB. Could it be changed?”
- “Be progressive and looking for ways to support your local airport - Good luck!”

1.11.2 Business User Survey

At the onset of the survey effort, there is speculation for increased demand at MWM if improved facilities, including a longer runway, were available. One reason for this possible demand for a longer runway at MWM is a result of Mainstream Holdings’ Citation Mustang. Mainstream Holdings is headquartered in Windom and owns a hangar at MWM. Mainstream Holdings initially owned a King Air 200 and operated at MWM approximately twice a week. However, since the acquisition of the C510 in 2016, the existing runway length of 3,599 feet at is inadequate to safely accommodate this aircraft and, as a result, Mainstream Holdings had to base the C510 at Worthington Municipal Airport (OTG). Additionally, Fredin Bros acquired a Pilatus PC-12 in 2016, which is currently housed in the large box hand located adjacent to the A/D Building. One of goals of the survey was to determine if there is demand for a longer runway at MWM, and how many additional annual aircraft operations would occur at MWM if improved facilities were available at the Airport.

Paper surveys, online surveys, as well as phone calls were conducted with business users to better assess the adequacy and demand of the Airport facilities and desired improvement. The business aviation users were asked if their business has a need for air travel, the number and type of business operations they fly annually, subjective facility ratings of MWM, and preferences for future development. Of the 76 Business User Surveys sent, 25 businesses responded/contacted (32.9% response rate).

1.11.2.1 Reported Business Aircraft Activity

Businesses were asked if their business used air travel. Of the 25 responding businesses, 12 indicated their business travel by air to conduct business in Windom, MN. Those using MWM were asked to indicate the average number of passengers on each flight. The average response was three passengers per flight. Those using MWM report traveling between 10 and 500 miles to and from MWM.

1.11.2.2 Reported Travel Purposes

Respondents were asked to indicate the type of work related to their air travel to or from MWM. The most common type given was services/tourism. The responses are summarized in Table 1-18.

Table 1-18 – Type of Work Related to Air Travel to/from MWM

Reason	Number of Responses
Manufacturing	2
Wholesale/Distribution	2
Retail	2
Services/Tourism	2
Construction	2
Real Estate/Finance	2
Government	0
Energy/Utilities	1
Other	4
*Other responses include: medical flights and agricultural spraying	

In addition, businesses were asked to indicate the purpose of flights to and from MWM. The most common purpose of travel to/from MWM reported was executive visits and meetings followed by customer contact. The responses are shown in Table 1-19.

Table 1-19 – Purpose of Work Related to Air Travel to/from MWM

Reason	Number of Responses
Executive Visits/Meeting	6
Technical/Inventory Visits	0
Business Start-Up	2
Conferences/Seminars	1
Customer Contact	2
Client/Marketing	1
Part/Supplies/Shipments	1
Recreation	4
Other	3
*Other responses include: medical flights and aerial images	

1.11.2.3 Subjective Facility Ratings

Similar to the pilot survey, business survey respondents were asked to provide a rating of 12 basic facilities at the Airport. The respondents were asked to rate each facility on a scale of zero through ten, with ten representing “adequate”, five representing “marginal”, and zero indicating “inadequate”. As a means to facilitate comparison of the subjective ratings, a comparison index, or perceived average rating, was again derived by computing an average of all ratings for each facility by the total number of responses for that facility. The perceived average includes only actual scores given; it does not average in non-responses. The results of the facilities ratings are listed in **Table 1-20**.

Table 1-20 – Business Survey - Summary of Existing Airport Facilities Ratings

Facility	Number of Responses	Perceived Average	Mode
Runway 17/35	10	7.0	7
Runway Lighting	10	8.0	10
Approach Procedures	10	6.6	1
Tiedown Availability	10	8.3	9
Based & Transient Hangar Availability	10	4.2	1
Arrival/Departure Building (FBO)	10	7.8	10
Pilot Services/Assistance	10	7.3	10
Fuel Service/Availability	10	8.2	7
Ground Transportation	10	7.4	7
Automobile Parking	10	8.8	10
Airport Ground Access	10	8.5	10

Examination of the responses and the comparison indices presented in the table above indicate that the responding business user of the Airport perceives two of the facilities to be rated below 7.00: Runway 17/35, Approach Procedures, and Based and Transient Hangar Availability. The remaining facility services are perceived to be satisfactory. Facilities are examined further in **Chapter 4.0**.

1.11.2.4 Projected Activity

Businesses were asked to indicate if they expected their use of MWM to increase, decrease or remain the same. Eleven users responded to this question, five indicated their use is projected to increase, and the remaining six indicated it would stay the same.

1.11.2.5 Unable to Use MWM

Similar to the Pilot Survey, businesses were asked the most common reason they are unable to use MWM, seven responded to this question. The responses are summarized in Table 1-21.

Table 1-21 – Most Common Reason Users Report Being Unable to Use MWM

Reason	Number of Responses
Runway length due to aircraft performance	2
Approach minimums not met	3
Runway length due to surface contamination	0
Other*	2
*Other responses include: crosswind	

1.11.2.6 Aircraft, Runway Length, and Activity Levels

Businesses were asked to indicate the runway length necessary for their operation at MWM and the number of operations that would result if the desire runway lengths was met. **Table 1-22** summarizes the responses.

Table 1-22 – User Survey Analysis for Longer Runway at MWM

Company	Aircraft ¹	Desired Runway Length	MWM Adjusted Takeoff Distance ²	Estimated Annual Aircraft Operations ³
Country Pride Services (Senex)	Air Tractors 5 & 6 Aero Commander	3,600' 2,000'	1,690' 1,830'	3,600 (Av. for all aircraft)
Fredin Bros	Piper Cherokee Pilatus PC-12	- 4,000'	2,300' 3,350'	416 208
Integrity Aviation	Cessna Skyhawk Cessna 414 King Air 200 ⁴ Pilatus PC-12 Citation Mustang	- - N/A 4,500' 5,000'	2,360' 3,340' N/A 3,350' 4,100'	12 12 N/A 75 75
Mainstream Holdings (Big Game / AntAir)	Citation Mustang Fut: Citation X (2018)	4,500' 4,800'	4,100' 6,215'	150 40
Oddson Underground	Piper Cherokee Six Piper Cherokee Cessna 414 Fut: Piper Meridian	- - 5,000' -	2,325' 2,325' 3,340' 3,140'	360 (Av. for all aircraft)
Olsem Aerial Application Services	Grumman G164A Aero Commander	2,000' 2,000'	2,070' 1,830'	3,600 (Av. for all aircraft)
Prairie Ventures Aviation/Holdings	Cessna 421 King Air 200	- 4,500'	2,990' 4,000'	2 4
Sanford Health	King Air 200	3,000'	4,000'	20

¹Aircraft as indicated in User Survey or phone conversation.
²Max Takeoff Weight (MTOW), temperature 85.3°F, 1,410' MSL, 50' obstacle, 0% flaps, no wind. Per Pilot operating manual (POM).
³Per conversations with each company.
⁴Integrity Aviation indicated that does not/would not operate the King Air 200 at MWM.

1.11.2.1 Additional Comments

Businesses were also given space to comment on previous questions or topics not covered in the survey. The list below summarizes the comments received.

- “It would be nice if the spray planes could have a hangar to use.”
- “Need additional hangars at MWM.”
- “Crosswind runway needed.”
- “We rent a large hangar at MWM. However we can't utilize it due to we rarely bring our Mustang into Windom.”
- “There are not enough hangars at MWM.”
- “Could provide better crew car, No taxi Service or Rental Car.”
- “Hangars as priority at the airport. Nicer pilots lounge.”

1.12 Windom Area Hospital Heliport/Helipad

Windom Area Hospital constructed a new/relocated helipad approximately two miles south of the Airport. In January 2016, the Windom Area Hospital submitted FAA Form 7480-1 to open a new helipad approximately 150 feet from the original location. MnDOT issued a temporary state heliport license in 2014. At the time MNDOT was waiting to issue a permanent license once the heliport received FAA identification code. Since then, the FAA issued the heliport the identification code of MN53. As part of the 2016 7460 Determination Letter, the FAA indicated that the communications between the heliport and the Airport should be well maintained do the proximity of the heliport to the Airport though a “Notification Agreement”. A Letter of Agreement (LOA) between Windom Area Hospital and MWM was completed and signed in January 2016 to establish communications between the two facilities. The LOA indicated that pilots enroute, landing, and departing the Windom Area Hospital will communicate their position five miles from the helipad on frequency 122.9MHz.

1.13 Transportation

1.13.1 Automobile Parking

MWM has seven automobile parking spaces available in the paved lot located east of the A/D building. The parking lot is paved and is in good condition.

1.13.2 Airport Access & Ground Transportation

The Airport is located approximately three miles north of Windom’s downtown district. MWM abuts public roads in two directions: to the east by 490th Avenue; and to the south by County State Aid Highway (CSAH) No. 28. The primary access to MWM is via CSAH 28 on the south side of the airfield. The Airport supplies a courtesy vehicle for pilots to use (see **Section 1.10.2**).

- Minnesota Trunk Highway (TH) 71, which traverses the western airport boundary. It is a key north-south principal arterial highway extending across west-central Minnesota between the borders of Iowa to Willmar. Trunk Highway 71 provides access into downtown Windom where it connects to Minnesota Trunk Highway 60.
- Minnesota Trunk Highway (TH) 60 is located south east of MWM. It is owned and operated by MnDOT, and classified as a principal arterial roadway. MNTH is known as 2nd Avenue, and extends south through the city of Windom. MNTH 60 extends southwest/northeast through southwestern Minnesota; connecting the cities of Windom, Worthington, and Saint James. It serves a variety of commercial, residential, and rural/agricultural land uses.
- County State Aid Highway No. 28 is owned and maintained by Cottonwood County. It extends east from Highway 71 to County Highway 2. It is classified as a major collector and provides access to the Town of Bingham Lake.
- County Highway 2 is located approximately 2.5 miles east of MWM and is maintained by Cottonwood County. It extends north through the County, serving rural residential and agricultural land uses.
- 490th Avenue extends north/south along the eastern boundary of MWM. 380th Street extends east/west along the north boundary of MWM. Both roadways are classified as a local township roads and service rural/agricultural land uses.

1.14 Utilities

1.14.1 Electricity and Gas

Electricity is provided by Windom Municipal Utilities. Gas is provided by Minnesota Energy Resources.

1.14.2 Water and Sewer

Water and sewer is provided by the City of Windom services through the City system.

1.14.3 Telephone

Telephone and internet services are provided by Century Link.

1.15 Police and Emergency Services

The Windom Police Department provides police and emergency services for the Airport. In addition, the Windom Fire Department provides service to the Airport in the event of a fire.

1.16 Land Use

The Airport is not within City limits, and is located three miles north of the central business district of Windom (see **Figure 1-6**).

1.16.1 Land Use Authority

Since the Airport is not within City Limits, the Airport and its surrounding areas are subject to Cottonwood County zoning and planning restrictions and controls. The Airport itself and the majority of the area surrounding are zoned as Agricultural (A-1), as shown in **Figure 1-6**. There is also a small parcel southwest of the Airport that is zoned as Commercial Industry (C-1). Cottonwood County zoning districts include Agricultural, Residential, Commercial, and Industrial, and are described in **Table 1-23**.

Table 1-23 – Cottonwood County Zoning Descriptions

District	Purpose	Permitted Uses
Agricultural (A-1)	To sustain and promote these activities while at the same time trying to balance competing land use activities and protecting the health, safety, and welfare of the residents of Cottonwood County	Agriculture, dwelling, feedlots, “dead animal holding” structure, windbreaks, flood control, nurseries, produce stands, airports, home occupations, municipal administration buildings, manufacturing, water supply distribution lines, parks, pipelines, family burial plot, seed dealership, signs and billboards, utility lines, utility buildings, veterinary clinics.
Residential (R-1)	To provide a district that will allow low density residential development with on-lot utilities of water and sewer in areas adjacent to urban development	Single family dwellings, agriculture, parks, pipelines, private swimming pool, schools.
Commercial Industry (C-1)	To provide a district that will allow low density Commercial Development in areas adjacent to the corporate limits of municipalities or in unincorporated settlements	Agriculture, automobile service stations, building material sales, cartage and express facilities, churches, offices, farm implement sales and storage, fire stations, fuel sales, governmental administration buildings, landscape nurseries, highway maintenance, parks, pipelines, police stations, radio and television towers, restaurants, fertilizer sales, signs and billboards.
Industry (I-2)	To provide a district that will allow clean, non-polluting industry located adjacent to existing urban areas at standards that will not impair the traffic-carrying capabilities of abutting roads and highways.	Agriculture, automobile service stations, building material sales, bus stations, cartage and express facilities, fertilizer plants, offices, dry cleaning, farm implement sales and storage, fire stations, fuel sales, grain elevators, pipelines, police stations, publishing, radar towers, radio and television towers, signs and billboards, refuse transfer station.

Source: Cottonwood County Zoning Ordinance (1968)

1.16.2 Airport Zoning Ordinance

In addition to the municipal and county zoning, the City of Windom enforces the Airport Zoning Ordinance on and around the Airport to protect the Airport from encroachment and incompatible land uses in accordance with the state rules. Minnesota Administrative Rules, Chapter 8800 requires all publicly-owned licensed airports in the State of Minnesota to have height and safety zoning. The purpose of the height and safety zoning to ensure that no objects penetrate the 14 Code of Federal Regulations (CFR) Part 77 imaginary surfaces, except when necessary for airport operations; and to ensure that the areas around an airport are clear of incompatible land uses. The Windom Airport Zoning Ordinance was adopted on January 9, 1979 by the City of Windom.

The existing airport safety zones for MWM are shown on **Figure 1-7**. The Windom Airport Zoning Ordinance establishes protections in accordance with the minimum standards defined by Minnesota Rules Chapter 8800.2400. The rule includes boundaries (Zones A, B, and C) established for the purpose of restricting those uses which may be hazardous to the operational safety of aircraft using the Airport, and furthermore, to protect the safety and property of people

on the ground in the area near the Airport. This is accomplished by limiting population and building density in the runway approach areas, thereby creating sufficient open space to protect life and property in case of an accident.

The safety zones are intended to protect the investment of the Airport by limiting or preventing situations that would become an incompatible land use, and potentially affect Airport safety and durability. The existing zoning ordinance was originally adopted in 1979 and corresponds with the 'future' airport design. At the time the zoning ordinance was adopted, the 'future' design consisted of the runway length of 3,600 feet for Runway 17/35, and future runway length of 4,200 feet for Runway 10/28. In addition to the land use zoning contained in the Airport Zoning Ordinance, the ordinance also provides height zoning. A copy of the official Windom, Minnesota Airport Zoning Ordinance is included in **Appendix B**.

1.17 Airport Property

Any airport property, when described in a grant or listed in the Exhibit 'A' Property Map, is considered to be "dedicated" or obligated property for airport purposes only and is subject to all FAA Airport Sponsor Grant Assurances. To verify the Airport's existing property boundary and easements, an Exhibit 'A' Property Map was completed as part of this Master Plan and conforms to the requirements stated in FAA SOP 3.00 FAA Review of Exhibit 'A' Airport Property Inventory Maps. Historical property records will be researched to verify existing parcel information and how each parcel was purchased. An owners and encumbrances report was prepared for each tract, and includes documents recorded on or before January 18, 2016. Airport parcels were searched back to the date the City of Windom originally acquired title to the property, and adjoining, non-airport parcels were searched back to the date that the current owner acquired title to the property. All pertinent information obtained from the report will be noted on the Exhibit 'A'. An airport boundary survey was not included as a part of this task.

The sections below summarize each tract of land own by the Airport, and right-of-way, utility, and aviation easement, and possible encroachments to Airport property. Per the owners and encumbrances report, the Airport currently owns 183.5 acres in fee, and an additional 4.79 acres in Aviation easements, as shown in shown in Figure 1-14. Please note, a boundary survey was not included in the scope for this project and is typically not an eligible item for federal funding. For the purpose of the Exhibit 'A' Property Map, airport parcels and boundaries, airport easements, and airport encumbrances are computed and shown based on the best information available including the following, but not limited to: record documents, record plats, record surveys, record right of way maps and/or plats, published section corner information, G.I.S. data obtained from the local government unit. The Exhibit 'A' Property Map does not constitute a boundary survey of any airport parcel, airport easement, or encumbrance shown thereon.

Recommendations for possible encroachments are discussed in **Chapter 4, Facility Recommendations (Section 4.5)**.

1.17.1 Tract 1, P.I.D. 08.0120600

Existing Legal Description

The West 400 feet of the Northwest Quarter of the Southeast Quarter in Section Twelve, Township one hundred five North of Range Thirty-six, West of the 5th principal Meridian, containing 12 acres more or less.

ALSO

The West 400 feet of the Southwest Quarter of the Northeast Quarter, in Section Twelve, Township one hundred five North of Range Thirty-six, West of the 5th Principal Meridian, containing 12 acres more or less.

ALSO

The West 660 feet of the Southwest Quarter of the Southeast Quarter, in Section Twelve, Township One hundred five North, of Range Thirty-six, West of the 5th Principal Meridian; containing 20 acres more or less.

Property Summary

Tract 1 is the main portion of the Airport property containing the majority of Runway 17/35. The Parcel was obtained in fee title by Certificate dated October 9, 1959 (Bk 89 Pg 145, Doc. No. 132829)

Recorded uses of Airport Property

Easement A-1: A 50.00 foot wide easement to South Central Electric Association dated May 1, 1981 (Doc. No. 178326). See **Section 1.19.1** for more details.

Unrecorded uses of Airport Property

B-1 – CSAH No. 28: No documents were provided to SEH for the approximately 660 feet of CSAH No. 28 that runs along the southern boundary of Parcel 1. The County Recorder states there are no documents of record regarding any portion of CSAH 28 in Section 12. The County Engineer claims 50 feet of right-of-way on each side of center line for a total right-of-way width of 100 feet. It appears the southerly 50 feet of airport property is encumbered by highway right-of-way, and the current limits of highway ditches supports this claim.

Federal/State Participation

Tract 1 was purchased with F.A.A.P. 9-21-093-01 and MnDOT grant 1701-03. Tract 1 was identified as Tract 1 on the 1965 Exhibit 'A' Property Map for F.A.A.P. 9-21-093-01.

1.17.2 Tract 2, P.I.D. 08.012.0600

Existing Legal Description

The West 400 feet of the Northwest Quarter of the Northeast Quarter of Section 12, Township 105, Range 36.

Property Summary

Parcel 2 is located in the northwest portion of the Airport property, comprising the northern portion of Runway 17/35. The parcel was obtained in fee title by Certificate dated October 9, 1959 (Bk 89 Pg 145, Doc. No. 132829) and also by Warranty Deed dated April 5th, 1965 (Bk 97 Pg 180, Doc. No. 143029).

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

None.

Federal/State Participation

Tract 2 was purchased with F.A.A.P. 9-21-093-01 and MnDOT grant 1701-03. Tract 2 was identified as Tract 2 on the 1965 Exhibit 'A' Property Map for F.A.A.P. 9-21-093-01.

1.17.3 Parcel 301, P.I.D. 08.012.0600

Existing Legal Description

That part of the West Half (W1/2) of the Southeast Quarter (SE1/4) of Section 12, Township 105 North, Range 36 West of the Fifth Principal Meridian, in Cottonwood County, Minnesota, Bounded by the following described lines:

Beginning at a point on the north line of the SW1/4 of the SE1/4 of said Section 12, said point being 400.00 feet east of the northwest corner thereof; thence northerly, along a line parallel with the west line of the SE1/4 of said Section 12, a distance of 500.00 feet; thence easterly, along a line parallel with the north line of the SW1/4 of the SE1/4 of said Section 12, a distance of 920 feet, more or less, to the east line of the W1/2 of the SE1/4 of said Section 12; thence southerly, along said east line, a distance of 1000.00 feet; thence westerly, along a line parallel with said north line, a distance of 660 feet, more or less, to a point 660 feet east of the west line of the SE1/4 of said Section 12; thence northerly, along a line parallel with said west line, a distance of 236 feet, more or less, to a point 264.00 feet south of said north line; thence easterly, along a line parallel with said north line, a distance of 165.00 feet; thence northerly, along a line parallel with said west line, a distance of 264.00 feet, to said north line; thence westerly, along said north line, a distance of 425.00 feet, to the point of beginning, containing 17.1 acres, more or less.

Property Summary

Parcel 301 is located in the central portion of the Airport property, and consists of the majority of the hangars. The Parcel was obtained in fee title by Warranty Deed on October 29, 1979 (File 164 Card 1176, Doc. No. 174604).

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

None.

Federal/State Participation

No documents were provided showing that federal or state funds were used to purchase Parcel 301.

1.17.4 Parcel 4, P.I.D. 08.012.0600

Existing Legal Description

Part of the Southwest Quarter of the Southeast Quarter of Section 12, Township 105, Range 36 described as follows:

Beginning at a point on the North line of the Southwest Quarter of the Southeast Quarter of said Section 12, which is 660 feet East of the Northwest corner thereof and running thence East on and along the North line of said Southwest Quarter of Southeast Quarter a distance of 165 feet; thence South at right angles a distance of 264 feet; thence West at right angles a distance of 165 feet; thence North at right angles a distance of 264 feet to the point of beginning, containing one acre.

Property Summary

Parcel 4 is a small parcel and is located in the central portion of the Airport property. The Parcel was obtained in fee title by Warranty Deed on July 5, 1968 (File 151 Card 152, Doc. No. 149648).

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

None.

Federal/State Participation

No documents were provided showing that federal or state funds were used to purchase Parcel 4.

1.17.5 Parcel 5, P.I.D. 08.012.0600

Existing Legal Description

The east 60.00 feet of the west 720.00 feet of the South 816.5 feet of the Southwest Quarter of the Southeast Quarter of Section 12, Township 105 North, Range 36 West in Great Bend Township, Cottonwood County, Minnesota, more particularly described as follows:

Commencing at an existing iron monument at the Southwest corner of the Southeast Quarter of said Section 12; thence South 89°58'37" East, bearing based on Cottonwood County Coordinate System, along the South line of the Southeast Quarter of said Section 12, a distance of 660.02 feet, to the point of beginning; thence continuing South 89°58'37" East, along said South line, a distance of 60.00 feet; thence North 00°27'40" East, parallel with the West line of the East Half of said Southeast Quarter, a distance of 816.65 feet, to a point on the South line of a tract of land conveyed by document number 174604 as filed and recorded in the Cottonwood County Recorder's office; thence South 89°59'18" West, parallel with the North line of the Southeast Quarter of the Southeast Quarter of said Section 12, and along the South line of said conveyed tract, a distance of 60.00 feet, to the Southwest corner of said conveyed tract; thence South 00°27'40" West, parallel with the West line of the East Half of said Section 12, a distance of 816.51 feet, to the point of beginning.

The tract contains 1.125 acres and is subject to C.S.A.H. 28 right-of-way and other easements of record, if any.

Property Summary

Parcel 5 is a small sliver of land 60 feet wide south of the airport office building. The parcel is directly east of Parcel 1 and south of Parcel 3. The Parcel was obtained in fee title by Warranty Deed on November 19, 2004 (Doc. No. 245468).

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

B-2 – CSAH No. 28: No documents were provided to SEH for the portion of CSAH No. 28 that runs along the southern boundary of Parcel 5. The County Recorder states there are no documents of record regarding any portion of CSAH 28 in Section 12. The County Engineer claims 50 feet of right-of-way on each side of center line for a total right-of-way width of 100 feet.

It appears the southerly 50 feet of airport property is encumbered by highway right-of-way, and the current limits of highway ditches supports this claim.

Federal/State Participation

Parcel 5 was purchased with A.I.P. 3-27-0113-03-04 and MnDOT Grant S.P. 1701-24. Parcel 5 was identified as "13.17 acres in fee" and "M. Stroud" within the Grant Agreement for A.I.P. 3-27-0113-03-04.

1.17.6 Parcel 6, P.I.D. 08.012.0600

Existing Legal Description

The East 60.00 feet of the West Half of Section 12, Township 105 North, Range 36 West in Great Bend Township, Cottonwood County, Minnesota, more particularly described as follows:

Beginning at an existing iron monument at the Northeast corner of the Northwest Quarter of said Section 12; thence South 89°51'50" West, bearing based on Cottonwood County Coordinate System, along the North line of the Northwest Quarter of said Section 12, a distance of 60.00 feet; thence South 00°27'40" West, parallel with the East Line of the West Half of said Section 12, a distance of 5,266.79 feet, to a point of the South line of the Southwest Quarter of said Section 12; thence South 89°58'56" East, along the South line of the Southwest Quarter of said Section 12, a distance of 60.00 feet, to the Southeast Quarter of said Southwest Quarter; thence North 00°27'40" East, along the East line of the West Half of said Section 12, a distance of 5,266.94 feet, to the point of beginning.

The tract contains 7.255 acres and is subject to existing county road easement and other easements of record, if any.

Property Summary

Parcel 6 is a sliver of land 60 feet wide on the west side of the Airport property. The parcel is directly west of parcels 1 and 2. The Parcel was obtained in fee title by Warranty Deed on January 24, 2005 (Doc. No. 245993).

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

B-3 – CSAH No. 28: No documents were provided to SEH for the portion of CSAH No. 28 that runs along the southern boundary of Parcel 6. The County Recorder states there are no documents of record regarding any portion of CSAH 28 in Section 12. The County Engineer claims 50 feet of right-of-way on each side of center line for a total right-of-way width of 100 feet. It appears the southerly 50 feet of airport property is encumbered by highway right-of-way, and the current limits of highway ditches supports this claim.

Federal/State Participation

Parcel 6 was purchased with A.I.P. 3-27-0113-03-04 and MnDOT Grant S.P. 1701-24. Parcel 6 was identified as "13.17 acres in fee" and "Klassen" within the Grant Agreement for A.I.P. 3-27-0113-03-04.

1.17.7 Parcel 7, P.I.D. 08.012.0600

Existing Legal Description

The east 60.00 feet of the west 460.00 feet of the north 816.4 feet of the Northwest Quarter of the Southeast Quarter of Section 12, Township 105 North, Range 36 West in Great Bend Township, Cottonwood County, Minnesota, more particularly described as follows:

Commencing at an existing iron monument at the northwest corner of the NE1/4 of said Section 12; thence North 89 degrees 54 minutes 04 seconds East, bearing based on Cottonwood County Coordinate System, along the north line of the NE1/4 of said Section 12, a distance of 400.02 feet; thence South 00 degrees 27 minutes 40 seconds West, parallel with the west line of the E1/2 of said Section 12, a distance of 2,635.13 feet, to a point on the north line of the SE1/4 of said Section 12, this being the point of beginning; thence continuing south 00 degrees 27 minutes 40 seconds west, parallel with the west line of the E1/2 of said Section 12, a distance of 816.35 feet, to the northwest corner of a tract of land conveyed by document number 174604 as filed and recorded in the Cottonwood County Recorder's Office; thence north 89 degrees 59 minutes 18 seconds east, parallel with the south line of the NW1/4 SE1/4 of said Section 12, and along the north line of said conveyed tract, a distance of 60.00 feet; thence north 00 degrees 27 minutes 40 seconds East, parallel with the west line of the E1/2 of said Section 12, a distance of 816.39 feet, to a point on the north line of the SE1/4 of said Section 12, thence South 89 degrees 57 minutes 15 seconds West, along the north line of said SE1/4, a distance of 60.00 feet, to the point of beginning.

This tract contains 1.125 acres and is subject to easements of record, if any.

AND

The East 60.00 feet of the West 460 feet of the Northeast Quarter of Section 12, Township 105 North, Range 36 West in Great Bend Township, Cottonwood County, Minnesota, more particularly described as follows:

Commencing at an existing iron monument at the Northwest corner of the Northeast Quarter of said Section 12; thence North 89°54'04" East, bearing based on Cottonwood County Coordinate System, along the North line of the Northeast Quarter of said Section 12, a distance of 400.02 feet, to the point of beginning; thence continuing North 89°54'04" East, along the North line of said Northeast Quarter, a distance of 60.00 feet; thence South 00°27'40" West, parallel with the West line of said Northeast Quarter, a distance of 2635.17 feet, to a point on the South line of said Northeast Quarter; thence South 89°57'15" West, along the South line of said Northeast Quarter, a distance of 60.00 feet; thence North 00°27'40" East, parallel with the West line of said Northeast Quarter, a distance of 2,635.13 feet, to the point of beginning.

The tract contains 3.629 acres, and is subject to existing easements of record, if any.

Property Summary

Parcel 7 is a sliver of land 60 feet wide in the northeast portion of the Airport property. The parcel is east of parcel 2 and north of parcel 3. The Parcel was obtained in fee title by Warranty Deed on November 19, 2004 (Doc. No. 245468) and also by Warranty Deed on November 19, 2004 (Doc. No. 245469).

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

None.

Federal/State Participation

Parcel 7 was purchased with A.I.P. 3-27-0113-03-04 and MnDOT Grant S.P. 1701-24. Parcel 7 was identified as "13.17 acres in fee", and as "Ketzenberg" and M. Stroud" parcels within the Grant Agreement for A.I.P. 3-27-0113-03-04.

1.17.8 Parcel 8, P.I.D. 08.012.0500

Existing Legal Description

The SE1/4 of Section 12, Township 105 North, Range 36 West, Cottonwood County, Minnesota, EXCEPT those parts thereof described as follows:

1. The easterly 833 feet of the northerly 272.25 feet of the NE1/4 SE1/4 of Section 12, Township 105 North, Range 35 West.
2. The easterly 833 feet of the southerly 272.25 feet of the northerly 544.5 feet of the NE1/4 SE1/4 of Section 12, Township 105 North, Range 36 West.
3. The west 660 feet of the SW1/4 SE1/4 in Section 12, Township 105 North, Range 36 West.
4. The west 400 feet of the NW1/4 SE1/4 in Section 12, Township 105 North, Range 36 West.
5. That part of the SW1/4 SE1/4 of Section 12, Township 105 North, Range 36 West, described as follows: Beginning at a point on the north line of the SW1/4 SE1/4 of Section 12, which is 660 feet east of the northwest corner thereof; running thence east on and along the north line of said SW1/4 SE1/4 a distance of 165 feet; thence south at right angles a distance of 264 feet; thence west at right angles a distance of 165 feet; thence north at right angles a distance of 264 feet to the point of beginning.
6. That part of the W1/2 SE1/4 of Section 12, Township 105 North, Range 36 West, bounded by the following described lines: Beginning at a point on the north line of the SW1/4 SE1/4 of said Section 12, said point being 400.00 feet east of the northwest corner thereof; thence northerly, along a line parallel with the west line of the SE1/4 of said Section 12, a distance of 500.00 feet; thence easterly, along a line parallel with the north line of said SW1/4 SE1/4 of said Section 12, a distance of 920 feet, more or less, to the east line of the W1/2 SE1/4 of said Section 12; thence southerly along said east line, a distance of 1000.00 feet; thence westerly along a line parallel with said north line, a distance of 660 feet, more or less, to a point 660 feet east of the west line of the SE1/4 of said Section 12; thence northerly, along a line parallel with said west line, a distance of 236 feet, more or less, to a point 264.00 feet south of said north line; thence easterly, along a line parallel with said north line, a distance of 165.00 feet; thence northerly, along a line parallel with said west line, a distance of 264.00 feet to said north line; thence westerly, along said north line, a distance of 425.00 feet to the point of beginning.
7. The east 60.00 feet of the west 460.00 feet of the north 816.4 feet of the NW1/4 SE1/4 of Section 12, Township 105 North, Range 36 West, Cottonwood County, Minnesota, more particularly described as follows: Commencing at an existing iron monument at the northwest corner of the NE1/4 of said Section 12; thence

North 89 degrees 54 minutes 04 seconds East, bearing based on Cottonwood County Coordinate System, along the north line of the NE1/4 of said Section 12, a distance of 400.02 feet; thence South 00 degrees 27 minutes 40 seconds West, parallel with the west line of the E1/2 of said Section 12, a distance of 2,635.13 feet, to a point on the north line of the SE1/4 of said Section 12, this being the point of beginning; thence continuing south 00 degrees 27 minutes 40 seconds west, parallel with the west line of the E1/2 of said Section 12, a distance of 816.35 feet, to the northwest corner of a tract of land conveyed by document number 174604 as filed and recorded in the Cottonwood County Recorder's Office; thence north 89 degrees 59 minutes 18 seconds east, parallel with the south line of the NW1/4 SE1/4 of said Section 12, and along the north line of said conveyed tract, a distance of 60.00 feet; thence north 00 degrees 27 minutes 40 seconds East, parallel with the west line of the E1/2 of said Section 12, a distance of 816.39 feet, to a point on the north line of the SE1/4 of said Section 12, thence South 89 degrees 57 minutes 15 seconds West, along the north line of said SE1/4, a distance of 60.00 feet, to the point of beginning.

8. The east 60.00 feet of the west 720.00 feet of the south 816.5 feet of the SW1/4 SE1/4 of Section 12, Township 105 North, Range 36 West, Cottonwood County, Minnesota, more particularly described as follows: Commencing at an existing iron monument at the southwest corner of the SE1/4 of said Section 12; thence South 89 degrees 58 minutes 37 seconds East, bearing based on Cottonwood County Coordinate System, along the south line of the SE1/4 of said Section 12, a distance of 660.02 feet, to the point of beginning; thence continuing South 89 degrees 58 minutes 37 seconds East, along said south line, a distance of 60.00 feet; thence North 00 degrees 27 minutes 40 seconds East, parallel with the west line of the E1/2 SE1/4, a distance of 816.65 feet, to a point on the south line of a tract of land conveyed by document number 174604 as filed and recorded in the Cottonwood County Recorder's Office; thence South 89 degrees 59 minutes 18 seconds West, parallel with the north line of the SW1/4 SE1/4 of said Section 12, and along the south line of said conveyed tract, a distance of 60.00 feet, to the southwest corner of said conveyed tract; thence South 00 degrees 27 minutes 40 seconds West, parallel with the west line of the E1/2 of said Section 12, a distance of 816.51 feet, to the point of beginning.

Property Summary

Parcel 8 comprises approximately half of the Airport property and is east of the runway and hangars. The Parcel was obtained in fee title by Personal Representative's Deed on December 23, 2010 (Doc. No. 263575). The City Resolution #2010-48 passed and accepted on December 21, 2010 indicated that the City of Windom received a donation of 102.65 acres of land for the Windom Airport from the Myrtle Stroud Estate. The land donation required that the property to be "used solely and exclusively for the improvement of the existing Windom Municipal Airport facility including, but not limited to, buildings and runways and for the acquisition of land for the expansion of the airport."

Recorded uses of Airport Property

None.

Unrecorded uses of Airport Property

B-4 – CSAH No. 28: No documents were provided to SEH for the approximately 1,900 feet of CSAH No. 28 that runs along the southern boundary of Parcel 8. The County Recorder states there are no documents of record regarding any portion of CSAH 28 in Section 12. The County Engineer claims 50 feet of right-of-way on each side of center line for a total right-of-way width of

100 feet. It appears the southerly 50 feet of airport property is encumbered by highway right-of-way, and the current limits of highway ditches supports this claim. Also, no documents were provided for the approximately 2,090 feet of 490th Ave., a Township Road that runs along the easterly boundary of Parcel 8. The County Recorder states there are no documents of record regarding any portion of 490th Avenue in Section 12. The Great Bend Township Supervisor claims 33 feet of right-of-way on each side of center line for a total right-of-way width of 66 feet. It appears the easterly 33 feet of airport property is encumbered by Township Road right-of-way, and the current limits of roadway ditches supports this claim.

Federal/State Participation

No documents were provided showing that federal or state funds were used to purchase Parcel 301.

1.18 Existing Airspace Easements

1.18.1 Tract 3, P.I.D. 08.001.0100

Existing Legal Description

Part of the Southwest Quarter of the Southeast Quarter of Section 1, Township 105 North, Range 36 West of the 5th P.M. bounded by the following described lines:

Beginning at a point on the South line of said Section 1, a distance of 28.46 feet North 89°25' East, along the South line of said Section 1, thence North 89°25' East, along said Section line, a distance of 343.41 feet, thence North 05°42'38" East, a distance of 533.91 feet, thence West, a distance of 424.07 feet, to the West line of the Southeast Quarter of said Section 1, thence South 00°06' West, along said West line a distance of 254.91 feet, thence South 05°42'38" East, a distance of 281.14 feet, to the point of beginning.

Easement Summary

Tract 3 is an Airspace Easement in favor of the City of Windom. The easement is located north of Parcel 2. The Parcel was obtained on August 3, 1965 (Bk 98 Pg 193, Doc. No. 143678). The Easement grants the easement holder the perpetual right to unobstructed passage of aircraft over and across described easement. The document does not recite any other specific rights granted by the grantee, nor any imposed restrictions. It does define in detail the airspace lying above an inclined plane, said plane having a slope ratio of 20:1.

Federal/State Participation

Tract 3 Airport Easement was purchased with F.A.A.P. 9-21-093-01 and MnDOT grant 1701-03. Tract 3 Airspace Easement was identified as Tract 3 on the 1965 Exhibit 'A' Property Map for F.A.A.P. 9-21-093-01

1.19 Recorded Interests on Airport Property

1.19.1 Right of Way Easement A-1, South Central Electric Association (Doc. No. 178326)

Permanent Easement for utility purposes to South Central Electric Association dated May 1, 1981 (Doc. No. 178326). The easement was granted by the Windom Airport, and covers a 50.00 foot wide strip along the southern half of Parcel 1 for purposes of construction, maintenance, alterations, repair, and operation of electric lines and related facilities. Subordination status is not

stated. According to the document, South Central Electric Association, and its successor, has the option to install said infrastructure either above or below ground. No above ground improvements were visible. The Windom Airport reserves the right to use the surface of the easement area for cultivation or other purposes which do not interfere with the use of the easement area by the grantee. One of the calls in the description states "northwesterly" and does not give a specific bearing, thus SEH is unable to accurately show the easement without physically locating the existing utility line if it is still in existence. The total acreage of this easement that falls on Airport Property is approximately 0.9 acres.

1.19.2 Unrecorded Uses on Airport Property

When non-aeronautical uses exist on an airport and are not properly documented and are not approved by the FAA the terms and conditions of the use have not been memorialized through filing the arrangements through the County Record's Office. These uses may or may not have obtained approval from FAA as required by sponsor rant assurances. The following sections list unrecorded uses on Airport property.

B-1, B-2, B-3 and portions of B-4 - Highway Right of Way for CSAH 28:

Certain airport property is likely subject to a Roadway Easement for County State Aid Highway (CSAH) 28 across the southerly 50 feet of Tracts 1, 5, 6 and 8. . The County Recorder states there are no documents of record regarding any portion of CSAH 28 in Section 12. The County Engineer claims 50 feet of right-of-way on each side of center line for a total right-of-way width of 100 feet. It appears the southerly 50 feet of airport property is encumbered by highway right-of-way, and the current limits of highway ditches supports this claim. SEH assumes a 100 foot wide right of way exists for this roadway, by reason of prescriptive use, as provided for in MN Statute 160.05, as well as the claim of the County Highway Engineer until proven otherwise.

B-4 - Highway Right of Way for 490th Avenue:

Certain airport property is likely subject to a Roadway Easement for the 2090 feet of 490th Avenue which runs across the easterly 33 feet of Tract 8. The County Recorder states there are no formal documents of record regarding any portion of 490th Avenue in Section 12. The Great Bend Township Supervisor claims 33 feet of right-of-way on each side of center line for a total right-of-way width of 66 feet. It appears the easterly 33 feet of airport property is encumbered by Township Road right-of-way, and the current limits of roadway ditches supports this claim. SEH assumes a 66 foot wide right of way exists for this roadway, by reason of prescriptive use, as provided for in MN Statute 160.05, as well as the claim of the Township Supervisor, until proven otherwise.

1.20 Environmental Inventory

1.20.1 Air Quality

The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) for six pollutants, termed "criteria pollutants" and requires each state to adopt a plan to achieve the NAAQS for each pollutant within specific timeframes. These air quality plans are known as State Implementation Plans (SIP). The State of Minnesota has developed a SIP, which contains the rules and programs the state uses to help ensure air quality continues to meet the NAAQS. The SIP focus is on non-attainment areas and maintenance areas. SIP rules are codified in

Minnesota Rules 7015 – 7023. Currently there are no non-attainment areas or maintenance areas in Cottonwood County.

1.20.2 Section 4(f)

Section 4(f) legislation was established under the Department of Transportation (DOT) Act of 1966 (now codified at [49 USC 303](#), [23 USC 138](#)) and provides protection for publicly owned land in public parks, recreation areas, or wildlife and waterfowl refuges of national, state, or local significance or lands from a historic site of national, state, or local significance.

There are no publicly funded parks, recreation areas, or wildlife refuges within or adjacent to the Airport that are potentially eligible to meet the provisions of the U.S. Department of Transportation Act of 1966, section 4(f) [48 U.S.C. 303(C)]. Nearby public recreational type land includes the Carpenter WMA, the Wolf Lake WMA, the Banks WMA, and the Bennet WMA; all of which are state owned land located between 2 and 5.5 miles away from the Airport. These WMAs and other public lands surrounding the Airport are shown on **Figure 1-8 and Figure 1-9**.

1.20.3 Farmlands

The Federal Farmland Protection and Policy Act and the Minnesota Agricultural Land Preservation and Conservation Policy Act, Minnesota Statute §17.80-17.84, were enacted to ensure that impacts to agricultural lands and operations are integrated into the decision-making process. These laws are also intended to minimize, to the extent reasonable, actions that result in unnecessary and irreversible conversion of farmland to non-agricultural purposes.

The Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS), NRCS electronic Field Office Technical Guide (eFOTG), and the Cottonwood County Soil Survey were referenced to identify prime and unique farmland, and farmland of statewide and/or local importance within the project area. Soils mapped and designated by the NRCS as prime farmland, prime farmland if drained, and farmland of statewide importance are located within the vicinity of the Airport site as shown on Figure 1-10. These soils include:

- **Havelock clay loam, 0 to 2 percent slopes, occasionally flooded (Map Unit 1024A)** is classified by the NRCS as “Prime farmland if protected from flooding or not frequently flooded during the growing season.” The series is defined taxonomically as fine-loamy, mixed, superactive, calcareous, mesic Cumulic Endoaquolls.
- **Terril loam, 2 to 6 percent slopes (Map Unit L129B)** is classified by the NRCS as “All areas are prime farmland”. The series is defined taxonomically as fine-loamy, mixed, superactive, mesic Cumulic Hapludolls.
- **Omsrud-Storden-Pilot Grove complex, 6 to 12 percent slopes, moderately eroded (Map Unit L156C2)** is classified by the NRCS as “Farmland of statewide importance”. The series is defined taxonomically as fine-loamy, mixed, superactive, mesic Typic Hapludolls. The storden series is defined as fine-loamy, mixed, superactive, mesic Typic Eutrudepts, and the Pilot Grove series is defined taxonomically as sandy, mixed, mesic Typic Hapludolls.
- **Estherville sandy loam, 0 to 2 percent slopes (Map Unit L74A)** is classified by the NRCS as “Farmland of statewide importance.” The series is defined taxonomically as sandy, mixed, mesic Typic Hapludolls.
- **Estherville-Pilot Grove complex, 6 to 12 percent slopes (Map Unit L161C)** is classified by the NRCS as “Not prime farmland”. Both the Estherville and Pilot Grove series is defined taxonomically as sandy, mixed, mesic Typic Hapludolls.

- **Clarion-Round Lake complex, 2 to 6 percent slopes (Map Unit L162B)** is classified by the NRCS as “Farmland of statewide importance”. The Clarion series is defined taxonomically as fine-loamy, mixed, superactive, mesic Typic Hapludolls; and the Round Lake series is described as sandy, mixed, mesic Typic Hapludolls.
- **Mayer loam, 0 to 2 percent slopes (Maps Unit L165A)** is classified by the NRCS as “Prime farmland if drained”. The series is defined taxonomically as fine-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, mesic Typic Endoaquolls.
- **Coland clay loam, 0 to 2 percent slopes, occasionally flooded (L219A)** is classified by the NRCS as “Prime farmland if protected from flooding or not frequently flooded during the growing season”. The series is defined taxonomically as fine-loamy, mixed, superactive, mesic Cumulic Endoaquolls.
- **Biscay loam, 0 to 2 percent slopes (Map Unit L6A)** is classified by the NRCS as “Prime farmland if drained”. The series is defined taxonomically as fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Endoaquolls.
- **Clarion loam, 2 to 5 percent slopes (Map Unit L79B)** is classified by the NRCS as “All areas are prime farmland”. The series is defined taxonomically as fine-loamy, mixed, superactive, mesic Typic Hapludolls.
- **Marna silty clay loam, 0 to 2 percent slopes (Map Unit L82A)** is classified by the NRCS as “Prime farmland if drained”. The series is defined taxonomically as fine, smectitic, mesic Vertic Endoaquolls.
- **Webster clay loam, 0 to 2 percent slopes (Map Unit L83A)** is classified by the NRCS as “Prime farmland if drained”. The series is defined taxonomically as fine-loamy, mixed, superactive, mesic Typic Endoaquolls.
- **Kingston silty clay loam, 1 to 3 percent slopes (Map Unit L87A)** is classified by the NRCS as “All areas are prime farmland”. The series is defined taxonomically as fine-silty, mixed, superactive, mesic Aquic Hapludolls.
- **Estherville-Hawick complex, 2 to 6 percent slopes (Map Unit L96B)** is classified by the NRCS as “Not prime farmland”. The Estherville series is defined taxonomically as sandy, mixed, mesic Typic Hapludolls, and the Hawick series is defined as Sandy, mixed, mesic Entic Hapludolls.

1.20.4 Floodplains

Division Creek, a tributary of the Des Moines River, flows through the Windom-Cottonwood County Airport property. The 100-year floodplain (Zone A) of Division Creek is located approximately 0.5 miles to the east of the existing runway. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for Cottonwood County, Minnesota-Panel Number 270622 0180 B map effective date January 2, 1981, is the panel that covers the area of Cottonwood County including the surrounding area of the Airport. Copies of the FIRM are available on the FEMA website.

FEMA Floodplain maps have not been digitized yet for the Airport and surrounding vicinity, and is therefore not available to integrate into GIS maps included with this report. The FEMA FIRM map is available in print at the FEMA website, and was utilized for the completion of the Master Plan. The available FEMA FIRM map is shown in **Figure 1-13**.

1.20.5 Fish and Wildlife Resources

The project site is within the Prairie Parkland (PPA) Province, and more specifically, the Minnesota River Prairie Subsection as defined by the MNDNR Ecological Classification System (ECS) *Field Guide to the Native Plant Communities of Minnesota: the Laurentian Mixed Forest Province* (MNDNR 2003). The land cover classifications are defined according to the MNDNR ECS to the Class level to provide a general characterization of dominant plant community and land form on the Airport.

Wildlife habitat within and surrounding the Airport is comprised mostly of agricultural lands, and the floodplain of Division Creek. The National Wetland Inventory (NWI) identifies several areas as wetland (see **Section 1.20.11**). Fish habitats may be present on the Airport in Division Creek.

1.20.6 Rare Threatened and Endangered Species

The Windom-Cottonwood County Airport is within the distributional range of the federally-listed Northern long-eared bat (*Myotis septentrionalis* - Proposed as Endangered). There have been no reported sightings. The Northern long-eared bat hibernates in caves and mines, which are not located within 10 miles of the Airport property.

The Airport is also within the distributional range of the federally-listed prairie bush-clover (*Lespedeza leptostachya* - Threatened). There have been no reported sightings. It is a plant in the pea family and is native to tallgrass prairies in Minnesota. There is no mapped critical habitat of the prairie bush-clover.

1.20.7 Hazardous Materials, Pollution Prevention and Solid Waste

A review of several environmental record sources was completed to obtain information regarding hazardous and environmental waste or any hazardous material related impacts on airport property. Several activities on-site are regulated in reference to stormwater and oil storage. The following sections describe current hazardous and solid waste generation activities, the applicable county solid waste management plan, site-specific waste inventory and survey, and facility regulated environmental activities.

1.20.7.1 Hazardous and Solid Waste Generation Activities

Currently, hazardous and solid waste can be generated as part of the following airport facilities and activities:

- Aircraft Storage: Aircraft storage facilities include four city-owned hangars.
- Public Arrival/Departure (A/D) Building: The A/D includes restrooms, vending machines, pilot lounge, and meeting room.
- Fueling Facilities: MWM has two underground storage fuel tanks that are owned and managed by the City: one 10,000 gallon tank of aviation gas and one 6,000 gallon tank of jet fuel.

Hazardous and solid waste generation from the above facilities are owned and managed by the City. The City does not conduct any aircraft maintenance on-site. Facility maintenance personnel and equipment for mowing and snow removal is provided by the City with equipment stored off-site at the City Street Shop.

Waste generation can generally be placed into four categories:

1. **Incidental recyclable material** that may be generated on a routine basis would include paper and cardboard, cans, glass, and recyclable plastic containers.
2. **Day to day operations** at the facility can also generate the following kinds of waste: municipal solid waste (MSW), organic materials (food and yard waste) and problem materials (such as electronics, fluorescent and HID lamps, household hazardous waste (HHW) cleaners, and rechargeable batteries).
3. Any **construction or remodeling projects** conducted at MWM could generate construction and demolition debris as well as problem materials (electronics, latex paints, textiles/carpets, and appliances).
4. Waste generated in association with **equipment, vehicle, or airplane maintenance** can include antifreeze, tires, vehicle batteries, oil filters, and used oil.

Many of the problem materials listed above are banned by Minnesota Statute 115A from land disposal including **collected recyclable materials, yard waste, major appliances, fluorescent lamps, electronics, HHW, used motor oil and motor oil filters, tires, lead acid, nickel-cadmium, and vehicle batteries**. It is the waste generator's responsibility to manage these materials in accordance with state and federal regulations.

1.20.7.2 County Solid Waste Management Plan

The Cottonwood County Solid Waste Management Department plans and manages the waste streams within Cottonwood County. The Solid Waste Director, part of the Cottonwood County Solid Waste Management Department, is responsible for administering, developing, and maintaining existing environmental programs within the County. Specifically, the Solid Waste Director oversees the solid waste management activities of the county including recycling, licensure, and the transportation and end processing of waste. Cottonwood County's Solid Waste Ordinance is applied county-wide to provide for safe, legal, and proper management of solid waste materials.

Cottonwood County, as part of the Southwest Regional Solid Waste Commission, completed a comprehensive Solid Waste Management Plan (November 2014). As described in the Plan, waste is managed through a number of programs including curbside recycling, public recycling drop-off facilities, municipal yard waste composting programs/facilities, and special waste programs. Waste not diverted through the recycling and special waste programs is transported to the Cottonwood County Landfill located near Windom for disposal. The Cottonwood County Landfill accepts household hazardous waste. Waste collected in the recycling bins or otherwise saleable material is directly managed and distributed by waste contractors. Used are accepted at are all repair shops. The Cottonwood County Landfill accepts oil filters as do some repair shops. Antifreeze is managed as household hazardous waste (HHW) as describe below.

Single-sort curbside recycling (allowing co-mingling of all recyclables) is provided in Windom near the MWM, but may not be available to the airport. A recycling shed is located at the Cottonwood County Fairgrounds in Windom and collects materials 24 hours a day, 7 days a week.

Cottonwood County also provides year round collection of HHW at the Cottonwood County Landfill located just outside of Windom. HHW collected in Cottonwood County is transported to a Regional HHW facility in Lyon County. Each regional facility also has a product exchange where

materials in good condition are available at no cost. The County accepts rechargeable batteries, lithium button batteries, fluorescent bulbs, and e-waste for shipment to a recycler.

1.20.7.3 Waste Generation Inventory and Survey

The following paragraphs summarize information provided by the City and from the Pilot User Survey described in **Section 1.11.1**.

City Information

On a day to day basis, the waste generated at MWM is minimal and in direct control of the City. Waste baskets for MSW are provided in the A/D Building. The airport manager collects waste and transports off-site for appropriate disposal. The frequency of waste collection is on an as-needed basis and the waste is disposed through Cottonwood County facilities. Currently, no organized waste abatement programs are in-place to collect recyclables, monitor, or educate users of the public facilities.

The users of the City-owned box hangars are responsible for removing their own waste. Currently, no organized waste abatement programs are in place to collect recyclables, monitor, or educate box hanger users.

Currently, there is no formal recycling program in use at MWM. There are no recycling bins in place at MWM. Although curbside recycling is not currently available to the MWM, the County maintains a county recycling drop-off site in Windom at 13th Street South. Recycling programs generally accept glass, metals cans, plastic, mixed paper and boxes including newsprint, paper, cardboard, magazines, phone books. Problem materials including tires and used oil/filters are accepted year around at the Cottonwood County Landfill near Windom.

The City does not provide any equipment and airplane maintenance at MWM. Generally, it is assumed that maintenance activities are primarily conducted off airport property. However, some owners of base aircraft change their own oil as needed as described in the Pilot Survey information below; private hangar owners are responsible for managing their own used oil and oil filters. No information is available on the volume of waste oil, filters, or other maintenance products generated at MWM.

Pilot Survey

Results of the Pilot Survey including questions pertaining to recycling habits were obtained as part of the survey described in **Section 1.11.1**. In general, the results of the survey indicated that the pilots always or usually recycle such items as paper, steel/aluminum, plastics and glass, but indicated that they brought the waste off-site. The majority of the respondents also indicated that they also actively collect maintenance waste. Those that actively collect waste generally indicated that waste management activities included: "transport to a collection point", "take to recycle point", and "dispose of properly".

1.20.7.4 Other Regulated Environmental Activities

Because of the storage of certain materials on-site, the Airport activities fall under environmental regulatory requirements. Airport facilities are required to obtain a permit for the discharge of stormwater from industrial activities. In addition, airport materials must comply with federal regulations regarding oil pollution prevention. The following sections summarize past regulatory issues, the Industrial Stormwater Permit requirements, and the Spill Prevention, Control, and Countermeasure (SPCC) Plan.

Environmental Regulatory History

The web-based search program available from the Minnesota Pollution Control Agency (MPCA) website was used to identify past regulatory issues at the airport. A petroleum release at the Airport (Leak No. 3194) was reported to the MPCA in September 1990. A remedial investigation occurred in 1991, followed by a corrective action plan, and monitoring report. The MPCA deemed the clean-up activities as adequate and file closure of the incident was completed on March 19, 1992. No other releases are documented for the site.

The MPCA website also indicates the facility has maintained permit coverage since 1992 for the discharge of stormwater from industrial activities under the National Pollutant Discharge Elimination System (NPDES) or the Industrial Stormwater Permit. Information on the NPDES permit is described separately below.

Industrial Stormwater Permit (NPDES)

Under the NPDES General Permit issued in 2010, the Airport was provided a coverage card by the MPCA for permit number MNR0534ZF issued September 27, 1992, with an expiration date of April 5, 2010; however, the 1992 General Permit expired and was re-issued in 2010. The 2010 permit expired on April 5, 2015. The airport applied for and received a new NPDES permit (MNR053C94) on April 5, 2015, with an expiration of April 5, 2020. This permit is still active. Permit number MNR0534ZF is listed as inactive on the on-line MPCA records.

Under the general Industrial Stormwater Permit, each facility must prepare and implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP documents that the design and operation of an industrial facility are based on preventing potential pollution issues that could occur as a result of storm events by identifying potential pollution sources, implementing stormwater control measures and best management practices (BMPs), training personnel, and conducting routine inspections, maintenance, and monitoring.

The City has indicated they have prepared and implemented a SWPPP in accordance with their Industrial Stormwater Permit.

SPCC Plan

The United States Environmental Protection Agency (U.S. EPA) has established regulations for oil pollution prevention in the Code of Federal Regulations, Title 40 (40 CFR), Parts 110 through 112. The Airport does not meet the three primary criteria requiring an SPCC Plan as follows:

- The facility must be non-transportation related and engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil and oil products.
- The facility must have an aggregate aboveground storage capacity greater than 1,320 gallons or below ground storage capacity greater than 42,000 gallons.
- There must be reasonable expectation that, due to its location, the facility could discharge oil into or upon the navigable waters or adjoining shorelines of the United States.

1.20.8 Historical, Archeological, Architectural and Cultural Resources

A preliminary cultural resources literature review was conducted to determine if any previously identified archeological and architecturally significant sites were located on or near the Airport.

The archeology search was conducted for properties listed in the City of Windom, and the surrounding area. The State Historic Preservation Office (SHPO) documentation lists one historic property in the City, located over 4 miles to the south of the existing Airport property. A field survey was deemed unnecessary and was not conducted.

1.20.9 Noise

Noise is measured by the Day-Night Sound Level (DNL). It is the logarithmic average of sound levels in decibels and is based on a 24-hour Equivalent Sound Level (Leq). DNL (also known as Ldn) has been equated through social surveys with public reactions to different noise levels. DNL values incorporate a 10-decibel penalty for noise events occurring between 10:00 PM and 7:00 AM to account for increased noise sensitivity at night. The FAA considers areas impacted by DNL 65 noise levels and higher as significant. Residential, school, hospital, day care, and retirement home uses within these areas are not compatible.

The DNL measurement was developed under the direction of the EPA to measure the cumulative impact of multiple noise events in an average day. The U.S. Departments of Housing and Urban Development, Transportation, and Defense recognize it as a proper basis for land use planning around airports. The recognized tool used to predict anticipated DNL coverage for a project, such as that outlined earlier, is the Aviation Environmental Design Tool (AEDT) developed by the FAA.

In accordance with the guidelines set forth in FAA Order 5050.4B, Chapter 5, Paragraph 47e, Section (1), a noise analysis is not required for proposed development options at airports where existing or forecast operation levels do not exceed 90,000 annual propeller operations or 700 annual jet operations. These numbers of propeller or jet aircraft operations result in cumulative noise levels not exceeding 60 Day/Night Level (Ldn) more than 5,500 feet from start of takeoff roll or 65 Ldn on the runway itself. Therefore, impacts in excess of these noise levels would not be expected outside of the Airport property limits. The operations levels at MWM are below these thresholds. To date, no noise assessments or noise contours have been created for MWM.

1.20.10 Water Quality

The Airport is located in the Warren L Outlet watershed of the Des Moines River Basin. Division Creek is located within the boundary of the Airport. Division Creek discharges to the Des Moines River southwest of the Airport. The waters from the Des Moines River Basin flow south, into the Des Moines River, eventually arriving in Mississippi River in Iowa.

The watershed is located in southwestern Minnesota and is a part of the Western Corn Belt Plains and Northern Glaciated Plains ecoregions. The watershed extends across seven counties: Murray, Cottonwood, Jackson, and Nobles and a small portion of Pipestone, Lyon, and Martin. It covers an area of 1,333 square miles. The subwatershed contributing to North and South Heron Lake is 467 square miles. The watershed has several impairments and the Des Moines River is classified as "Caution" and was added to the inventory of impaired waters in 2008. The MPCA warns the river may not support a thriving community of fish and other aquatic organisms, as indicated by excessive turbidity (suspended solids).

Surface water runoff from the runways and taxiways is treated in grassed swales along the length of the runway and taxiway facilities. As described in **Section 1.20.7.4**, the facility is not required to prepare and implement a Stormwater Pollution Prevention Plan under the No Exposure

Exclusion of their Industrial Stormwater Permit. Runoff ultimately discharges to Division Creek by overland flow.

1.20.11 Wetlands

Wetlands are defined in federal Executive Order 11990 as:

“those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

The National Wetlands Inventory (NWI) Map (**Figure 1-11**) shows several wetland areas on Airport property and large expanses of wetland along Division Creek. Additionally, it is likely there are several small pot-hole wetlands located throughout the airport property.

Field delineation of wetland habitat on the Airport property was out of scope of this master plan. Wetland boundaries near the airport property were delineated using GIS remote sensing (**Figure 1-12**). This data should be used for planning purposes only and does not constitute an on-site wetland delineation. Prior to completing any proposed action at the airport property, a formal wetland delineation will be conducted.

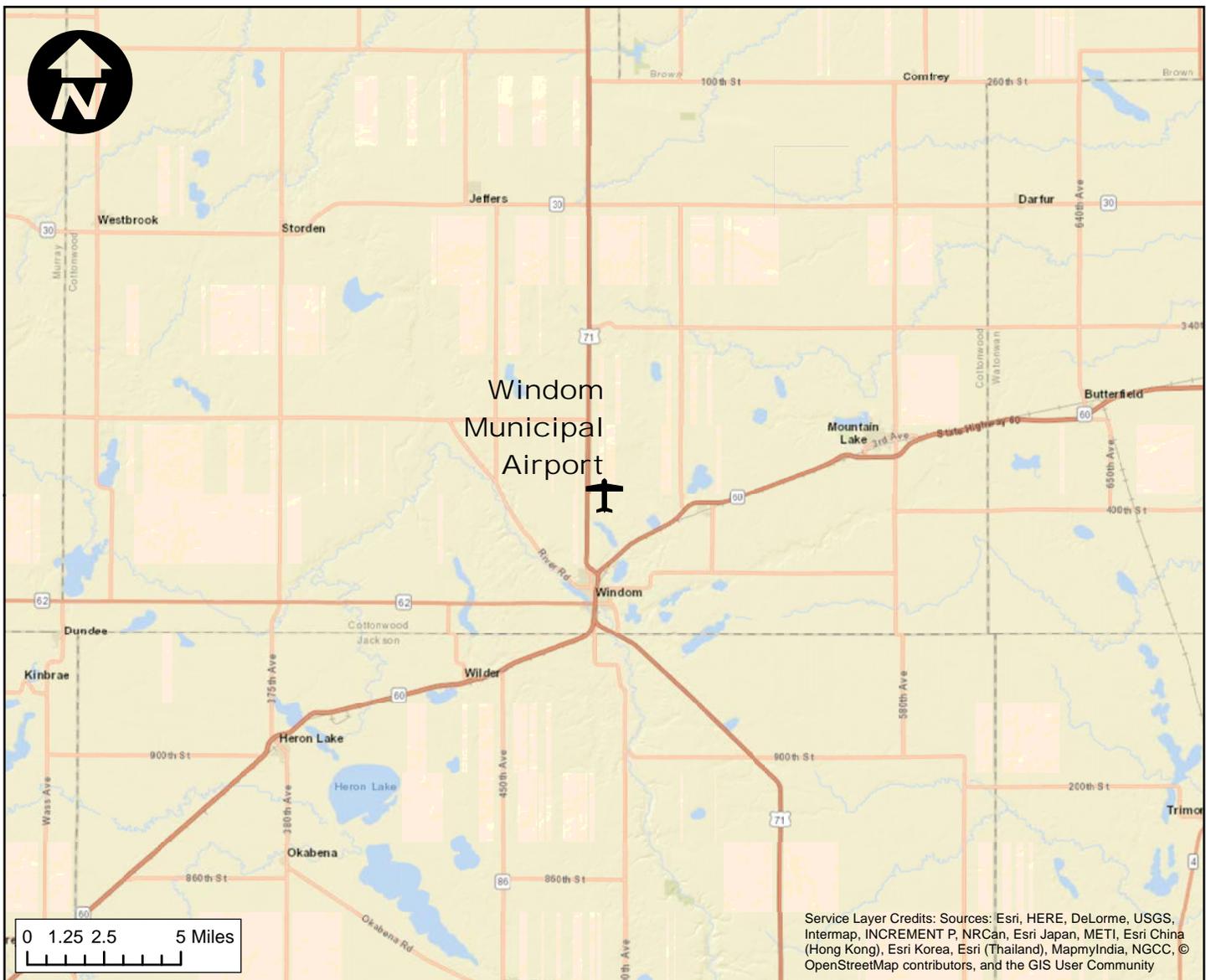
1.21 Sustainability

Airport sustainability is a broad term used by the FAA that encompasses a wide variety of practices applicable to planning, design, building and operating airport facilities. The FAA has defined three core principles:

1. Protecting the environment;
2. Maintaining high and stable levels of economic growth; and
3. Social progress that recognizes all stakeholders' needs.

There are many benefits of airport sustainability planning, including reduced energy consumption, reduced noise impacts, reduced hazardous and solid waste generation, reduced greenhouse gas emissions, improved water quality, improved community relations, and cost savings.

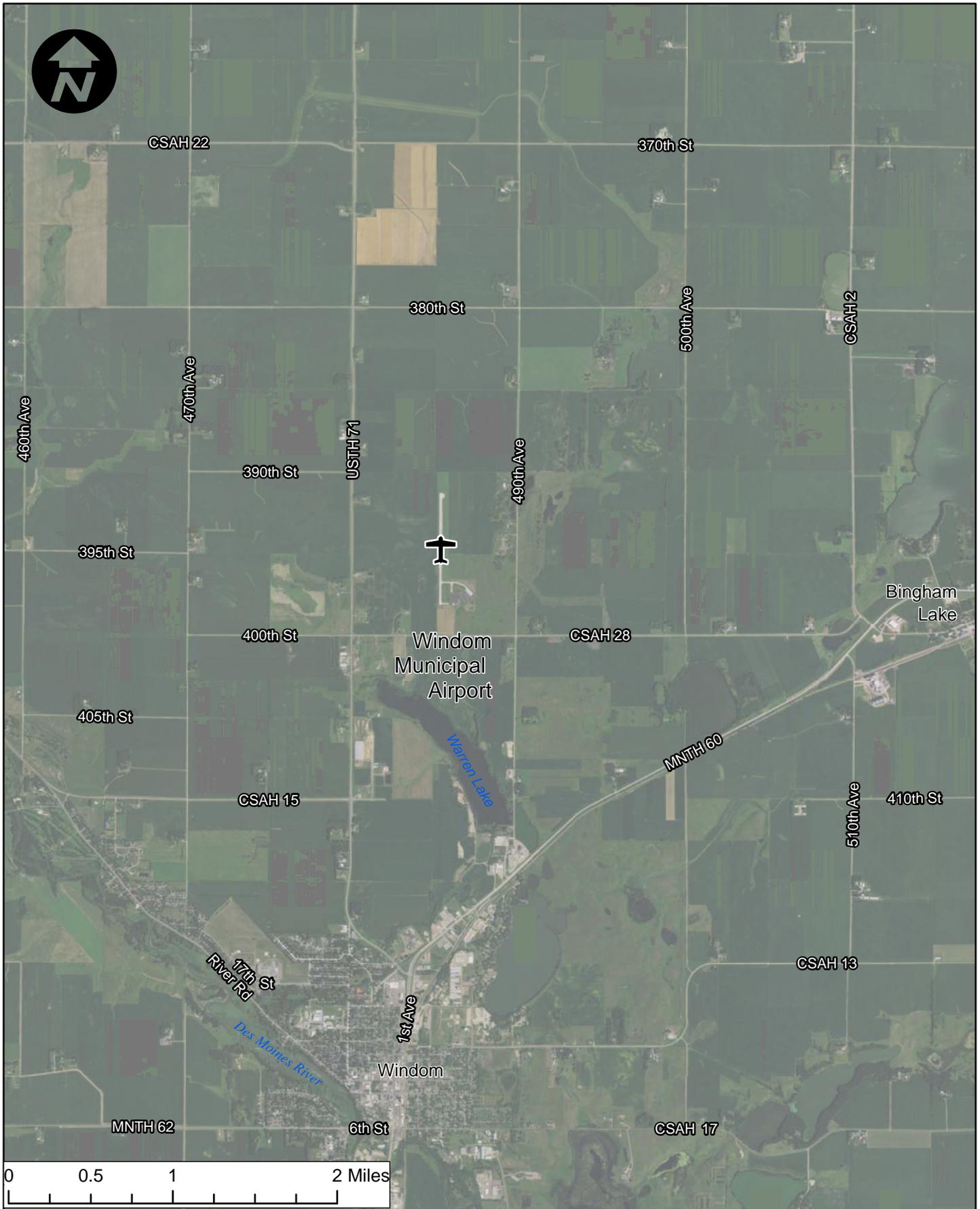
Currently, no specific sustainability plan has been developed for the Airport. Recommendations for airport sustainability are discussed in **Chapter 4, Facility Recommendations**.



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Date: 12/8/2017

	3535 VADNAIS CENTER DR. ST. PAUL, MN 55110 PHONE: (651) 490-2000 FAX: (651) 490-2150 WATTS: 800-325-2055 www.sehinc.com	Project: WINDM 138969 Print Date: 12/8/2017	<h2>LOCATION MAP</h2> <h3>Windom Municipal Airport</h3> <h3>Windom, Minnesota</h3>	<h2>Figure 1-1</h2>
		Map by: BLM Projection: Cottonwood County Coords Source: Mn/DOT, ESRI, SEH		

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



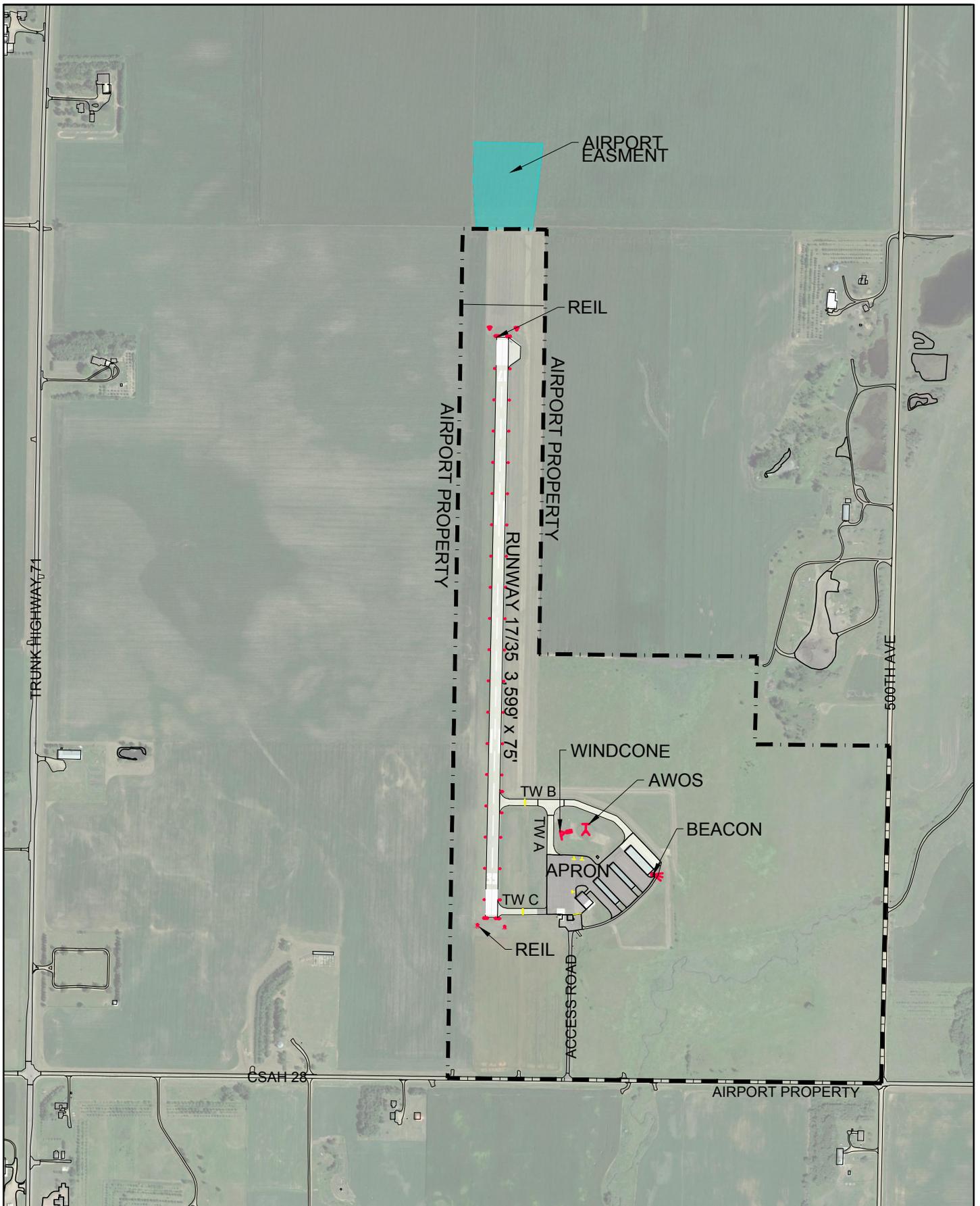
Document Path: S:\UZ\W\Windom\138969\6-planning\Report\Figures\1-2 Vicinity Map.mxd
 Date: 12/8/2017



	3535 VADNAIS CENTER DR. ST. PAUL, MN 55110 PHONE: (651) 490-2000 FAX: (651) 490-2150 WATTS: 800-325-2055 www.sehinc.com	Project: WINDM 138969 Print Date: 12/8/2017	Vicinity Map Windom Municipal Airport Windom, Minnesota	Figure 1-2
		Map by: BLM Projection: Cottonwood County Coords Source: Mn/DOT, ESRI, SEH		

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

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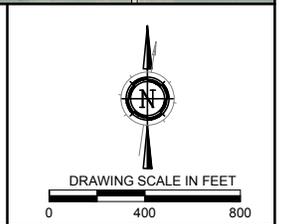


AIRPORT MASTER PLAN
WINDM 138969
JANUARY 2018

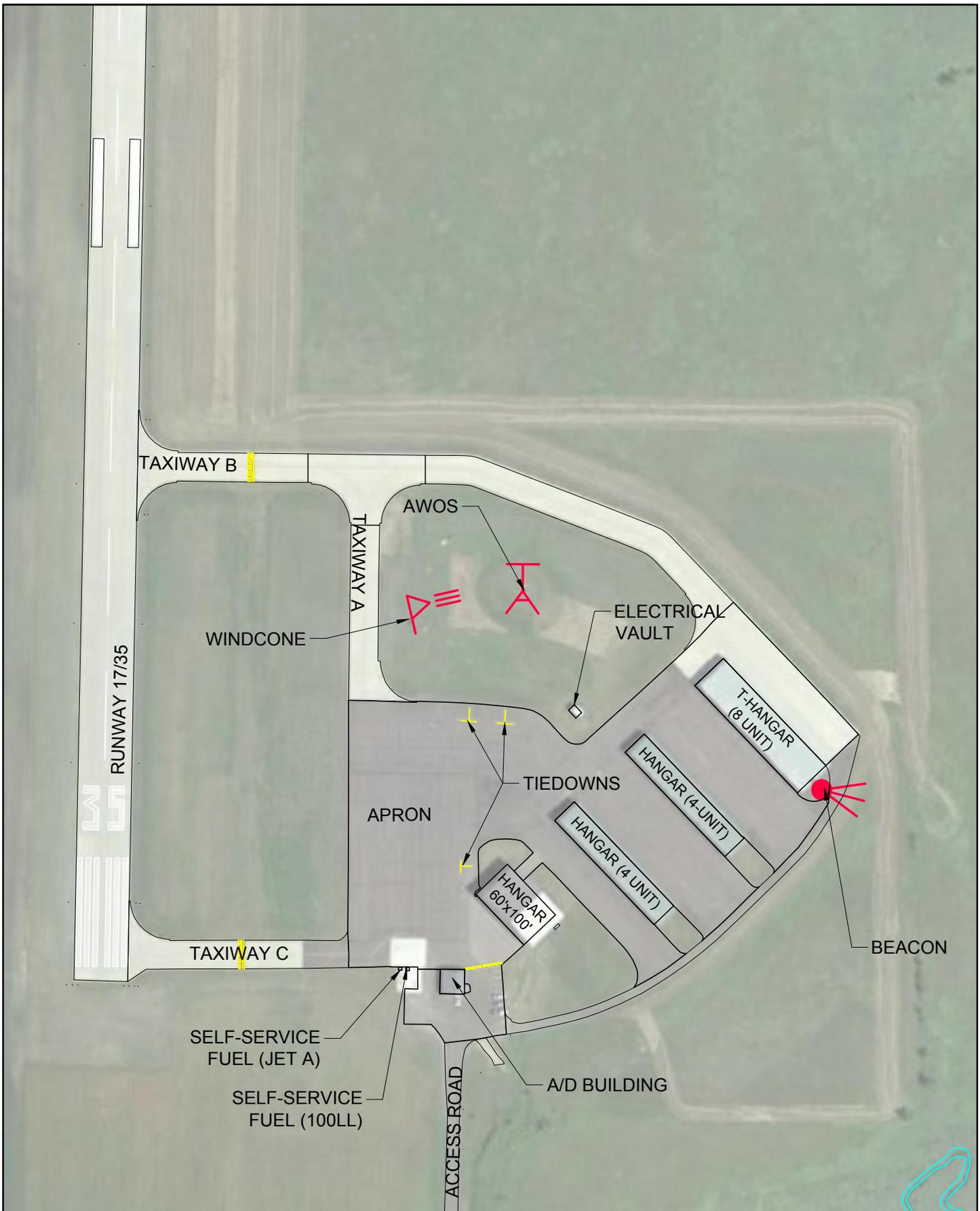
WINDOM MUNICIPAL AIRPORT

EXISTING AIRPORT FACILITIES

Figure 1-3



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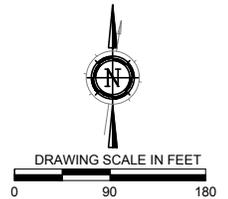


AIRPORT MASTER PLAN
WINDM 138969
JANUARY 2018

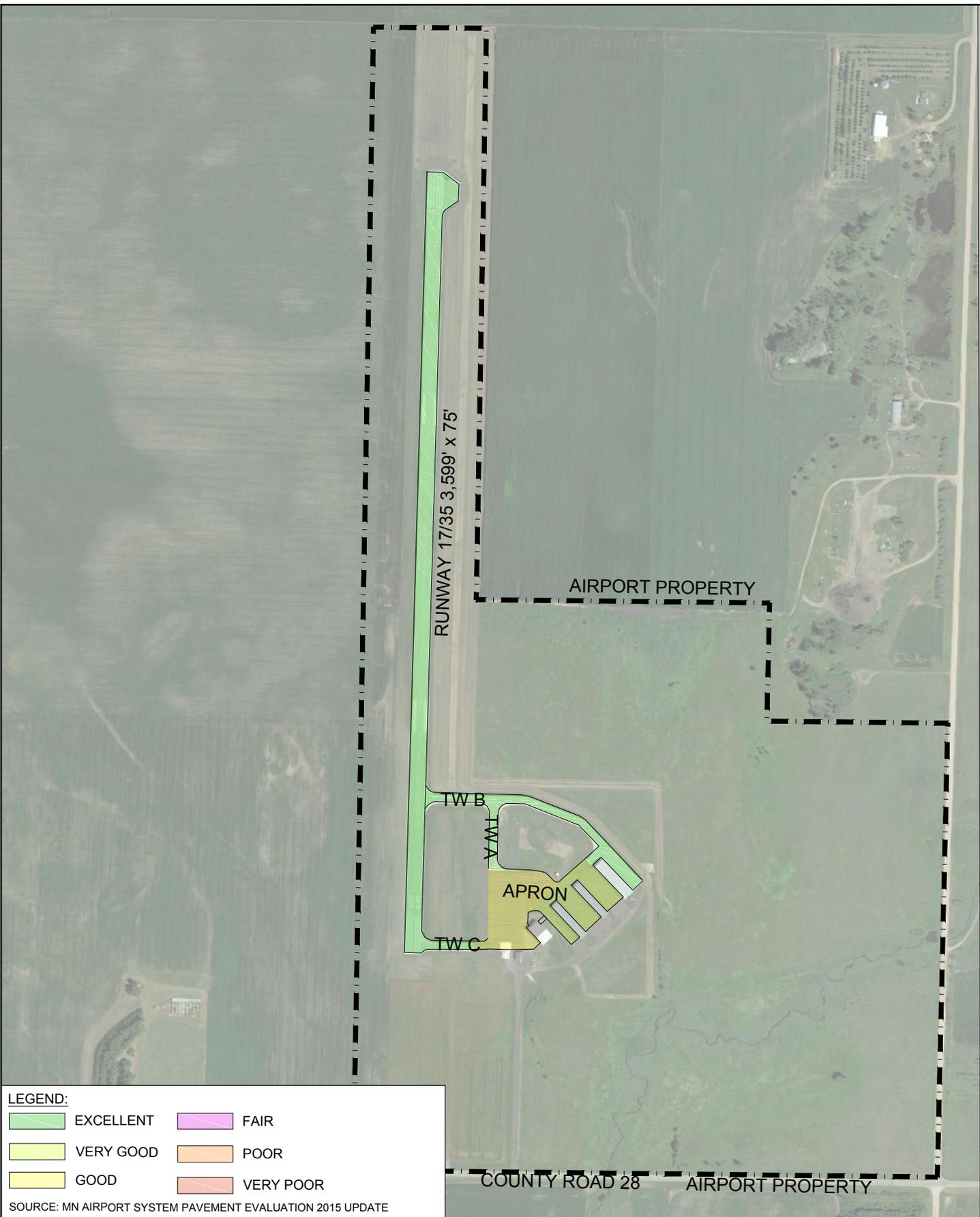
WINDOM MUNICIPAL AIRPORT

EXISTING BUILDING AREA

Figure 1-4



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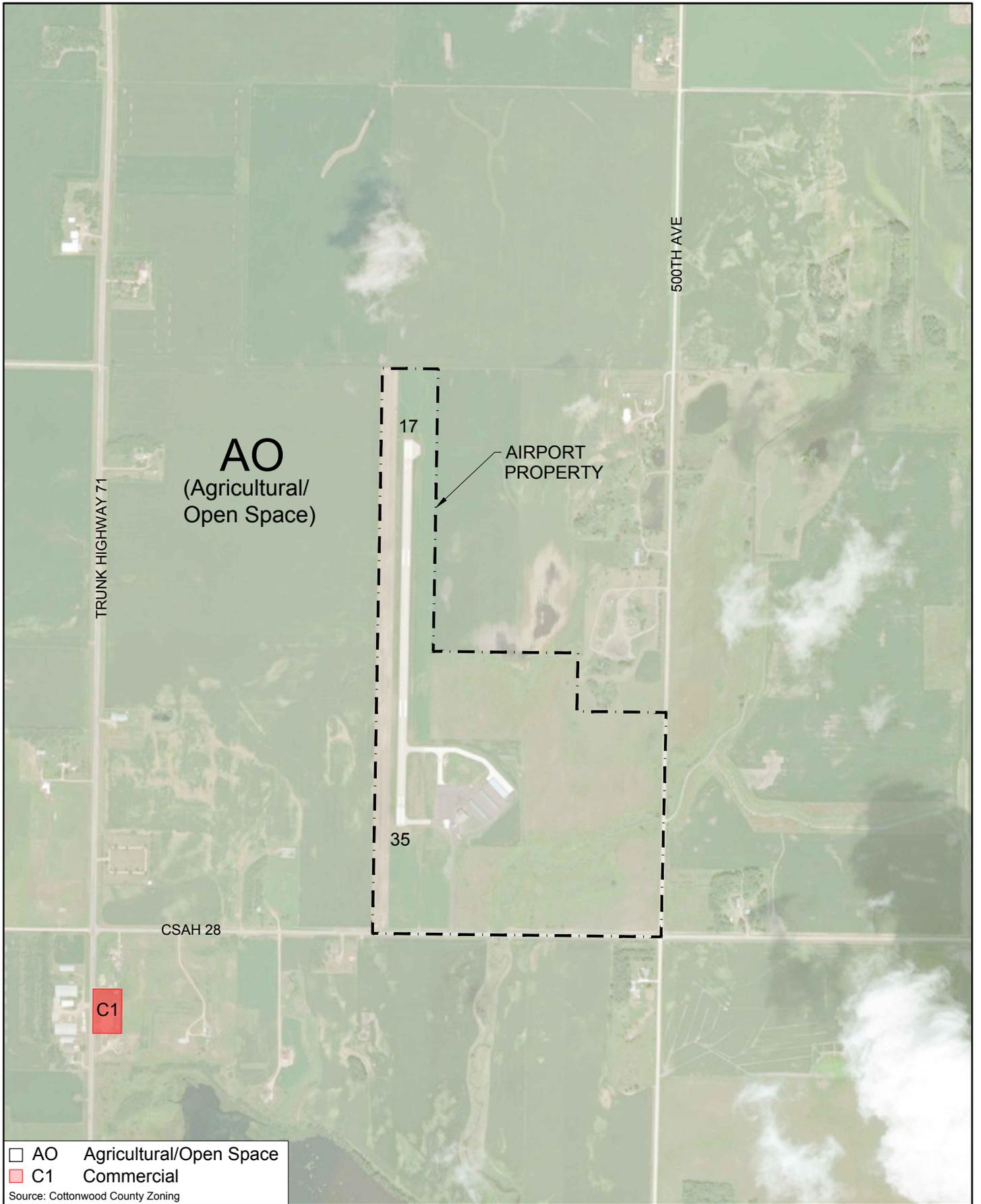
	AIRPORT MASTER PLAN
	WINDM 138969
	JULY 2017

WINDOM MUNICIPAL AIRPORT
PAVEMENT CONDITION INDEX

Figure 1-5

DRAWING SCALE IN FEET

S:\UZ\W\Windm\138969\5-final-dsgn\Master Plan\MWM_Fig 1-6 Land Use.dwg 4/16/2018 1:39 PM ckutll



	AO Agricultural/Open Space
	C1 Commercial

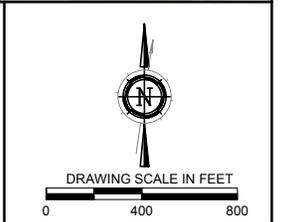
Source: Cottonwood County Zoning



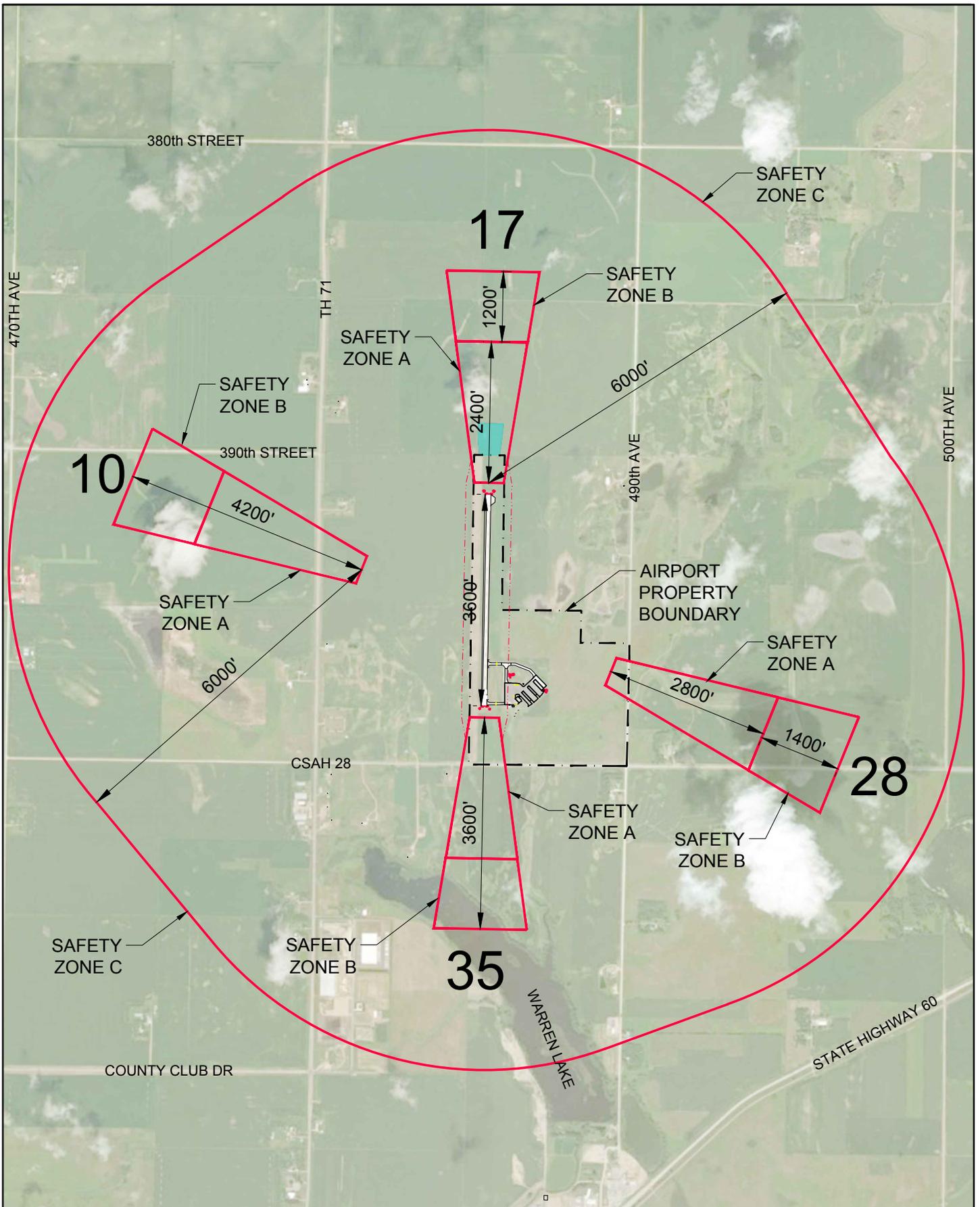
AIRPORT MASTER PLAN
 WINDM 138969
 APRIL 2018

**WINDOM MUNICIPAL
 AIRPORT**
 EXISTING LAND USE

Figure 1-6



S:\UZ\W\Windm\138969\5-final-dsgh\Master Plan\MvM_Fig 1-7 Airport Zoning.dwg 4/16/2018 2:02 PM ckutil



AIRPORT MASTER PLAN

WINDM 138969

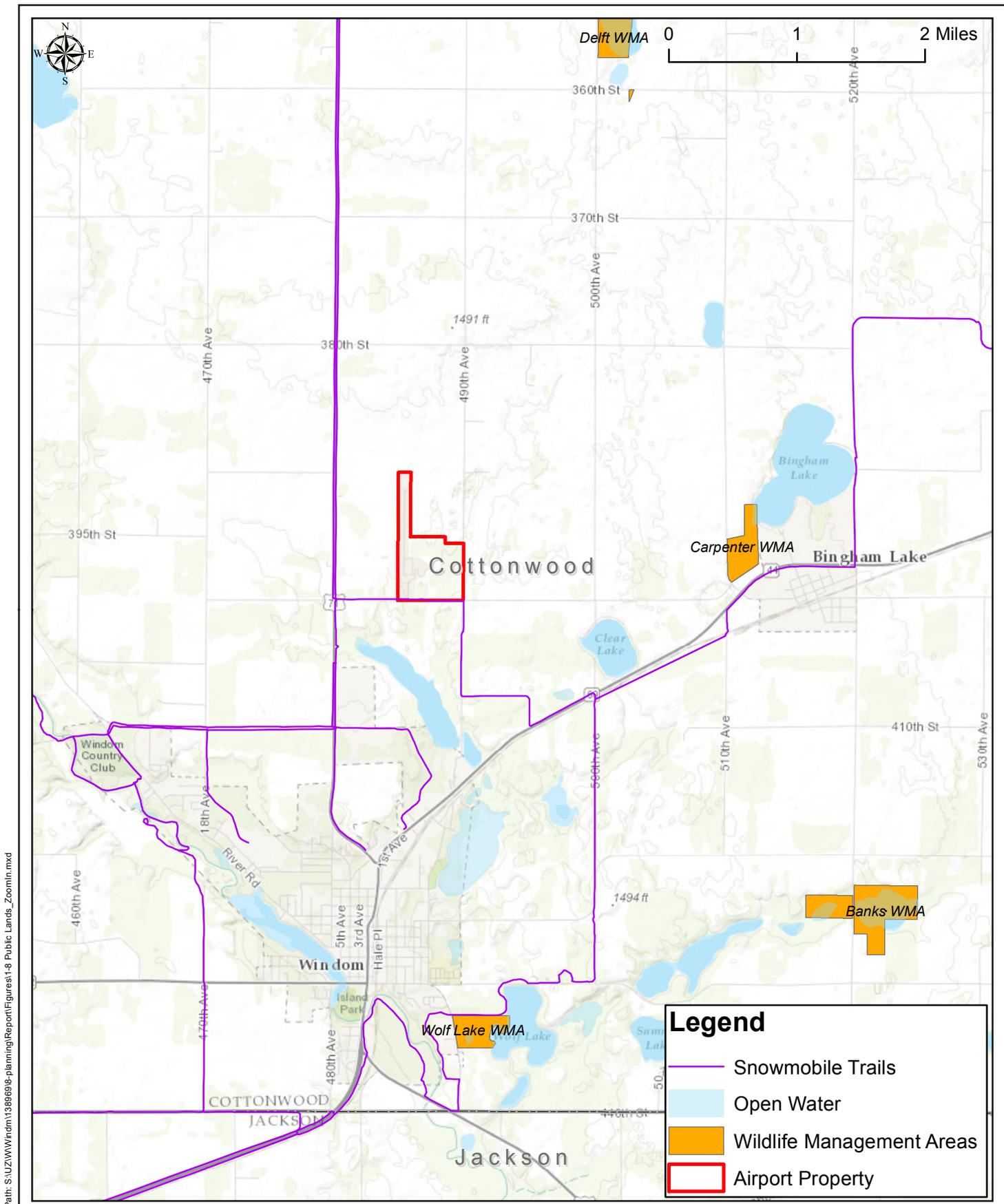
JULY 2017

**WINDOM MUNICIPAL
AIRPORT**
EXISTING AIRPORT ZONING

Figure 1-7



DRAWING SCALE IN FEET
0 1,100 2,200



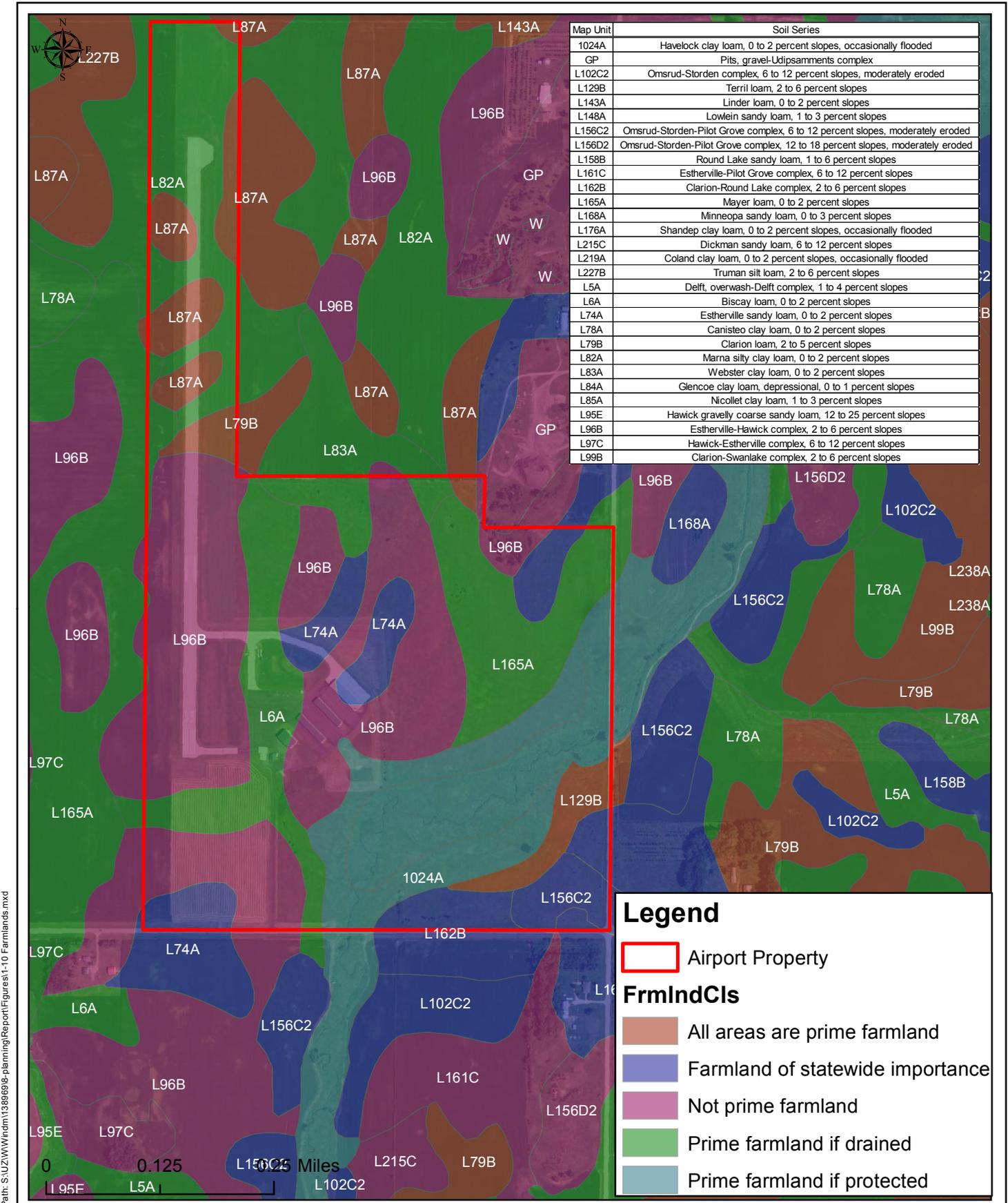
Path: S:\UZI\W\Windom\138869\8-planning\Report\Figures\1-8 Public Lands_Zoomin.mxd

Legend

-  Snowmobile Trails
-  Open Water
-  Wildlife Management Areas
-  Airport Property

	<p>3535 VADNAIS CENTER DR. ST. PAUL, MN 55110 PHONE: (651) 490-2000 FAX: (888) 908-8166 TF: (800) 325-2055 www.sehinc.com</p>	<p>Project: WINDM 138869 Print Date: 11/1/2016 Map by: rbeduhn Projection: HARN_MN_Cottonwood(ft) Source: SEH, ESRI, MnDNR USGS, NRCS, USDA</p>	<p>Public and Tribal Lands Windom Municipal Airport Windom, Minnesota</p>	<p>Figure 1-10</p>
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Path: S:\UZW\Windom\138969\g-planning\Report\Figures\1-10 Farmlands.mxd



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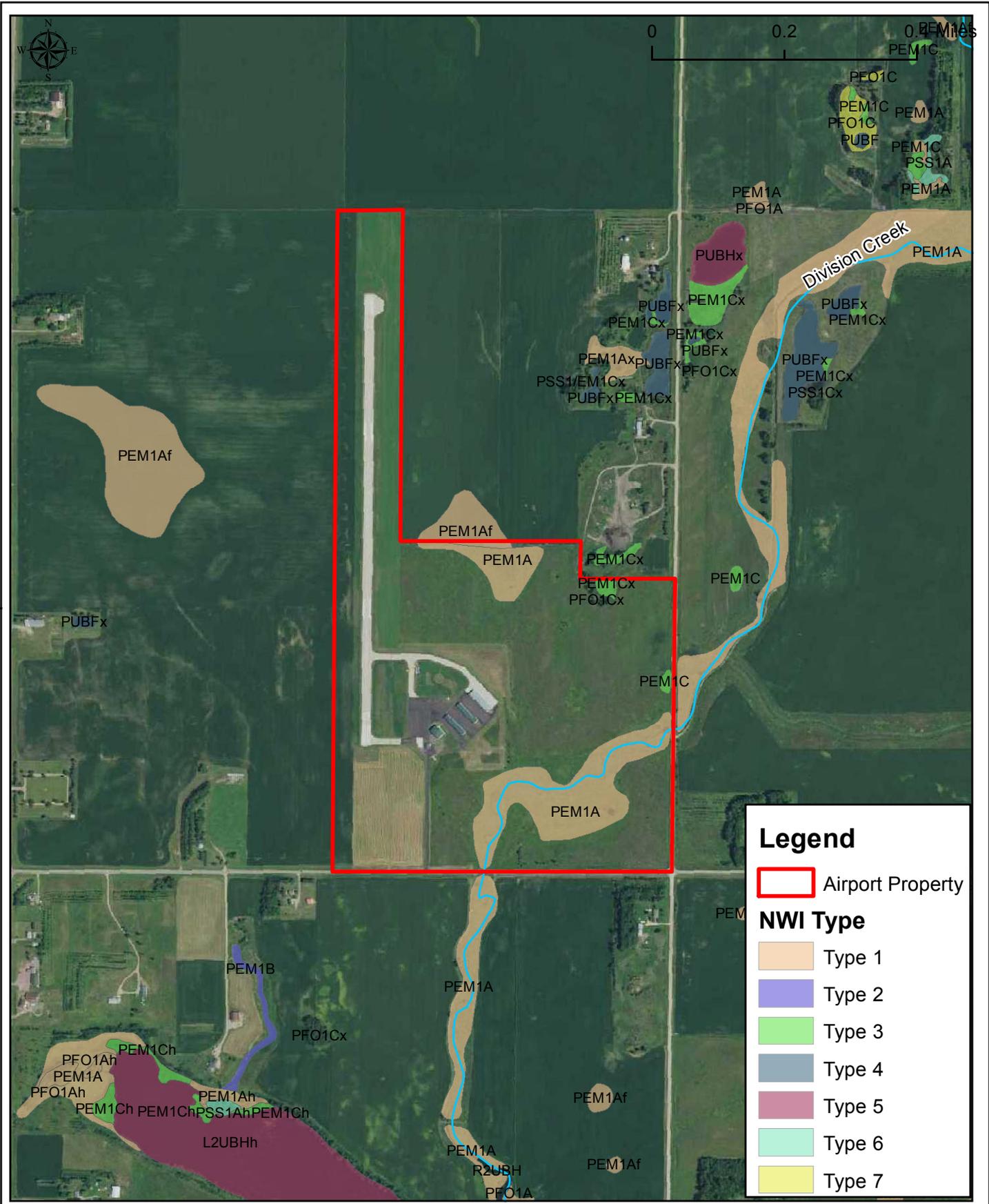
Project: WINDM 138969
Print Date: 11/1/2016
Map by: rbeduhn
Projection: HARN_MN_Cottonwood(ft)
Source: SEH, ESRI, MnDNR
USGS, NRCS, USDA

Prime Farmland Classifications

Windom Municipal Airport
Windom, Minnesota

Figure
1-10

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Project: WINDM 138969
Print Date: 11/1/2016

Map by: rbeduhn
Projection: HARN_MN_Cottonwood(ft)
Source: SEH, ESRI, MnDNR
USGS, NRCS, USDA

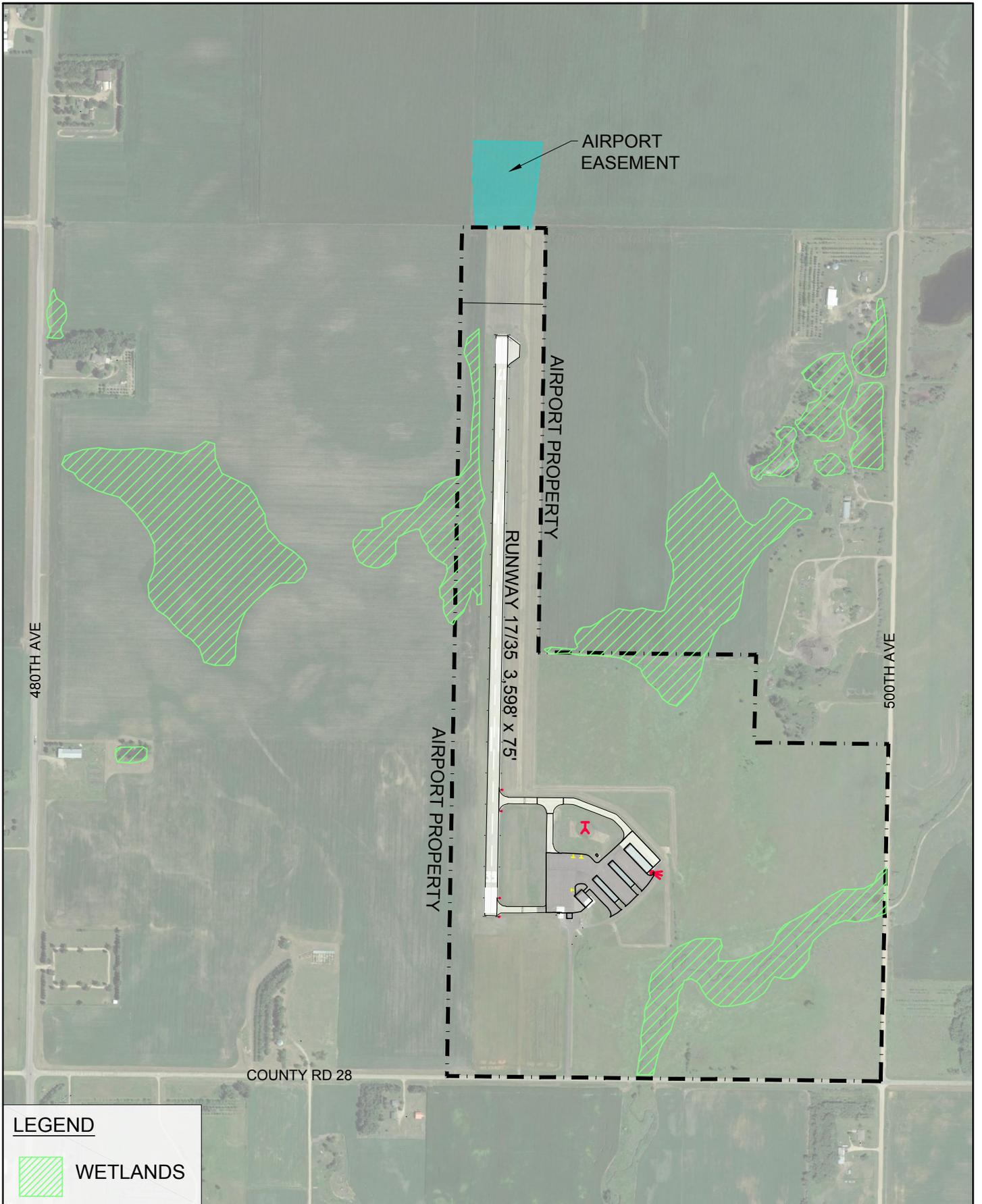
National Wetlands Inventory

Windom Municipal Airport
Windom, Minnesota

Figure
1-11

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S:\UZ\W\Windm\138969\5-final-dsgn\Master Plan\MWM_Fig 1-12 Remote Sensing (Level 1) Wetlands Boundaries.dwg 7/20/2017 12:38 PM jgamet



LEGEND

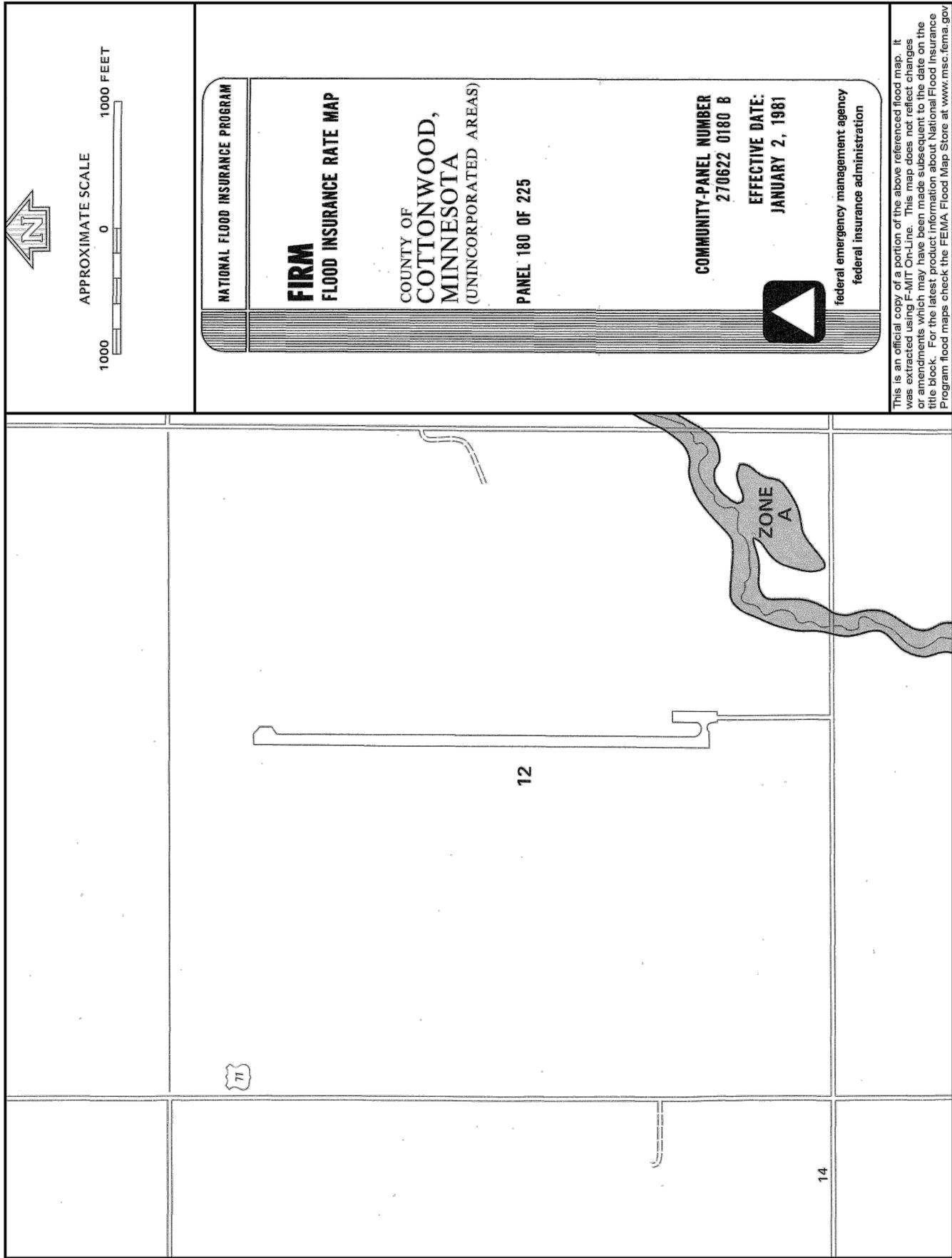
 WETLANDS

	AIRPORT MASTER PLAN
	WINDM 138969
	MARCH 2018

**WINDOM MUNICIPAL
AIRPORT**
REMOTE SENSING (LEVEL 1)
WETLANDS BOUNDARIES

Figure 1-12


 DRAWING SCALE IN FEET

AIRPORT MASTER PLAN

WINDM 138969

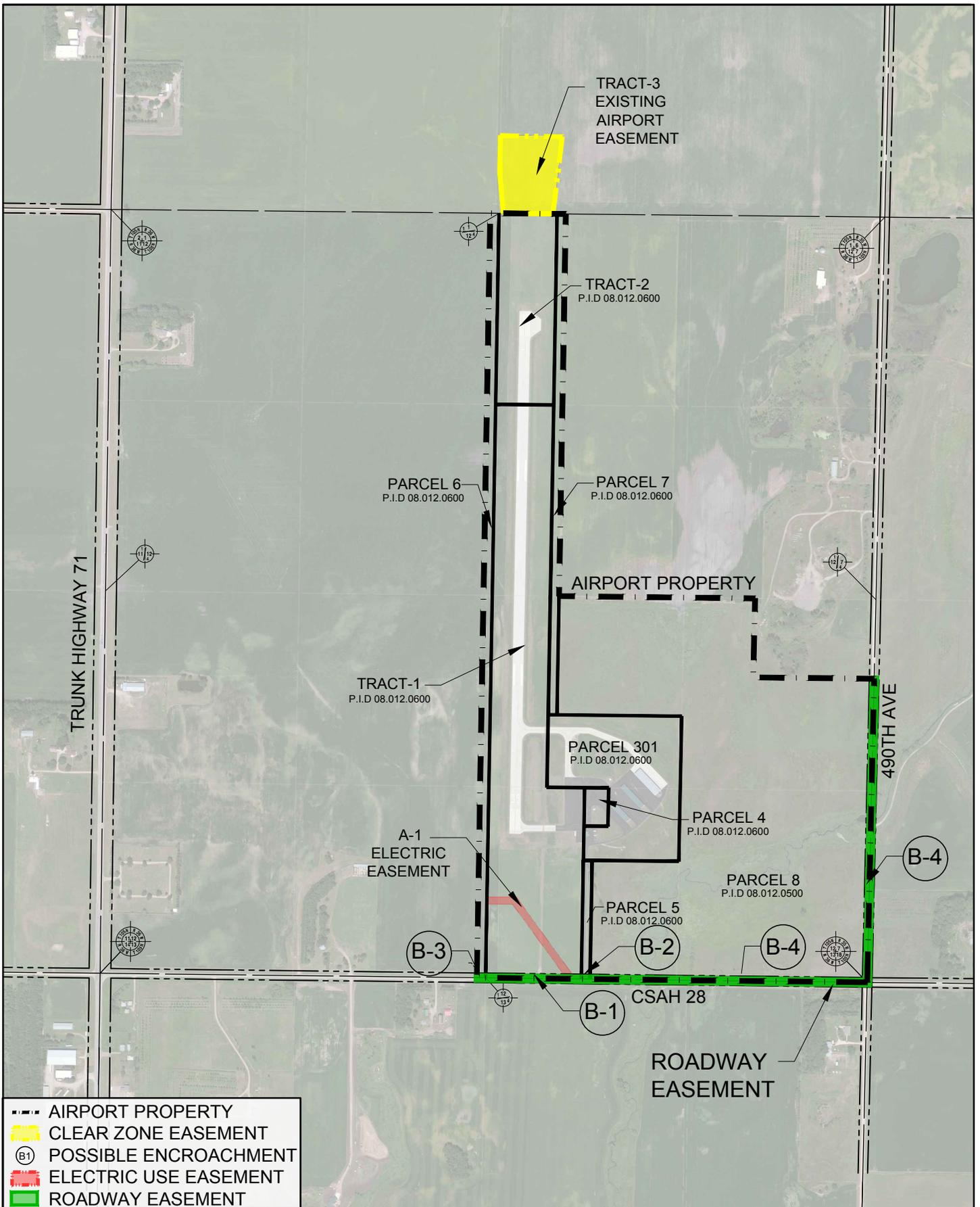
MARCH 2018

WINDOM MUNICIPAL
AIRPORT
 FEMA FIRM MAP
 JANUARY 2, 1981

Figure 1-13



DRAWING SCALE IN FEET
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	AIRPORT MASTER PLAN
	WINMD 138969
	JULY 2017

WINDOM MUNICIPAL AIRPORT
AIRPORT PROPERTY

Figure 1-14

N



DRAWING SCALE IN FEET
0 500 1000

2 Aviation Activity Forecasts

The objective of the activity forecasts chapter is to provide updated forecasts of aviation activity and input for the assessment of the facility requirements and the evaluation of future development alternatives at Windom Municipal Airport (MWM). It also provides information needed to assess the type and timing of new facilities and aid in the evaluation of potential impacts of improvements on the Airport and its surroundings.

The forecasts are for a 20-year planning period, and comprise of short-term (5 year), mid-term (10 year), and long-term (20 year) increments. The forecasts are broken down into annual aircraft operations, itinerant and local operations, aircraft fleet mix, based aircraft, and identification of the most demanding (critical) aircraft. The forecast of aviation activity includes an analysis of existing national and state general aviation activity forecasts, the development of an airport service area, a tabulation of the Airport User Survey data, and the determination of current aviation activity at MWM. Using the estimation of current airport activity and reasonable forecasting methodologies, future projections are made based upon established growth rates, area demographics, industry trends, and consultant experience.

While forecasting is important to determine demand, it is only an estimate of possible future activity. There are various unforeseen factors that can affect the forecast, positively and negatively. Therefore, activity forecasts should be revisited periodically.

2.1 Forecasting Aviation Metrics

The forecasting metrics used for a general aviation airport consists of the number of based aircraft and aircraft operations. The baseline year used for forecasting both based aircraft and aircraft operations is 2017, as a full year of data is required. The forecasts were produced for a 20-year period, 2018 through 2038.

2.1.1 Based Aircraft

Based aircraft are aircraft that reside at an airport. Based aircraft forecasts assist in identifying the amount and type of hangars and aircraft parking apron space needed at an airport. Table 2-1 shows the based aircraft at MWM per the various sources.

The FAA requires non-Primary National Plan of Integrated Airport Systems (NPIAS) airports, such as MWM, to enter the aircraft that are based at their facilities into the National Based Aircraft Inventory website (www.basedaircraft.com). As a result, the FAA requires the National Based Aircraft Inventory website to be used as the official list for based aircraft for master planning purposes. Currently, the National Based Aircraft Inventory indicates 17 aircraft based at MWM (15 single-engine, one multi-engine, and one jet aircraft). The FAA requires the National Based Aircraft Inventory to be used as a baseline when forecasting based aircraft for a Master Plan.

The 2017 based aircraft baseline used for forecasting utilizes the 17 “Validated Aircraft” (15 single-engine, one multi-engine, and one jet aircraft) from the FAA’s National Based Aircraft Inventory¹⁰.

¹⁰ BasedAircraft.com; November 14, 2016

Table 2-1 – Summary of Based Aircraft

Source	Based Aircraft				
	Single-Engine	Multi-Engine	Jet	Other	Total
National Based Aircraft Inventory	15	1	1	-	17
Form 5010	14	1	1	-	16
FAA Terminal Area Forecasts (TAF)	-	-	-	-	16
MnDOT Aeronautics	12	-	-	-	12
Minnesota State Airport System Plan (Forecast Year 2020)	17	-	1	-	18

Source: FAA Form 5010 (12/7/2017), TAF (2017), MnDOT Aeronautics Based Aircraft Records (July 2016), MN SASP (2012), BasedAircraft.com (11/14/16), and FAA TAF does not indicate aircraft type, only total based aircraft.

There are currently three interested parties on the Hangar Waiting List for MWM for four hangars. Discussions with Airport Management indicated two of these individuals are either ready to build hangars or occupy City/Airport managed hangars as soon hangars or development space becomes available. The forecasts take into account that there are three individuals ready to occupy four hangars at the Airport now.

Note to Reviewer: In 2018 the City is pursuing Federal and State grants for the development of two hangar expansions, and design for the extension and widening of a taxiway to accommodate a proposed 4-unit hangar. The hangar additions are anticipated to be completed by Spring of 2020. Once these improvements are completed, the Master Plan will be updated with the as-built conditions.

2.1.2 Aircraft Operations

An aircraft operation is a takeoff or a landing at an airport. Thus, an airplane flying to an airport performs one operation when landing and another operation when departing. Aircraft operation forecasts are the most important activity metric for airfield planning because they help determine the level, capacity, and type of aviation activity for an airport.

Since MWM is a non-controlled airport, meaning that it does not have a traffic control tower, it is more difficult to obtain the exact number of operations that occur. Estimates are based on a number of sources including existing historical data, the Airport User Surveys, and existing forecasts prepared by State and Federal agencies. **Table 2-2** shows the aircraft operations at MWM in 2017 per various sources.

Table 2-2 – Summary of 2017 Aircraft Operations

Source	2017 Aircraft Operations
Form 5010	8,300
FAA Terminal Area Forecasts (TAF)	8,300
Minnesota State Airport System Plan (Forecast Year 2020)	8,646
User Survey Operations Estimate (Table 2-3)	9,288
Notes: MnDOT Aeronautics does not collect aircraft operations data. Airport management does not track or maintain records of aircraft operations.	

Source: FAA Form 5010 (12/7/2017), TAF (2017), MN SASP (2012)

The 2017 baseline for aircraft operations was determined by using the following methods: discussion with existing users, analysis of user survey data, and discussions with Airport Management. Currently, two agricultural spray operators (Olsem Aerial Application and Country Pride Services (Senex) operate Air Tractors 502 (A-II) and 602 (B-II), and Aero Commander S2R Thrushes (B-I) at the Airport in the summer months. These operators indicate they average two operations an hour per operator for 12 hours a day from June to October, which equates to 7,200 annual operations. Additionally, data from the user surveys showed 850 annual operations are conducted by small aircraft users and approximately 1,230 by larger based and transient aircraft. With this information, the 2017 baseline used is 9,288 operations for forecasting purposes.

Table 2-3 – Estimate User Aircraft Operations

Company	Aircraft	Estimated Annual Aircraft Operations
Country Pride Services (Senex)	Air Tractors 5 & 6 (A-II & B-II) Aero Commander (B-I)	3,600 (Av. for all aircraft)
Fredin Bros	Piper Cherokee (A-I) Pilatus PC-12 (B-II)	416 208
Integrity Aviation	Cessna Skyhawk (A-I) Cessna 414 (B-I) Pilatus PC-12 (B-II) Citation Mustang (B-I)	12 12 75 75
Mainstream Holdings (Big Game / AntAir)	Citation Mustang (C510) (B-I)	50
Oddson Underground	Piper Cherokee Six (A-I) Piper Cherokee (A-I) Cessna 414 (B-I)	360 (Av. for all aircraft)
Olsem Aerial Application Services	Grumman G164A (A-I) Aero Commander (B-I)	3,600 (Av. for all aircraft)
Prairie Ventures Aviation/Holdings	Cessna 421 (B-I) King Air 200 (B-II)	2 4
Sanford Health	King Air 200 (B-II)	24
MWM Based Aircraft Users (estimate per surveys)		850
Total		9,288
Notes: Operations estimates from conversation with individual users or data retrieved from the User Surveys.		

Source: SEH, Inc.

The Airport Management indicated that estimated annual operations per the user survey data collected, which shows a total operations count of 9,288, accurately reflects the activity levels at MWM. The baseline of 9,288 aircraft operations will be used for 2017 in the forecasting scenarios.

2.2 Airport User Survey

To help determine actual activity levels at MWM (**Section 1.11**), the Pilot User Survey asked to estimate the number of operation they complete at MWM per year. From twelve based aircraft users who responded to this section of the survey, an average of 64 annual operations per based aircraft is estimated. Additionally, from seventeen transient users who responded, the estimated transient operations is approximately 960 annual operations, or an average of 57 operations per transient aircraft.

Additionally, 23.3% (7 of 30) of respondents indicated they project an increase in activity, 70% (21 of 30) project the same level of activity, and 6.7% (2 of 30) project a decrease in activity at MWM in the future. This information was used to assist in forecasting operations at MWM.

2.3 Demographic and Economic Factors

Demographic and economic factors, such as population, disposable income, and geographic attributes, have an effect on aviation demand. Given that there is a causal relationship, aviation demand is largely a function of demographic and economic activity. Socioeconomic data was considered in the preparation of the aviation activity forecasts. For this Master Plan, data was collected from Woods & Poole Economics. Woods & Poole is an independent firm that specializes in long-term economic and demographic projections through 2050 for every county in the United States, using more than 900 variables.

While MWM is located within Cottonwood County. **Table 2-4** shows Woods & Poole’s projected growth of Cottonwood County demographic and economic activity. Woods & Poole forecasts a slight decline in population (0.19%) in Cottonwood County, but a slight increase in population (0.84%) for the State of Minnesota as a whole. Additionally, Woods & Poole forecast a growth in employment and personal income for both Minnesota and Cottonwood County.

Table 2-4 – Woods & Poole Demographic and Economic Forecasts

Year	Cotton County			State of Minnesota		
	Population (in 1,000s)	Employment (in 1,000s)	Income (in millions of 2009 dollars)	Population (in 1,000s)	Employment (in 1,000s)	Income (in millions of 2009 dollars)
2018	11.515	7.778	481.443	5,637.10	3,858.92	48,916.00
2023	11.46	8.099	523.492	5,897.73	4,147.80	52,784.00
2028	11.381	8.344	562.424	6,164.48	4,423.75	56,466.00
2033	11.26	8.518	592.368	6,426.12	4,679.96	59,642.00
2038	11.078	8.635	616.533	6,668.58	4,917.88	62,706.00
CAGR	-0.1933%	0.5240%	1.2443%	0.8437%	1.2198%	1.2495%

Source: Woods & Poole Economics 2017

2.4 Airport Service Area

In determining the airport's general aviation service area, it is assumed that airport users choose to base their aircraft or use airports that are closest to their residence or business and provides the level of services required by their particular needs. An additional determining factor in this decision is the length of paved runway that is required by the type of aircraft being operated.

Current FAA planning guidelines for selecting an airport site indicate that a NPIAS airport should be located 30 minutes or more average ground travel time from the nearest existing or proposed NPIAS airport. This is a valid assumption since the main advantage of flying is in the savings in long distance travel time. Service area boundaries for the Airport were constructed for two separate cases, 30-minute drive time service area and 60-minute drive time service area.

Both of the drive time service areas for the Airport were determined by travel along established thoroughfares. In this case, travel was assumed along the most direct route and at published speed limits. The drive time service areas are shown on **Figure 2-1**. There are no public airports within the 30-minute drive time of MWM. Within the 60-minute drive time of MWM, there are four airports: Jackson Municipal (MJQ), Springfield Municipal (D42), St James Municipal (JYG), and Worthington Municipal (OTG).

2.5 FAA Aerospace Forecast Fiscal Years 2017-2037

The FAA prepares The FAA Aerospace Forecasts, a national aviation forecast, annually. This forecast attempts to project commercial and general aviation activity levels in order for the FAA to determine the funding needs for various sections of the FAA, such as Air Traffic Control and Airspace. The current forecast document is for federal fiscal years 2017-2037.

The active general aviation fleet is projected to grow minimally by an average of 0.1% per year until 2037, and the number of general aviation hours flown is project to increase by 0.9% annually. The more expensive and sophisticated turbine-power aircraft are projected to grow by an average of 1.9% annually, with the turbojet share growing at 2.3% per year by 2037. Conversely, the single-engine fixed-wing piston aircraft projected to decline by an average of 0.8% per year, while the turbine aircraft (including rotorcraft) are forecasts to increase by 2.4% each year. Jet aircraft are expected to account for the majority of the increase at an average annual rate of 3.0%. Lastly, the number of active general aviation pilots, excluding Air Transport Pilots (ATP), is projected to decrease by 0.1% annually by 2037, with ATP category increasing by 0.5% annually.¹¹

2.6 FAA Terminal Area Forecast

Annually, the FAA publishes the *FAA Terminal Aerospace Forecasts* (TAF). The TAF includes past data as well as forecasts of based aircraft and operations for all airports in the National Plan of Integrated Airport System (NPIAS). The FAA normally uses a conservative approach when forecasting general aviation airports similar to MWM, especially when no site-specific data is available. Table 2-5 shows the TAF's forecasted number of based aircraft and aircraft operations

¹¹ FAA Aerospace Forecasts Fiscal Year 2017-2037.
https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2017-37_FAA_Aerospace_Forecast.pdf

for MWM. The FAA forecasts no growth in the number of based aircraft or for aircraft operations for MWM with the 20-year planning period (2018-2038).

Table 2-5 – FAA TAF for MWM

	2018	2023	2028	2033	2038
Airport Operations					
<i>Itinerant Operations</i>					
Air Taxi & Commuter	300	300	300	300	300
GA	4,000	4,000	4,000	4,000	4,000
Military	0	0	0	0	0
Total Itinerant	4,300	4,300	4,300	4,300	4,300
<i>Local Operations</i>					
GA	4,000	4,000	4,000	4,000	4,000
Military	0	0	0	0	0
Total Local	4,000	4,000	4,000	4,000	4,000
TOTAL Operations	8,300	8,300	8,300	8,300	8,300
Based Aircraft					
TOTAL Based Aircraft	16	16	16	16	16

Source: FAA Terminal Area Forecast (TAF) for Windom Municipal Airport.

2.7 Minnesota State Aviation System Plan (SASP)

The 2012 Minnesota State Aviation System Plan (SASP), adopted in 2013, provides a description and assessment of the performance of the current Minnesota State Aviation System, which consists of 135 state funded airports, as well as guidance for the future development of aviation in Minnesota. As part of the SASP, aviation activity forecasts prepared for MWM estimates that from 2010 to 2030 aircraft operations will grow at a CAGR of 1.56%, and based aircraft will grow by 0.86% annually as shown in **Table 2-6**.

Table 2-6 – MN SASP Forecast for MWM

	2010	2015	2020	2030
Operations				
Local	4,150	4,481	4,619	5,655
Itinerant	4,150	4,481	4,619	5,655
Total Operations	8,300	8,962	9,238	11,310
Based Aircraft				
Single-Engine	15	17	17	18
Multi-Engine	1	1	1	1
Other	-	-	-	-
Total Based Aircraft	16	18	18	19

Source: 2012 MnDOT SASP for Windom Municipal Airport.

2.8 Forecasting Methodologies

Three different methodologies were used when developing forecasts: regression analysis, FAA's forecasted CAGR (0.0%) for MWM, and the Minnesota SASP's general aviation forecasted growth rates. Short-term (5 year), mid-term (10 year), and long-term (20 year) forecasts were developed with each methodology used. The different methodologies are described below.

It is anticipated the Airport can expand its facilities as needed to meet demand. As a result, all forecasting scenarios used are unconstrained forecasting. Meaning the forecasts assume that all airport facilities will be in place to meet demand as the demand warrants. For example, enough hangar space is provided at the Airport to meet based aircraft demand.

2.8.1 Regression Analysis

Regression analysis is a statistical technique that ties aviation activity (dependent variable) to socioeconomic metrics (independent variables), such as income and population. The independent variable in essence “explains” the projected aviation activity levels. Regression analyses should use simple models utilizing independent variables for which reliable forecasts are available. For these aviation activity models, the regression analyses used socioeconomic data collected from Woods & Poole. This analysis used forecasted growth rates for Cottonwood County’s population, employment, total earnings, personal income, and retail sales to reflect the activity that occurs at MWM, which are shown in **Table 2-7**.

Table 2-7 – Woods & Poole CAGR Forecasted Demographic and Economic

	Cottonwood County Combined				
	Population	Employment	Total Earnings	Income	Retail Sales
20-Year CAGR	-0.1933%	0.5240%	1.2011%	1.2443%	0.3992%

Source: Woods & Poole Economics 2017; SEH, Inc.

2.8.2 FAA TAF

This forecast analysis applies the FAA’s TAF for MWM forecasted annual growth rate of 0.0% to aircraft operations and 0% to based aircraft using the baselines established as discussed in **Section 2.5**.

2.8.3 Minnesota SASP Forecasts

This forecast analysis applies the Minnesota SASP’s general aviation forecasted growth rates to the estimated aircraft operations and based aircraft baselines. As discussed in **Section 2.7**, the Minnesota SASP estimates a CAGR of 1.56% for aircraft operations and 0.86% for based aircraft for general aviation airports in the State of Minnesota.

2.9 Based Aircraft Forecast

The based aircraft forecast is used to determine aircraft storage needs, hangars and apron space, using the baseline of 17 “Validated Aircraft” (15 single-engine, one multi-engine, and one jet aircraft) from the FAA’s National Based Aircraft Inventory¹². **Table 2-8** shows the forecasts prepared for this analysis. The forecasts take into account the three interested parties with four aircraft on the hangar waiting list to be accommodated by 2023.

¹² BasedAircraft.com, December 21, 2017.

The forecasting scenarios range from 20 to 26 based aircraft within the 20-year planning period. This represents a range in CAGR of 0.0% to 1.56%. These forecasts represent the most realistic upper and lower limits of what may occur at MWM within the planning period. Since the forecasts already take into account the four aircraft ready to base at MWM, the medium based aircraft forecast (employment regression analysis), with 23 based aircraft and a CAGR of 0.52% in 20-year forecast, will be used for planning purposes as it is a conservative estimation and best reflects hangar demand. It is assumed that once hangar sites and once a potential T-hangar are constructed at MWM, there will be demand and space to accommodate the additional based aircraft included in the selected growth rate.

Table 2-8 – Based Aircraft Forecasts

Year	Regression Analysis					SASP Growth	FAA TAF Growth
	Population	Employment (Selected Forecast)	Earnings	Income	Retail Sales		
2018	17	17	17	17	17	17	17
2023*	21	21	22	22	21	22	21
2028	21	22	24	24	22	22	21
2033	21	23	25	25	22	23	21
2038	20	23	26	26	23	24	21
CAGR**	-0.19%	0.52%	1.20%	1.24%	0.40%	0.86%	0.00%

Source: SEH

*Four aircraft were added in 2023 to the forecast scenarios to account for four aircraft on the waiting list and the earliest hangar construction could occur.

**CAGR accounts for the growth rates applied to each forecasting scenario, does not account for the “added” aircraft in 2023 as a result of the hangar waiting list.

2.9.2 Based Aircraft Breakout

Table 2-9 shows the aircraft distribution for the planning period (2018-2038). Currently there are 14 single-engine, one multi-engine, one turboprop (PC-12), and one jet (C510) aircraft based at MWM¹³. It is anticipated that total based aircraft will grow at the rate of 0.52% (employment regression analysis), as previously discussed. The FAA national growth rate for each aircraft type (as discussed in **Section 2.5**) was used for forecasting the composition of the total based aircraft. The total based aircraft are expected to grow to a total of 18 single-engine aircraft, three multi-engine, one turboprop, and one jet aircraft based at MWM by 2038.

¹³ BasedAircraft.com, December 21, 2017.

Table 2-9 – MWM Based Aircraft Forecast Summary

Based Aircraft	2018	2023	2028	2038
Single-Engine	14	17	17	18
Multi-Engine	1	2	3	3
Turbo Prop	1	1	1	1
Jet	1	1	1	1
Other	0	0	0	0
Total	17	21	22	23

Source: SEH

2.10 Aircraft Operations Forecast

As discussed in **Section 2.6**, 9,288 operations was used as the 2017 baseline for forecasting. Table 2-10 shows the operations forecasts prepared for this analysis. The forecasting scenarios, described in **Section 2.8**, range from 9,288 to 12,106 total operations in the 20-year planning period, with a CAGR range of -0.19% to 1.56%.

Table 2-10 – Aircraft Operations Forecast Scenarios

Year	Regression Analysis					SASP Growth	FAA TAF Growth
	Population	Employment (Selected Forecast)	Earnings	Income	Retail Sales		
2018	9,281	9,383	9,447	9,453	9,356	9,433	9,288
2023	9,236	9,771	10,175	10,279	9,626	10,191	9,288
2028	9,173	10,066	10,840	11,043	9,828	11,011	9,288
2033	9,075	10,276	11,444	11,631	9,987	11,897	9,288
2038	8,929	10,417	11,996	12,106	10,131	12,854	9,288
CAGR	-0.19%	0.52%	1.20%	1.24%	0.40%	1.56%	0.00%

Source: SEH

These forecasts represent the most probable upper and lower limits of what may realistically occur at MWM within the planning period based on available information from the Airport (**Section 1.4.3**), Woods & Poole (**Section 2.3**), FAA (**Sections 2.6** and **2.8.2**), and MN SASP (**Section 2.8.3**). The medium operations forecast (Employment regression analysis), with a CAGR of 0.52% and 10,417 operations in the final forecast year (2038), will be used going forward because it is a conservative estimation of the total operations forecast. The employment regression analysis is the most realistic forecast given the limited information available for MWM's activity, and represents the most plausible expectation of future activity at the Airport.

2.10.2 Local and Itinerant Operations Forecast

Local operations are operations to and from an airport that operates in the local traffic patterns or within sight of an airport. Itinerant operations, also known as transient operations, are take-offs and landings from aircraft traveling to or from other airports. The SASP and Form 5010 indicates that 50% of MWM's operation are local and 50% are itinerant. The Airport Management concurs with the SASP's local versus itinerant operations ratio of 50%/50%. A ratio of 50% local and 50% itinerant traffic was used for this forecast, as shown in Table 2-11.

Table 2-11 – Forecasted Local and Itinerant Operations Forecast

Year	Itinerant	Local	Total
2018	4,692	4,691	9,383
2023	4,886	4,885	9,771
2028	5,033	5,033	10,066
2038	5,209	5,208	10,417

Source: SEH; MN SASP

2.10.3 Aircraft Seasonal Use Determination

A seasonal fluctuation in aircraft operations is expected at any airport. This fluctuation is most pronounced in regions where severe winter weather patterns exist in combination with non-towered air traffic control. Table 2-12 compares seasonal use trends for airports similar MWM (SEH Planning Studies) with IFR Flight Plans filed from 2012 to 2017. Since the IFR Flight Plans filed do not include General Aviation activity, and, as a result, do not completely reflect the activity level at MWM, the average of the SEH Planning Studies and IFR Flight Plans use percentages will be used for forecasting purposes as it better reflects the actual seasonal trends at the Airport.

Table 2-12 – Seasonal Use – Percent Usage

Month	SEH Planning Studies	Flight Plans Filed	User Survey Estimates	Average
January	3.50%	6.24%	2.69%	4.14%
February	4.00%	6.85%	2.94%	4.60%
March	4.80%	6.85%	3.34%	5.00%
April	7.50%	6.24%	4.69%	6.14%
May	11.30%	7.91%	6.59%	8.60%
June	13.50%	9.89%	15.44%	12.94%
July	14.80%	10.88%	16.09%	13.92%
August	13.00%	10.81%	15.19%	13.00%
September	10.00%	12.18%	13.69%	11.96%
October	8.00%	6.70%	12.69%	9.13%
November	5.80%	8.75%	3.84%	6.13%
December	3.80%	6.70%	2.84%	4.44%

Source: SEH Planning Studies; User Surveys; FAA Traffic Flow Management System Counts (TFMSC) 2012-2017.

2.11 Determination of Critical Aircraft

The FAA classifies airports by the type of aircraft traffic they experience, this classification is known as the Runway Design Code (RDC). This classification is based on two components: approach speed and wingspan or tail height of the aircraft. The Aircraft Approach Category, approach speed, is an alphabetical classification, denoted with letters A through E (A being the slowest and E being the fastest). While the Airport Design Group (ADG), wingspan or tail height, is a numerical classification, denoted with roman numerals I through VI (I being the smallest and VI being the largest). The RDC classification of a specific airport and its facilities are based on the RDC of its Critical Aircraft. Critical Aircraft is defined as the most demanding airplane, or

family of airplanes, that have a minimum of 500 annual operations currently using or forecasted to use the airport. Existing aviation activity at MWM and airport sponsor input was used to determine the distribution of RDC aircraft type.

Since there is no Air Traffic Control Tower (ATCT) at MWM, the exact breakout of operations conducted by each RDC is not known. **Table 2-13** shows the average annual fleet mix from the data gathered from IFR Flight Plans filed from 2012 to 2017.

Table 2-13 – IFR Flight Plan Fleet Mix

RDC	Flight Plans Filed						Average Annual Fleet Mix
	2012	2013	2014	2015	2016	2017	
A-I	144	70	60	94	126	103	45.12%
B-I	18	64	26	70	42	68	21.77%
B-II	46	86	80	72	18	88	29.48%
>B-II	0	0	0	0	0	0	0.00%
Helicopter	8	2	4	10	4	6	2.57%
Unknown	4	0	2	0	0	8	1.06%
Total	220	222	172	246	190	273	100.00%

Source: FAA TFMSC 2012-2017; SEH, Inc.

Table 2-14 further documents the “larger” aircraft that operate at MWM in 2015, 2016, and 2017. It is important to note that Mainstream Holdings (a.k.a. AntAir LLC) replaced their King 200 with a Citation Mustang (C510) in 2016. Since the acquisition of the C510, the existing runway length at is inadequate to safely accommodate the C510 and, as a result, Mainstream Holdings had to base the aircraft at Worthington Municipal Airport (OTG). Additionally, Fredin Bros acquired a Pilatus PC-12 in 2016, which is currently housed in the large box hangar located adjacent to the A/D Building.

Table 2-14 – MWM IFR Flight Plans Filed – Larger Aircraft

Aircraft	RDC	Flight Plans Filed		
		2015	2016	2017
Citation Mustang (C510)	B-I	18	4	2
Citation Jet/CJ1 (C525)	B-I	0	0	2
Piper Navajo PA-31	B-I	2	4	22
Socata TBM-7	B-I	0	0	4
Socata TBM-9	B-I	0	0	2
King Air 90	B-I	2	0	6
King Air 200	B-II	68	16	24
Super King Air 300	B-II	0	0	0
Super King Air 350	B-II	0	0	2
Citation I/SP	B-II	2	0	0
Pilatus PC-12	B-II	0	2	56

Source: FAA TFMSC 2012-2017; SEH, Inc.

It is important to note that B-II or larger aircraft tend to file IFR Flight Plans more often than A/B-I type aircraft. This is because these larger aircraft are more often used in business/corporate purposes, whereas A/B-I aircraft are used more often for recreational purposes. Based on the

IFR Flight Plan data and discussions with Airport Management, the estimated operations at MWM are approximately 18.0% A-I/A-II traffic, 74.0% B-I traffic, 6.9% B-II traffic 0.1% for larger than B-II, and 1.0% helicopter traffic. These are reflective of the historical IFR Flight Plans filed at MWM, the large number of agricultural spray operations that occur in the summer months at MWM (A-I and B-I aircraft), as well as the B-II (PC-12) aircraft based at MWM. Using this information, the estimated operations forecast by RDC type is shown in **Table 2-15**.

Table 2-15 – RDC Forecast (Operations per Year)

RDC (Fleet Mix)	2018	2023	2028	2033	2038
A-I (18.0%)	1,501	1,563	1,710	1,644	1,667
B-I (74.0%)	7,131	7,426	7,550	7,810	7,917
Subtotal	8,632	8,989	9,260	9,454	9,584
B-II (6.9%)	648	674	695	709	719
>B-II (0.1%)	9	10	10	10	10
Subtotal	657	684	705	719	729
Helicopter (1.0%)	94	98	101	103	93
Total Operations	9,383	9,771	10,066	10,276	10,417

Source: SEH; FAA TFMSC, Airport Management

The current and forecasted future critical aircraft using MWM is a B-II Small single-engine aircraft, as shown in **Table 2-15**. This aircraft can be described as having a wingspan up to but not including 49 feet and an approach speed of 91 knots but not more than 121 knots, and a wingspan greater than 49 feet up to 79 feet. This with, the Critical Aircraft for MWM is a Pilatus PC-12.

2.12 Factors that May Create Changes in the Forecast

Aviation forecasts attempt to predict the future based on known conditions. Nevertheless, numerous factors, on a local and national scale, can greatly affect the future activity at any airport. The survey data collected was used to develop realistic first year estimates; however these estimates do not account for those who did not respond to the surveys. Several circumstances could measurably alter the number of forecasted based aircraft, as well as levels and types of aviation activity at the MWM. Some examples are:

- Flight training
- Maintenance and repair facilities
- Pricing of fuel
- Charter operations

2.13 Comparison to Existing FAA TAF

The FAA requires that study-related forecasts be consistent with the TAF or include sufficient documentation to explain the difference. Table 2-15 summarizes the forecast comparison to the TAF as recommended in Appendix C of the FAA document, *Forecasting Aviation Activity by Airport*. A forecast is considered to be consistent with the FAA TAF if it:

- Differs by less than 10% in the 5-year forecast and 15% in the 10-year forecast, or
- Does not affect the timing or scale of an airport project, or

- Does not affect the role of the Airport as defined in the current version of FAA Order 5090.3, Field Formulation of the National Plan of Integrated Airport Systems (see **Section 1.6.1**)

Table 2-16 – FAA Template for Comparing Airport Planning and TAF Forecasts

AIRPORT NAME: Windom Municipal Airport				
	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Total Operations				
Base yr.	2018	9,383	8,300	13.05%
Base yr. + 5yrs.	2023	9,771	8,300	17.72%
Base yr. + 10yrs.	2028	10,066	8,300	21.28%
Base yr. + 15yrs.	2033	10,276	8,300	23.81%
Base yr. + 20yrs.	2038	10,417	8,300	25.51%
Based Aircraft				
Base yr.	2018	17	16	6.25%
Base yr. + 5yrs.	2023	21	16	31.25%
Base yr. + 10yrs.	2028	22	16	37.50%
Base yr. + 15yrs.	2033	23	16	43.75%
Base yr. + 20yrs.	2038	23	16	43.75%

Source: FAA; SEH; Airport Management

2.13.2 Based Aircraft Forecast

The FAA forecasts show no growth for based aircraft for MWM, with a based aircraft forecast of 16 for the 20-year planning period (CAGR of 0.0%); whereas the chosen based aircraft forecast shows 23 based aircraft in 2038 with CAGR of 0.56%. The chosen based aircraft forecast differs from the TAF's 5-year forecast by 31.25%, the 10-year forecast by 37.50%, and the 20-year forecast by 43.75%, as shown in **Table 2-16**. The primary difference is due to the FAA TAF showing no growth for 20-year planning period. The based aircraft forecast does not affect the timing or scale of an airport project and does not affect the role of the Airport as defined in FAA Order 5090.3, and therefore is considered consistent with the FAA TAF.

2.13.3 Aircraft Operations Forecast

The FAA forecasts show no growth in aircraft operations for MWM, with an operations forecast of 8,300 for the 20-year planning period (CAGR of 0.0%). The selected aircraft operations forecast projects 10,417 aircraft operations at the end of the planning period, with a CAGR of 0.52%. The preferred operations forecast differs from the TAF's 5-year forecast by 13.05%, the 10-year forecast by 21.28%, and the 20-year forecast by 25.51%, as shown in **Table 2-16**. Again, this difference is primarily due to the FAA TAF forecasting no growth in operations at MWM. The operations forecast is consistent with the FAA TAF as it does not affect the timing or scale of an airport project and does not affect the role of the Airport as defined in FAA Order 5090.

2.14 Summary of Chosen Forecasts

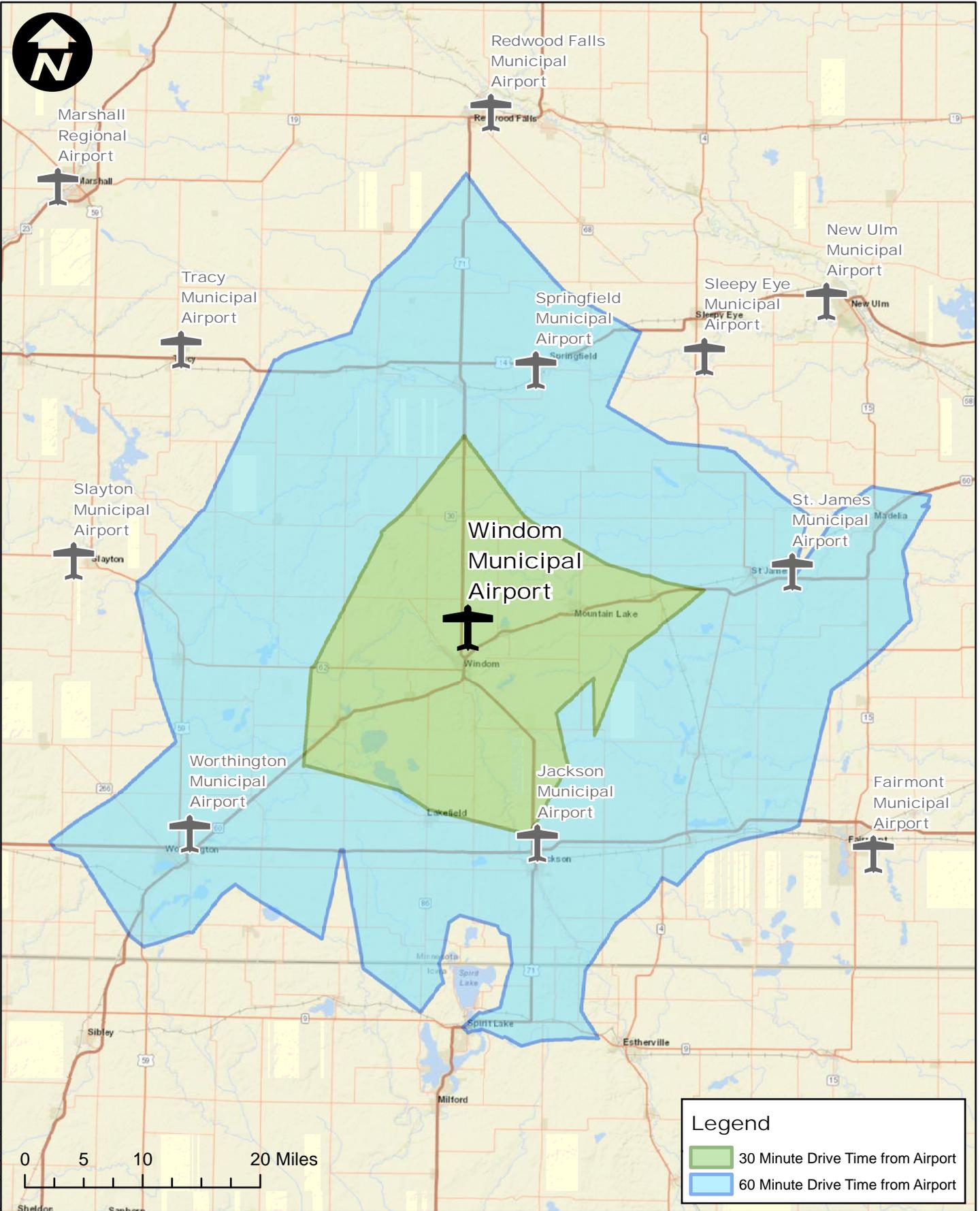
Appendix B of the FAA document, *Forecasting Aviation Activity by Airport*, recommends formatting the preferred forecast data into a particular tabular format for ease of readability. This format is shown in **Table 2-17**

Table 2-17 – Summarizing and Documenting Airport Planning Forecasts

Airport Name:		Windom Municipal Airport		Specify base year: 2017					
	<u>Base Yr. Level</u>	<u>Base Yr. to Yr.+1Yr.</u>	<u>Base Yr. to Yr.+5Yrs.</u>	<u>Base Yr. to Yr.+10Yrs.</u>	<u>Base Yr. to Yr.+20Yrs.</u>	<u>Base Yr. to +1</u>	<u>Base Yr. to +5</u>	<u>Base Yr. to +10</u>	<u>Base Yr. to +20</u>
Operations									
<u>Itinerant</u>									
Commuter/air taxi	0	0	0	0	0	N/A	N/A	N/A	N/A
General aviation	4,644	4,692	4,886	5,033	5,209	1.0%	1.0%	0.8%	0.8%
Military	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
<u>Local</u>									
General aviation	4,644	4,691	4,885	5,033	5,208	1.0%	1.0%	0.8%	0.8%
Military	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	9,288	9,383	9,771	10,066	10,417	1.0%	1.0%	0.8%	0.8%
Instrument Operations	650	657	684	705	719	1.0%	1.0%	0.8%	0.7%
Peak Hour Operations Based Aircraft	4.8	4.9	5.1	5.3	5.4	2.1%	1.2%	1.0%	0.8%
<u>Single Engine (Nonjet)</u>									
Single Engine (Nonjet)	15	15	18	18	19	0.0%	3.7%	1.8%	1.6%
<u>Multi Engine (Nonjet)</u>									
Multi Engine (Nonjet)	1	1	2	3	3	0.0%	14.9%	11.6%	7.6%
<u>Jet Engine</u>									
Jet Engine	1	1	1	1	1	0.0%	0.0%	0.0%	0.0%
<u>Helicopter</u>									
Helicopter	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
<u>Other</u>									
Other	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL BASED AIRCRAFT	17	17	21	22	23	0.0%	4.3%	2.6%	2.0%

B. Operational Factors

	<u>Base Yr. Level</u>	<u>Base Yr. to Yr.+1Yr.</u>	<u>Base Yr. to Yr.+5Yrs.</u>	<u>Base Yr. to Yr.+10Yrs.</u>	<u>Base Yr. to Yr.+15Yrs.</u>
GA operations per based aircraft	273	276	233	229	226



Legend

- 30 Minute Drive Time from Airport
- 60 Minute Drive Time from Airport



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Project: WINDM 138969
 Print Date: 12/20/2017
 Map by: BLM
 Projection: NSRS.07_MN-SF
 Source: Mn/DOT, ESRI, SEH

Drive Time
Windom Municipal Airport
 Windom, Minnesota

Figure
2-1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

3 Demand Capacity Analysis

3.1 Estimated Hourly Demand

In order to arrive at a reasonable estimate of the actual demand on the Airport facilities, it is necessary to develop a method to calculate the estimated Maximum Peak Hourly Demand that might be expected to occur.

Using the information calculated in **Chapter 2**, a formula was derived which calculates the average daily operations (D) in a given month. The formula is as follows:

$$D = \text{Average Daily Operations in a given month (M/30)}$$

Where M = Monthly operations (A*T)

A = Total annual operations

T = Monthly percent of use (as discussed in Table 2-11)

On average, 90 percent of total daily operations occur between the hours of 7:00 AM and 7:00 PM, and the Maximum Peak Hour activity may be 50% greater than the average hourly operations calculated for this time period. These usage patterns are typical for airports with characteristics similar to MWM.

The Estimated Peak Hourly Demand (P) in a given month was determined by compressing 90 percent of the Average Daily Operations (D) into the 12-hour peak use period. This is demonstrated as follows:

$$P = 1.5(0.90D/12)$$

Where P = Estimated Peak Hourly Demand in a given month

D = Average Daily Operations in a given month

The calculations were made for each month for 2018 and 2038 operations levels. The totals for these annual operations are listed in **Chapters 2** of this report. The total aircraft operations for 2018 are 9,383 and 10,417 for 2038.

Table 3-1 – Total Estimated Hourly Demand/Month

Month	"T" % Use	2018 "A" = 9,383			2038 "A" = 10,417		
		"M"	"D"	"P"	"M"	"D"	"P"
January	4.1%	389	13	1.5	432	14	1.6
February	4.6%	431	14	1.6	479	16	1.8
March	5.0%	469	16	1.8	520	17	2.0
April	6.1%	576	19	2.2	640	21	2.4
May	8.6%	807	27	3.0	896	30	3.4
June	12.9%	1,215	40	4.6	1,348	45	5.1
July	13.9%	1,307	44	4.9	1,450	48	5.4
August	13.0%	1,220	41	4.6	1,354	45	5.1
September	12.0%	1,122	37	4.2	1,245	42	4.7
October	9.1%	857	29	3.2	951	32	3.6
November	6.1%	575	19	2.2	639	21	2.4
December	4.4%	417	14	1.6	463	15	1.7

Source: SEH

As depicted in Table 3-1, the Maximum Peak Hourly Demand for operations at the MWM occurs in the month of July, with 4.9 operations in 2018 and 5.4 operations in 2038.

3.2 Theoretical Hourly Capacity

The methodology for computing the relationship between an airport's demand versus its capacity is discussed in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*. The method included in AC 150/5060-5 is derived from computer models used by the FAA to analyze airport capacity and reduce delay at larger air carrier facilities.

Moreover, in order to facilitate a comparison, computations were made to approximate the hourly capacity of the Airport in Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions. The determinations were made using the assumption recommended in AC 150/5060-5 for the particular airport layout and conditions combined with the forecast operational data generated with this study. For the theoretical airport hourly capacity, it was assumed that less than 2% of the aircraft using MWM have a maximum gross takeoff weight of 12,500 pounds or more, and the peak hour movement consists of 50 percent arrivals and 50 percent departures.

The result of this analysis indicates that, with the one runway configuration, MWM has an airfield theoretical hourly capacity of 98 aircraft in VFR conditions and 59 aircraft in IFR conditions.

3.3 Annual Service Volume

The Annual Service Volume (ASV) is a calculated estimate of an airport's annual capacity in aircraft operations. FAA AC 150/5060-5, *Airport Capacity and Delay* specifies the method used to calculate ASV, and considers the difference in runway use, aircraft mix, and weather conditions, as well as other factors that be encountered over a year's time.

For this analysis, based on the weather data collected from MWM's AWOS (see **Section 1.9.7**), it was assumed that weather conditions dictate IFR about 9% of the time, and that the Airport is not usable (weather conditions below published minimums) less than 2% of the time. Based upon the assumptions stated above, MWM's ASV is approximately 230,000 annual operations.

3.4 Summary of Airside Demand/Capacity Relationship

The comparison of an airport's demand versus its capacity is critical in determining the need and timing of capacity related improvements. A summary of the airport's demand/capacity relationship is presented in **Table 3-2**.

Table 3-2 – Summary of Demand/Capacity Relationship

	2018	2038
Annual Peak Operations	9,383/230,000 = 4.51%	10,417/230,000 = 4.53%
Peak Hour VFR	4.9/98 = 5.0%	5.4/98 = 5.51%
Peak Hour IFR	4.9/59 = 8.31%	5.4/59 = 9.15%

Source: SEH

By comparing the relationship between the airport's theoretical demand and its capacity, the hourly and annual capacities of the runway system at MWM far exceed the operations forecasted for the entire 20 year planning horizon. No airfield improvements are warranted on the basis of capacity.

4 Facility Recommendations

This section identifies airfield (airside) and building area (landside) facilities needed to satisfy the 20-year forecast of aviation demand at Windom Municipal Airport (MWM). Airport facilities are developed in accordance with FAA airport design standards and airspace criteria. The following is an outline of facilities documented in this section:

- Runway Design Code
- Runway Length & Width Design Standards
- Instrument Approach Requirements
- Taxiway System
- Airport Visual Aids, Communications, and Weather Reporting
- Building Area Facilities

The basic intention of this study is to develop realistic recommendations for the planning period. The planning period of this study covers calendar years 2018 through 2038. Whether the recommendations for the future development will actually be implemented depends on the actual demand, ability of the Airport to accommodate the development, environmental impacts, and available resources of the local, state, and federal decision-makers to meet that demand. Of significant importance is that this Master Plan considers a future design that represents an aggressive approach to the planning process, addressing the most demanding contingencies that may present themselves during the planning period.

Due to the rapid changes occurring in general aviation industries as well as increased frequency of regulatory changes within the FAA, it is equally important that an ongoing process of evaluation for existing conditions and near-term trends be implemented to assure the validity of the contents and recommendations of this master plan.

4.1 Minnesota State Aviation System Plan (SASP) Recommendations

As previously discussed in **Section 1.6.2**, the 2012 Update to the *Minnesota State Aviation System Plan* (SASP) classifies MWM as an Intermediate Airport. **Table 4-1** includes the minimum objectives for an Intermediate Airport and any recommended improvements for MWM. Any recommendations from the SASP will be discussed further in the sections that follow.

Table 4-1 – MnDOT SASP Intermediate Airport Objectives

Facility	MWM Facilities	Minimum Objectives	Recommend
Runway Length (Primary)	3,599 feet	2,400 feet	No Change
Runway Width (Primary)	75 feet	75 feet	No Change
Taxiway Type	Turnaround	Turnaround	No Change
Primary Runway Approach	Enhanced NPI w/ Vertical	Enhanced NPI w/ Vertical	No Change
Runway Lighting	MIRLs	MIRLs or LIRLs	No Change
Visual Aids and Approach Light Configuration	Wind Cone, Rotating Beacon, REILs	Lighted Wind Cone, Rotating Beacon, PAPIs & REILs	PAPIs Install
Approach Lighting	None	None	No Change
Weather Reporting	AWOS	As Needed	No Change
Fuel	100LL & Jet A	24/7 100LL Desirable	No Change
T-Hangar (Units)	16	100% of Jets & Turboprops; 95% of Single & Multi Engine	Construct
Conventional Hangars	1		
Transient Aircraft Apron (SY)	10,500	Unhangared Based Aircraft & Peak Hour Itinerant Operations	Construct
Based Aircraft Apron (SY)	1,170		
Based Tiedowns (Ea.)	3		
Public Facility	GA/Administration Building	GA/Administration Building	No Change
Automobile Parking	13	1 Stall per Based Aircraft Plus 25%	Construct
Perimeter Fencing	None	Full Desirable	Install

Source: Minnesota State Aviation System Plan, 2012

4.2 Airside Facility Recommendations

4.2.1 Runway Design Code (RDC)

As discussed in **Section 1.8** and **Section 2.11**, the FAA classifies airports and each runway facility by the Runway Design Code (RDC) of its Critical Aircraft. The Critical Aircraft for MWM has been identified in **Chapter 2** as RDC B-II Small, a Pilatus PC-12 for the current and the ultimate (20-year) forecast. All facility recommendations going forward for Runway 17/35 are designed to accommodate RDC B-II standards for small aircraft weighing less than 12,500 pounds.

4.2.2 Runway 17/35 Designations

Aircraft compasses and runway identifiers utilize magnetic north for directional guidance. For this reason, it is important to evaluate an airport's runway number designations every few years to ensure that the numbers painted on the runway truly represent the magnetic heading of the runway. The magnetic forces across the planet are constantly shifting, and therefore a declination must be applied to a compass to arrive at a true north heading. The current declination is used for the runway designation calculations. According to the National Geophysical Data Center, as

of December 20, 2017, the current declination for Windom is 1°47' east and is changing by 0°5' west per year¹⁴.

The current true bearing for Runway 17/35 is North 180°21'36.00" West. Applying the declination of 1°47' east to the true bearing results in a magnetic heading of 178°34'36" for Runway 17 and 358°34'36" for Runway 35. This means that the current runway designations of 17 and 35 are incorrect, and the runway designations should to be updated to Runway 18 and Runway 36 to reflect the current magnetic headings of the runways. ***It is recommended that Runway 17/35 be updated to Runway 18/36 as well as all corresponding airport markings, signage, and documentation.*** For consistency purposes the runway will continue to be referred to as Runway 17/35 through the remainder of the Master Plan.

FAA Flight Standards will determine the appropriate time to make this change (i.e. update instrument approach procedures, airport facility directory, etc.), and will coordinate the timing of this change with the Airport to update pavement markings and signage.

4.2.3 Runway Pavement

4.2.3.1 Runway Pavement Strength

Runway 17/35 has a weight bearing capacity of 15,000 pounds for Single Wheel Gear (SWG) equipped aircraft and 20,000 pounds for Dual Wheel Gear (DWG) equipped aircraft. MWM is designed to accommodate RDC B-II standards for small aircraft weighing no more than 12,500 pounds. ***Therefore, Runway 17/35's pavement strength meets the needs of the Critical Aircraft, no additional strengthening is recommended.***

However, MWM's Critical Aircraft of a Pilatus PC-12 is a SWG aircraft with a maximum takeoff weight of 10,500 pounds. ***With this, it is recommended that the published pavement strength for Runway 17/35 be updated to 12,500 SWG.*** Since the actual pavement strength is greater than what is published, the Airport Layout Plan will document the actual and published pavement strengths.

4.2.3.2 Runway Pavement Condition

The most current pavement ratings were taken from the 2015 MnDOT Airport Pavement Management Study (see **Figure 1-5**). The 2015 study found that Runway 17/35's pavement was in "Excellent" condition, with a 97 PCI. ***Routine maintenance, such as joint and cracking sealing, and slurry seal, should be performed on a scheduled basis to extend the life of the pavement. No other surface improvements to the Runway 17/35 are recommended.***

¹⁴ <http://www.ngdc.noaa.gov/geomag-web/#declination>

4.2.4 Runway Length

The purpose of the runway length analysis is to determine if the length of the existing runway is adequate for existing and projected aircraft fleet operations at MWM. Runway length is dependent on many factors including: airport elevation, temperature, wind velocity and direction, ambient air temperature, aircraft weight, flap settings, length of haul, runway surface (wet or dry), runway gradient, presence of obstructions, and any imposed noise abatement procedures or other prohibitions. While the FAA does not have standards for runway lengths, FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance to determine the recommended runway length for an airport based on the above factors.

The process to determine recommended runway length begins by determining the landing weight of the Critical Aircraft and the aircraft anticipated to regularly use the Airport within the planning period. For aircraft weighing 60,000 pounds or less, the runway length is determined by family groupings of aircraft having similar performance characteristics (i.e. small and large airplanes). Small airplanes are defined by the FAA as airplanes weighing 12,500 pounds or less at Maximum Takeoff Weight (MTOW), while large airplanes in this context exceed 12,500 but weigh less than 60,000 pounds. For aircraft weighing more than 60,000 pounds, the required runway length is determined by aircraft specific length requirements.

Table 4-2 shows the FAA recommended runway lengths for MWM computed using the guidance provided in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. The runway lengths in AC 150/5325-4B are calculated based on the anticipated types of aircraft using the facility, the Airport elevation, and site meteorological conditions, such as the mean maximum temperature of the hottest month during the hottest month of the year. According to National Oceanic and Atmospheric Administration (NOAA), the mean daily maximum temperature for the City of Windom, Minnesota is 85.3°F and occurs in July (see **Section 1.9.7.1**). The Airport has an elevation of 1,410.8 feet above mean sea level. The existing and anticipated Critical Aircraft for MWM a Pilatus PC-12, a RDC B-II Small aircraft, which is a small airplane weighing less than 12,500 pounds.

Table 4-2 – FAA Recommended Runway Lengths for Airport Design

Aircraft Type	Runway Length
Small Airplanes with Approach Speeds <30 knots	342'
Small Airplanes with Approach Speeds ≤50 knots	913'
Small Airplanes with Approach Speeds >50 knots	
Small Airplanes with <10 Passenger Seats	
95% of these Small Airplanes	3,500'
100% of these Small Airplanes	3,700'
Small Airplanes with ≥10 Passenger Seats	4,400'
Large Airplanes of 60,000lbs. or less	
75% of large airplane at 60% useful load	5,500'
75% of large airplane at 90% useful load	5,700'
100% of large airplane at 60% useful load	5,500'
100% of large airplane at 90% useful load	5,700'

Source: AC 150/5325-4B, *Runway Length Requirement for Airport Design*

MWM's Critical Aircraft places the Airport in the group of Small Airplanes with approach speeds greater than 50 knots. Within this grouping of aircraft, FAA recommends choosing a runway length to accommodate 95% or 100% of Small Airplanes based on the airport's location and the amount of existing or planned aviation activities. The "95% of Small Airplanes with less than 10 passenger seats" criterion applies to airports that are primarily intended to serve medium size population communities with a diversity of usage. It also applies to those airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas. The "100% of Small Airplanes with less than 10 passenger seats" criterion applies to an airport that is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area.

As small to medium size community, the City of Windom falls within the "95% of Small Airplanes with less than 10 passenger seats" category. Based on the FAA's runway length recommendation of 3,500 feet from criteria in AC 150/5325-4B, Runway 17/35's length of 3,599 feet is adequate to accommodate the aircraft fleet currently using and forecasted to use MWM, (see Section 2.11); **therefore, no runway extension is recommended in the near-term.**

The 2016 FAA Conditionally Approved ALP shows a future length of 4,400 feet to an ultimate length of 5,000 feet. While there is currently not enough demand forecasted in the 20-year planning period to justify construction of a runway extension at this time, the City would like to evaluate if it remains appropriate and feasible that an ultimate extension for Runway 17/35 be shown on the ALP. **As a result, as part of the alternative analysis in Chapter 5, the existing airport site will be examined to determine if an ultimate extension to Runway 17/35 is feasible.**

The Airport's existing zoning ordinance was originally adopted in 1979 and corresponds with 'future' design consisted of a length of 3,600 feet for Runway 17/35, and a length of 4,200 feet for future crosswind Runway 10/28. This 'future' runway plan is not consistent with what is currently shown on the 216 ALP. Existing and future runway end coordinates were not included in the 1979 Zoning Ordinance. **With this, it is important to note any change in the future plan of the Airport, MnDOT requires the Zoning Ordinance to be updated prior to any construction.**

Since Runway 17/35's extension would be shown as an ultimate condition, a Runway Protection Zone (RPZ) Analysis would not be required until such time as the project were being planned for construction.

4.2.4.2 Draft AC 150/5325-4C, Runway Length Recommendation for Airport Design

In July 2013, the FAA released Draft AC 150/5325-4C, *Runway Length Recommendations for Airport Design*. The updated Draft Runway Length AC, recommends using aircraft manufacturers' manuals to determine basic recommended runway length for large airplanes and light jets, instead of using the runway length curves as shown in AC 150/5325-4B. While the runway length curves for large airplanes do not apply to MWM because its critical aircraft is not a 'large aircraft', it is important to note that AC 150/5325-4C is currently available in draft form. The recommended runway length for small aircraft is the same in both the current and draft AC. The runway length recommendations made in this Master Plan are based on current guidance provided in AC 150/5325-4B.

4.2.5 Runway Width

Runway 17/35 is 75 feet wide, which meets RDC B-II Small standards visibility minimums not lower than 1 mile standard of 75 feet. **Runway 17/35's width meets the corresponding FAA standards; therefore, no change in runway width is required.**

4.2.6 Instrument Approach Procedures

Instrument approach procedures can be broken down into precision instrument or non-precision instrument approaches. Precision instrument approaches are those approaches that provide both vertical and horizontal guidance to the runway. An Instrument Landing System (ILS) is a common example of a precision approach. Most non-precision approaches have only directional guidance to the runway and can include any combination of the following types of approaches: localizer, RNAV/GPS (area navigation/global positioning system), RNAV/RNP (area navigation/required navigation), NDB (non-directional beacon), and VOR/TVOR (VHF Omni-directional range/terminal VHF Omni-directional range). A TACAN-A (tactical area navigation) is a circling approach with distance measuring (DME) information. The TACAN-A is used by military aircraft, although the DME information is available to civilian aircraft. The newest approach published at airports around the country is a Localizer Performance with Vertical Guidance (LPV) approach. An LPV approach is considered a non-precision approach yet it provides both horizontal and vertical guidance to pilots. Most LPV approaches require non-precision design standards at an airport.

As previously discussed in **Section 1.9.3** and shown in **Table 4-3**, MWM is currently served by two non-precision approaches via enroute area navigation (RNAV/GPS) to Runways 17 and 35, and a VOR approach to Runway 14. The existing approaches and their associated visibility and ceiling minimums at MWM are summarized in **Table 1-6**. Both Runway 17 and 35's RNAV(GPS) approaches have a LPV approach procedures. The existing approaches and their associated visibility and ceiling minimums at MWM are summarized in **Table 4-2**.

Table 4-3 – Instrument Approach Procedures

Runway	Approach	Visibility Minimums	Ceiling Minimums (Above Ground Level – AGL)
17	RNAV(GPS)	1 Mile	449' (500')
35	RNAV(GPS)	1 Mile	429' (500')

Note: All approaches have a circling option

Source: U.S. Terminal Procedures, December 7, 2017

The MnDOT SASP recommends that MWM, as an Intermediate Airport, have a non-precision approach with vertical guidance on at least one runway end, such as an LPV approach. MWM has two basic non-precision approaches providing vertical guidance to both runway ends. MWM meets the recommended SASP standards for instrument approaches. However, several based aircraft users, as well as Airport Management have indicated the need for improved approaches procedures at MWM, increasing from 1 mile visibility to greater than $\frac{3}{4}$ mile visibility. **Therefore it is recommended that the Airport plan future improved approaches from 1 mile to $\frac{7}{8}$ mile (greater than $\frac{3}{4}$ mile) for both Runway 17 and 35.** This can be accomplished by requesting improved instrument approach procedure (IAP) once the AGIS data is uploaded and verified on the FAA website (see **Section 4.4**). The existing obstructions data FAA Flight Procedures has on

file is old, but once the new AGIS data is verified, the Airport Sponsor can request improved instrument approach procedure (IAP) with FAA Flight Procedures. Please note, if approach procedures were increased to $\frac{3}{4}$ mile or less, the Approach Surfaces and Primary Surface would increase to a size that would require redesign of the existing apron (see **Section 4.4**), as well as relocation of several hangars. **As a result, improved approaches of $\frac{3}{4}$ mile or less are not recommended.** Additional analysis of the implications of improved approved are examined in **Chapter 5, Alternatives Analysis.**

4.2.7 Detailed Runway Design Standards

Runway design standards are based on the RDC of a runway. The existing and future RDC of Runway 17 and 35 is B-II Small not lower than 1 mile visibility. **Table 4-4** lists the separation standards, safety area, and design criteria that are applicable to Runway 17 and 35. This table represents the guidance outlined in AC 150/5300-13A, *Airport Design* and should be used in designing future improvements at the Airport. The runway design standard for MWM is also shown in **Figure 4-1**.

Runway Safety Area (RSA) - RSA is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the paved surface.

Runway Object Free Area (ROFA) – ROFA is an area on the ground that is centered on a runway and provides enhanced safety for aircraft operations by clearing the area of above-ground objects. Some objects are acceptable in the ROFA, including objects that need to be located in that area for air navigation or aircraft ground maneuvering purposes and must be frangible, or objects that are less than three inches tall.

Runway Obstacle Free Zone (ROFZ) - ROFZ is a volume of airspace intended to protect aircraft in the early and final stages of flight. It must remain clear of object penetrations, except for frangible NAVAIDs located in the ROFZ because of their function. The OFZ is comprised of, where applicable, the Precision OFZ (POFZ), the Inner-Approach OFZ, and the Inner Transitional OFZ.

Runway Protection Zone (RPZ) – The RPZ is a trapezoidal shaped area off of each runway end designed to enhance the safety and protection of people and property on the ground. It is desirable to clear the entire RPZ of all above-ground objects. Airport service roads that are directly controlled by the Airport operator are permissible within the RPZ; however, public roads are not. Additionally, in order to ensure that the RPZ is kept clear of incompatible uses, the FAA recommends that all land included in the RPZ should be controlled by the Airport sponsor, either by fee or easement. As shown in **Figure 4-1** not all of the land within Runway 17/35's RPZ is owned or controlled by the Airport. **It is recommended the Airport have plans to acquire all land, through easement or fee, within Runway 35's future not lower than $\frac{3}{4}$ mile RPZ.**

Building Restriction Line (BRL) - The BRLs are lines that run parallel to the runway and offset at a distance that ensures that new construction is below protected airspace, per 14 CFR Part 77 imaginary surfaces. The BRLs at MWM are calculated based on a 20-foot tall structure, and include the RPZs off the runway ends. **It is recommended that the Airport have plans to acquire all land, through easement or fee, within Runway 35's 20-foot BRL, as shown in Figure 4-1.**

Table 4-4 – Runway Design Standards

Runway Design Code (RDC)	Existing Runway 17/35	Future Runway 17/35
	B-II Small Not Lower than 1 Mile	B-II Small Not Lower than 3/4 Mile
Runway Design		
Runway Width	75 ft	75 ft
Shoulder Width	10 ft	10 ft
Blast Pad Width	95 ft	95 ft
Blast Pad Length	150 ft	150 ft
Runway Protection		
Runway Safety Area (RSA)		
Length Beyond Departure End ^{10,11}	300 ft	300 ft
Length Prior to Threshold	300 ft	300 ft
Width	150 ft	150 ft
Runway Object Free Area (ROFA)		
Length Beyond Runway End	300 ft	300 ft
Length Prior to Threshold	300 ft	300 ft
Width	500 ft	500 ft
Runway Obstacle Free Zone (ROFZ)		
Length Beyond Runway End	200 ft	200 ft
Length Prior to Threshold	200 ft	200 ft
Width	250 ft	250 ft
Approach Runway Protection Zone (RPZ)		
Length	1,000 ft	1,700 ft
Inner Width	250 ft	1,000 ft
Outer Width	450 ft	1,510 ft
Acres	8.035	48.978
Departure Runway Protection Zone (RPZ)		
Length	1,000 ft	1,000 ft
Inner Width	250 ft	500 ft
Outer Width	450 ft	700 ft
Acres	8.035	13.770
Runway Separation		
Runway Centerline to:		
Holding Position	125 ft	200 ft
Parallel Taxiway/lane Centerline ^{2,4}	240 ft	240 ft
Aircraft Parking Area	250 ft	250 ft

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

4.2.7.2 MnDOT Clear Zones

MnDOT Aeronautics requires airports to have adequate Clear Zones in place to restrict land uses that may be hazardous to the operational safety of aircraft and to protect life and property in the runway approach areas. To meet MnDOT Aeronautics' Clear Zone requirements, the recommended Clear Zones for existing runway conditions are shown in **Table 4-5**, and are shown in **Figure 4-1**. Not all of the land within Runway 17/35's MnDOT Clear Zones is owned or controlled by the Airport, as shown in **Figure 4-1**. **It is recommended the Airport have plans to acquire all land, through easement or fee, within the MnDOT Clear Zones.**

Table 4-5 – MnDOT Clear Zone Requirements

Runway	MnDOT Clear Zone	Inner Width	Length	Outer Width
Existing 17/35	Non-Precision Utility (≥1 mile)	500'	1,000'	800'
Future 17/35	Non-Precision Instrument Utility > 3/4-Mile	500'	1,700'	1,010'

Source: MnDOT Office of Aeronautics: Clear Zone Requirements

4.2.8 Runway Orientation / Wind Coverage

A runway's orientation is its alignment in relation to magnetic north. The primary factor when determining runway orientation is the direction of the prevailing winds. Each aircraft has an acceptable crosswind component for takeoff and landing. Generally, the smaller the aircraft, the more it is affected. Per the FAA AC 150/5300-13A, *Airport Design*, when the current runway system provides less than 95% wind coverage for any aircraft that use the Airport on a regular basis, a crosswind(s) runway should be considered. The 95% coverage is computed on the basis of the crosswind not exceeding **10.5 knots for RDC A-I and B-I; 13 knots for RDC A-II and B-II;** 16 knots for RDC A-III, B-III, and C-I through D-III; and 20 knots for RDC A-IV through D-VI. For MWM, the runway configuration need to accommodate at least B-II aircraft, having a crosswind component of 13 knots.

Wind data collected through the National Oceanic and Atmospheric Administration (NOAA) at the actual airport site is the best source of information. NOAA collects wind data at MWM. The FAA requires wind data analysis to be completed with at least 10 years of consecutive data from the airport site or the closest available site. Wind data analysis was completed using data from MWM's AWOS for the period 2006 to 2015. **Table 4-6** shows the wind coverage for the existing runways at MWM.

Table 4-6 – Wind Coverage – Runway 17/35¹

		10.5 knots	13 knots	16 knots
Runway 17/35	All	85.23%	91.12%	96.01%
	VFR	85.97%	91.59%	96.25%
	IFR	79.59%	87.64%	94.39%

Note¹: Calculated based on Runway 17/35 with True Bearing of 180.36°.

Source: Windom Municipal Airport AWOS. 2007 to 2016. Obtained from the National Climatic Data Center.

Since MWM is designed as a B-II Small airport, the crosswind component should not exceed 13 knots. Primary Runway 17/35 does not meet the recommended 95% coverage for 13 knots (91.12%; B-II aircraft). Additionally, the recommended 95% wind coverage is not met for smaller RDC A-I aircraft with the single runway orientation of 17/35 (85.23%, A-I aircraft).

Although MWM's Critical Aircraft is B-II Small, a crosswind runway are generally to accommodate smaller A-I type aircraft, which have a maximum crosswind component of 10.5 knots. With this, an additional wind analysis was completed to determine the best orientation for a crosswind runway at MWM to accommodate A-I aircraft. **Table 4-7** shows that a runway orientation of 12/30 provides the highest percent of wind coverage at MWM at 97.48%. The existing 1979 Airport Zoning Ordinance indicates a future crosswind runway with an orientation of 10/28 and length of 4,200 feet. No coordinates were provided in 1979 Ordinance specifying the exact location of the future runway ends.

Table 4-7 – Crosswind Runway Orientation Analysis¹

Crosswind Runway Orientation	10.5 knots	
	All Weather	IFR
1/19	85.89%	80.45%
2/20	86.57%	81.25%
3/21	87.33%	82.04%
4/22	88.23%	82.98%
5/23	89.25%	83.95%
6/24	90.42%	85.07%
7/25	91.72%	86.44%
8/26	93.20%	88.11%
9/27	94.78%	90.18%
10/28	96.21%	92.69%
11/29	97.19%	94.98%
12/30	97.48%	96.44%
13/31	96.75%	96.46%
14/32	95.57%	95.51%
15/33	94.04%	93.71%
16/34	91.87%	90.26%
17/35	88.85%	85.15%
18/36	85.35%	79.78%

Note¹: All Weather, with Runway 17/35 at 10.5 Knots. Calculated based on primary runway of Runway 17/35 (True Bearing of 180.36°).

Source: Windom Municipal Airport AWOS. 2007 to 2016. Obtained from the National Climatic Data Center.

A crosswind runway is eligible for FAA and MnDOT funding when the recommended 95% wind coverage is not met by the primary runway at 10.5 knots (A/B-I aircraft) during all-weather conditions. A crosswind runway is justifiable when a demonstrated minimum of 500 annual operations be anticipated for crosswind runway use by A/B-I aircraft during all-weather conditions. The existing estimated 2018 annual operations at MWM is 9,383, with an estimated 8,632 operations conducted by A-I/B-I aircraft (Year 2018, see **Section 2.10**). A crosswind runway with an orientation 12/30 would increase wind coverage by 9.77% for A-I/B-I aircraft (95% - 85.23%), which would accommodate an estimated 843 annual operations by A-I/B-I aircraft in 2018 (9.77% x 8,632), and approximately 936 annual operations by A-I/B-I in 2038 (12.25% x

9,584). These estimates exceed the minimum threshold of 500 operations for a crosswind runway to be justifiable and fundable by the FAA and MnDOT **As a result, a crosswind runway is recommended at MWM.**

The 2016 Conditionally Approved ALP showed a future crosswind runway at MWM with an orientation of 11/29, at length of 3,000 feet and width 60 feet. **Chapter 5, Alternative Analysis** will evaluate possible crosswind runway locations, as well as length and width of the future crosswind runway at MWM.

4.2.9 Taxiway System Recommendations

Runway 17/35 is served by partial parallel Taxiway A, and two connector taxiways: Taxiways B and C, as shown in Figure 1-3. All taxiways are 40 feet wide.

Taxiway systems are designed to provide access to and from the runway(s), apron(s), hangars, and other aviation related areas on an airport. AC 150/5300-13A, *Airport Design*, provides basic taxiway system design principles, which include:

- Whenever possible, taxiways should be designed such that the nose gear steering angle is no more than 50 degrees.
- Turns should be 90 degrees wherever possible. For intersections, the preferred standard angles are 30, 45, 60, 90, 120, 135, and 150 degrees.
- Taxiway systems should use the “three-node concept.” A pilot should have no more than three turn choices at an intersection, ideally, left, right, and straight ahead.
- Minimize runway crossings, and limit the runway crossing to the outer thirds of the runway.
- Avoid wide expanses of pavement. Wide pavements require placement of signs and edge lighting or markers far from the pilot’s eye and reduces the conspicuity of visual cues.
- Taxiways should not provide direct access from an apron to a runway in order to reduce opportunity for human error.

4.2.9.1 Taxiway & Apron Pavement

As previously discussed in **Section 1.9.8** and shown in **Figure 1-5**, the 2015 study found that the connecting taxiways and Taxiway A, were all either rated “Excellent” or “Very Good” condition. Moreover, the Apron was in “Good” condition with a PCI rating of 68. Based on the 2015 Pavement Study of the airport pavements, it is recommended that a joint/crack repair effort be completed by 2021, and plan for the apron to be reconstructed around 2025 (20 year after last reconstruction). **Additionally, routine maintenance, such as joint and cracking sealing, and slurry seal, should be performed on a scheduled basis to extend the life of the pavement.**

4.2.9.2 Taxiway Design

Taxiway system design criteria are based on the airport’s Airport Design Group (ADG) and Taxiway Design Group (TDG). These standards are also shown in **Table 4-7**.

ADG is determined by wingspan and tail height of the Critical Aircraft and ADG defines the Taxiway Safety Area (TSA), Taxiway Object Free Area (TOFA), and taxiway separation (to runway and parallel taxiway) standards. The ADG for the taxiway system at the MWM should be designed to ADG II standards to meet the demands of its Critical Aircraft, Pilatus PC-12.

The TDG is determined by the undercarriage dimensions, overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance, of the most demanding aircraft projected to use the airport. MWM's Critical Aircraft, Pilatus PC-12, has a TDG 1B. For a TDG 1B taxiway system, the taxiways' width must be 25 feet, and the pavement type and strength will be similar to the runway able to handle 12,500 pounds aircraft. However, since MWM is designed to accommodate RDC B-II aircraft, it is recommended the taxiway system be designed TDG 2 (width of 35 feet) as this is the largest TDG of RDC B-II size aircraft that operate regularly at MWM (e.g. King Air 200, TDG 2).

All of MWM's taxiways are 40 feet wide, exceeding TDG 2 standards, and have pavement strengths of 12,500 pounds SWG (same as Runway 17/35). **As a result, no taxiway widening or strengthening is recommended. However, when the taxiways are reconstructed it is recommended they be reconstructed to width of 35 feet. It is also recommended that any future improvements to the taxiway system should be designed to TDG 2 standards.**

Table 4-8 – Taxiway Design Standards

Item	ADG II
Taxiway Safety Area (TSA)	79 ft
Taxiway Object Free Area (OFA)	131 ft
Taxilane OFA	115 ft
Taxiway Centerline to Parallel TW/TL Centerline	105 ft
Taxiway Centerline to Fixed or Movable Object	65.5 ft
Taxilane Centerline to Parallel TW/TL Centerline	97 ft
Taxilane Centerline to Fixed or Movable Object	57.5 ft
Taxiway Wingtip Clearance	26 ft
Taxilane Wingtip Clearance	18 ft
Item	TDG 2
Taxiway Width	35ft

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

4.2.9.3 Direct Apron to Runway Access

Currently, there is direct access from the apron to Runway 17/35 via Taxiway C. The FAA recommends that all direct runway access points be redesigned to increase pilot situational awareness at an airport. Basic taxiway system design principles state that taxiways should not provide direct access from an apron to a runway in order to reduce opportunity for human error and minimize runway incursions. The practicality and ability to relocate Taxiway C or reconfigure the apron to remove this direct access point is not feasible since Taxiway C is necessary to serve the end of Runway 35. Additionally, that while the apron does connect directly to Runway 17/35 via Taxiway C, there are hard turns that aid in increasing pilot's situational awareness after leaving the apron area, meeting the intent of the taxiway design standards. **As a result, no realignment of the Taxiway C to remove the direct access is recommended.**

4.2.9.1 Parallel Taxiway

Currently, Runway 17/35 does not have a parallel taxiway. At many smaller airports, back-taxiing is common. Back-taxiing is when a pilot taxis the aircraft from one runway end to the other for takeoff. For safety reasons, runway occupancy time should be minimized, increasing safety. The

SASP only recommends a turnaround at each runway end for Intermediate Airports, such as MWM. For a full-length parallel taxiway system to be recommended, the FAA and MnDOT recommend a minimum of 20,000 annual aircraft operations. Although MWM does not meet the 20,000 annual operations threshold, the Airport experiences a mix of aircraft types (small single-engine to jet), the addition of a parallel taxiway would significantly improve safety. ***Due to the activity levels and mix of traffic at MWM, a full-length parallel taxiway for Runway 17/35 is ultimately recommended.*** The layout of the ultimate parallel taxiway will be evaluated to minimize or remove any direct access to the runway. This will be evaluated as part of the runway extension and hangar development analyses in **Chapter 5, Alternatives Analysis**.

4.2.10 Airfield Lighting and Airport Visual Aids

Airport visual aids assist pilots in locating and landing at an airport. Runway 17/35 is a non-precision runway and is equipped with Medium Intensity Runway Lights (MIRLs). The existing MIRL lighting system is currently in excellent condition.

Both ends of Runway 17/35 are equipped with Runway End Identifier Lights (REILs)¹⁵. The SASP recommends a minimum of Low Intensity Runway Lights (LIRLs), as well as REILs and PAPIs¹⁶ be installed on primary runway for Intermediate Airports. ***As a result, PAPIs are recommended for both runway ends.***

Runway 17/35 currently has non-standard MIRLs and threshold lighting configuration. When Runway 17/35 was constructed in 2009 it was designed as a visual runway, this included: six threshold lights on each runway end and MIRLs with clear or white globes along the length of the runway. Since then, non-precision instrument approach procedures were created in late fall of 2015 for both runway ends.¹⁷ The addition of instrument approach procedures (RNAV/GPS), improved the runway from a visual runway to a non-precision runway, and as a result changed the runway lighting requirements. Per AC150/5340-30H, *Design and Installation Details for Airport Visual Aids* a non-precision runway requires eight threshold lights on each runway end and MIRLs with yellow globes in the last 2,000 feet or one-half of the runway length (whichever is less). ***It is recommended that the MIRLs and threshold lights to be updated to non-precision runway standards.***

Currently, the apron area and all taxiways at MWM do not have any retroreflector markers or lighting. Advisory Circular (AC) 150/5340-30G, *Design and Installation Details for Airport Visual Aids* recommends Medium Intensity Taxiway Lights (MITLs) for taxiways at airports where a runway lighting system are installed. MITLs provide increased visibility to taxiing aircraft during night time and low visibility weather conditions. Additionally, the SASP recommends MITLs for all Intermediate Airports. ***It is recommended that MWM ultimately install MITLs on all taxiways, and retroreflector markers in the apron area meet the FAA and SASP standards.***

The MnDOT SASP also recommends a lighted wind cone and rotating airport beacon at an Intermediate Airport. MWM has a rotating airport beacon and a lighted wind cone located on the

¹⁵ REILs are synchronized flashing lights that identify the beginning of the useable runway.

¹⁶ PAPIs provide color-coded descent guidance to a runway.

¹⁷ Instrument procedures can be added by the FAA Flight Procedures at any time, often times without the airport sponsor knowledge. FAA Flight Procedures have the ability to produce instrument procedures by their own decision or a user or tenant could have submitted a request for improved approved at an airport.

airfield, as previously shown in **Figure 1-3**. **No additional airport visual aids are recommended.**

4.2.11 Pavement Markings and Airfield Signage

Runway 17 and 35 are marked with Non-Precision Runway Markings, which include centerline, threshold, aiming point, and runway designator markings. **No additional improvements to the runway markings are recommended.**

The taxiways are marked with yellow centerline striping. The FAA has recently established new marking standards and recommended (not required) that all airports have surface painted runway holding position markings whenever a taxiway intersects a runway, found in AC 150/5340-1K, *Standards for Airport Markings*. Additionally, the new TDG 2 taxiway pavement design standards in AC 15/5300-13A, *Airport Design* decreases the taxiway centerline radius from 75 feet to 60 feet at 90 degree taxiway intersections, but taxiway intersections at angles other than 90 degrees still have a 75 foot taxiway centerline radius. **It is recommended that the taxiway pavement markings be updated during the next scheduled painting to reflect the new taxiway centerline radius standards for TDG 2 to meet AC 150/5300-13A design standards.**

MWM is not equipped with any standard airfield signage. Standard airfield signage provides essential guidance information that is used to identify items and locations on an airport, as defined in AC 150/5340-1J, *Standards for Airport Sign Systems*. **It is recommended that MWM be equipped with a wide array of FAA required signage including instruction, location, direction, destination, and information signs to maximize pilot situational awareness at the Airport.**

4.2.12 AWOS

MWM's existing AWOS's 500-foot Critical Area is not clear of obstructions, as it is currently located within the existing hangar area. Below is a list of the **general** siting criteria for an AWOS, per FAA Order 6560.20B, *Siting Criteria for Automated Weather Observing Systems (AWOS)*. The general siting criteria are also shown in **Figure 4-2**.

General Siting Criteria for an AWOS:

- 300-Foot Northern Octant Clear Area: Sensor should be oriented with respect to true north and must have a clear area for 300 feet in the forward octant of the sensor.
- Six-Foot Radius: The area within six feet of sensor is free of all vegetation
- 100-Foot Critical Area: Any grass or vegetation within 100 feet of sensor is clipped to a height of 10" or less.
- 500-Foot Critical Area: All obstructions be at least 15 feet lower than the height of the sensor **or** have an occlude angle of 10 degrees or less within 500 foot radius. Also all obstructions must be no greater than 10 feet lower than the sensor from 500 feet to 1,000 feet from sensor. MWM's AWOS wind sensor is 33 feet above ground (or 1,441.1' MSL).

It is recommended that the Airport relocate the AWOS to clear its 500-foot Critical Area of all obstructions and increase potential for additional hangar space in the existing building area. Future location of the AWOS will be examined as part of **Chapter 5, Alternatives Analysis**.

Discussions were had with Airport Management and MnDOT Navigation Systems about the possibility of raising MWM's AWOS Sensor from 33-feet AGL to 40 feet AGL, instead of

relocating it outside the existing Hangar Area. MnDOT recommended that the AWOS is relocated in the future as best practices recommends that no structures are within the AWOS 500-foot Critical Area. Also by showing a future relocation does not commit the City to relocating the AWOS, and the City can decide in the future whether to only raise or relocate the AWOS.

4.2.13 Airside Facility Requirements and Recommendations – Summary

After taking inventory of the existing facilities of MWM and determining the future needs of the facility, the Master Plan has developed the following airside facility recommendations:

Runway 17/35:

- Update Runway 17/35's designation to Runway 18/36, as well as all corresponding airport marking, signage, and navigation documentation (**Sections 4.2.2 and 4.2.11**).
- Update Runway 17/35's published pavement strength to 12,500 SWG (**Section 4.2.3.1**).
- Routine maintenance, such as joint and cracking sealing, and slurry seal, should continue to be performed on a scheduled basis to extend the life of the pavement (**Section 4.2.3.2**).
- Examine the ability of the existing airport site to determine is an ultimate extension to Runway 17/35 is feasible. The runway extension alternative analysis is discussed in Chapter 5 (**Section 4.2.4**).
- Plan for improved approaches from 1 mile to 7/8 mile (greater than ¾ mile) for both Runway 17 and 35 (**Section 4.2.6**).
- Acquire all land, through easement or fee within the existing and future RPZs and MnDOT Clear Zones, as well as the 20-foot BRL (**Section 4.2.7 and 4.2.7.2**).
- Install PAPIs on both Runway 17 and 35 (**Section 4.2.10**).
- Update MIRLs and threshold lights to non-precision runway standards (**Section 4.2.10**).

Crosswind Runway:

- Construct crosswind runway (**Section 4.2.8**).

Taxiway & Apron System:

- Routine maintenance, such as joint and cracking sealing, and slurry seal, should continue to be performed on a scheduled basis to extend the life of the pavement (**Section 4.2.9.1**).
- Update taxiways system to TDG 2 design and marking standards (**Section 4.2.9.2**).
- Construct parallel taxiway to Runway 1/19 (**Section 4.2.9.1**), and mitigate/minimize direct apron to runway access when possible as part of the design (**Section 4.2.9.3**).
- Install Medium Intensity Taxiway Lights (MITLs) on all taxiways, and retroreflector markers in the apron area (**Section 4.2.10**).

Other:

- Install airfield signage (**Section 4.2.11**).
- Relocate AWOS to remove obstructions from the 500-foot Critical Area (**Section 4.2.12**).

4.3 Landside Facility Recommendations

4.3.1 Aircraft Storage and Aircraft Parking Aprons

4.3.1.1 Hangar Storage

MWM hangar storage consists of four hangar buildings providing 17 total hangar spaces. These include two 4-unit buildings, an eight-unit t-hangar building, and a single-unit building. The hangar layout is included in **Figure 1-4**. Currently, all of MWM's 17 aircraft based are hangared (15 single-engine, one multi-engine, and one jet)¹⁸. This averages to approximately one aircraft per hangar. The MnDOT SASP recommends enough hangars to accommodate 100% of jet and turboprop aircraft and 95% of single- and multi-engine aircraft based at an airport. Hangar demand for the 20-year planning period was determined using the SASP recommendation and is shown in **Table 4-7**. By 2038, it is forecasted that 23 aircraft will be based at MWM requiring approximately 23 hangar spaces (see **Section 2.9** for Based Aircraft forecast).

Table 4-9 - Hangar Capacity Needs

	Existing (2017)	Forecasted			
		2018*	2023*	2028	2038
Based Aircraft	17	17	21	22	23
Existing Hangar Capacity	17	19	23	23	23
Estimated Hangar Demand (95%)	16	16	20	21	22
Estimated Hangar Surplus / Shortage	1	3	3	2	1

*Note: In 2018, the City is pursuing Federal and State grants for the development of two hangar expansions, and extension of a taxiway to accommodate a proposed privately owned 4-unit hangar.

Source: SEH

Taking into account the 2018 hangar development project and proposal of a 4-unit private hangar, one additional hangar space is recommended in the 20-year planning period. However, it is recommended that locations and layouts for ultimate hangar development (t-hangars & box) be evaluated. This evaluation is prepared in **Chapter 5 Alternative Analysis**. The hangar development alternatives analysis evaluates possible ultimate hangar layouts against the alternatives for the proposed crosswind runway (**Section 4.2.8**).

4.3.1.2 Aircraft Parking Apron and Tiedowns

The existing apron area is approximately 9,300 square yards with three aircraft tiedown positions for transient aircraft. Minnesota Administrative Rules 8800 require a minimum of three tiedown positions for the Airport to be licensed. The MnDOT SASP recommends that Intermediate Airports have at least enough tiedown space to accommodate all unhangared based aircraft and peak hour transient aircraft. Currently, all based aircraft are hangared at MWM. Airport Management indicated commonly one tiedown is utilized several times a week. Calculations for the number of aircraft tiedown recommendations are shown in **Table 4-10**. Based on these calculations, **no additional tiedowns are recommended in the 20-year planning period**. However, future apron layouts are examined as part of the hangar development alternatives section in **Chapter 5, Alternatives Analysis**.

¹⁸ BasedAircraft.com, December 21, 2017.

Table 4-10 – GA Aircraft Parking Space Needs

	2018	2023	2028	2038
Annual Transient Operations	4,692	4,885	5,033	5,209
Peak Month Transient Operations	694	723	745	771
Peak Day Transient Operations	23	24	25	26
Peak Day Transient Aircraft	12	12	12	13
Peak Hour Transient Aircraft	1.3	1.4	1.4	1.5
Unhangared Based Aircraft	0	0	0	0
Tiedown Demand	1	2	2	2
Existing Tiedowns	3	3	3	3

Source: SEH

The existing apron and taxilane meet Group I Taxilane Object Free Area (TOFA) standards. However, as a Group II airport, MWM’s current apron layout does not meet TOFA standards for Group II on the northwest aide of the hangar development. Taxilanes require a certain amount of clear space, called a Taxilane Object Free Area (TOFA), to allow for the safe operation of aircraft on and around parking ramps. Currently, all of the tiedowns are within the existing TOFA. Options to ensure TOFA standard are met are evaluated as part of the hangar development alternatives section in **Chapter 5, Alternatives Analysis**.

4.3.2 Arrival/Departure (A/D) Building

The existing A/D building was completed in 2005, and is located south of the apron (see **Figure 4**). MWM has seven automobile parking spaces available in the paved lot located east of the A/D building. The A/D Building and parking lot are in good condition.

However, 250 square feet of the A/D Building, approximately 560 square yards of the automotive parking lot, and the airport entrance road are currently located within and penetrates Runway 35’s Departure Surface (**Figure 4-3**). There is FAA new guidance related to structures within the Departure Surfaces¹⁹, and local FAA Airport District Offices (ADOs) have been instructed to work with NPIAS airports to clear obstacles from the Departure Surfaces, when practicable, to ensure the safety of an airport. Previously, these obstructions were not required to be removed, only reported to the FAA for consideration in instrument procedure development. **As a result, as part of longer-term planning, it is recommend the Airport plan to relocate these outside of the Departure Surface once the A/D Building and parking lot have reached the end of their useful life.** The location of the ultimate A/D Building is be evaluated in **Chapter 5** as part of the hangar development alternatives analysis. MWM’s Departure Surfaces are discussed in further detail in **Section 4.4.2**.

Additionally, the Airport currently only has a single copper communication line for the telecommunications at the airport. The install of fiber optic communication cable is desired by the City to improve quality and reliability of the telecommunications at the Airport. **As a result, it is**

¹⁹Departure Surface is an imaginary obstruction-limiting surface that is longitudinally centered on the runway centerline and extends outward and upward from the runway end at 40 to 1 slope, from a width of 1,000 feet expanding uniformly to a width of 6,466 feet at a distance of 10,200 feet.

recommended the Airport install fiber optic communication cable to improve telecommunications at the Airport.

4.3.3 Aviation Fuel

MWM has a self-service fuel system located south of the apron. The fueling system consists of a 10,000 gallon underground tank containing Aviation Gas (AvGas, 100LL) and a 6,000 gallon underground tank containing Jet Fuel (Jet A). The AvGas tank was installed in 2005, and the Jet A tank was installed in 2014. The fuel tanks are in excellent condition. The City owns the fuel tank and manages the fueling operations.

4.3.3.1 AvGas Replacement

AvGas is the only transportation fuel that still contains lead. Lead is a toxic substance that can be inhaled or absorbed in the blood stream. The FAA is supporting the research of alternate fuels and is working with the aircraft and engine manufacturers, fuel producers, the EPA, and industry associations to overcome technical and logistical challenges to developing and deploying a new unleaded fuel. The FAA is also working with the EPA to make a smooth transition from leaded to unleaded aviation fuels and to ensure the supply of aviation gasoline is not interrupted so that all aircraft can continue to fly.²⁰ **It is recommended that MWM continue to monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas, such as the 100LL currently sold at MWM.**

4.3.3.2 Chip Credit Card Reader

EMV²¹ credit cards are smart cards which store data on computer chips versus magnetic strips. Due to recent and numerous large-scale data breaches and increasing rates of counterfeit card fraud, U.S. card issuers are migrating to this new EMV technology to protect consumers and reduce the costs of fraud. As of October 1, 2015, due to the implementation of the EMV, the fraud liability shifted from the financial institutions to the merchants (except automated fuel dispensers). On October 1, 2020 the fraud liability shift will take effect for transactions generated from automated fuel dispensers. **It is recommended the Airport install a Chip Credit Card Reader prior to October 2020.**

4.3.4 Automobile Parking and Access Roads

4.3.4.1 Automobile Parking

MWM has six automobile parking spaces available, located west of the A/D building, as previously shown in **Figure 1-4**. The MnDOT SASP recommends one automobile parking space for every based aircraft plus 25% to account for transient users. However, discussions with Airport Management indicated that the majority of the based aircraft owners park their vehicle inside or near their hangar, and that the existing parking is rarely full.

Based on existing user trends at MWM, it is estimated that the required number of parking spaces is approximately 5% of based aircraft and 30% of peak day transient aircraft. **Table 4-11** shows the number of forecast based aircraft, peak day transient aircraft, and corresponding

²⁰ Aviation Gasoline. <http://www.faa.gov/about/initiatives/avgas/>

²¹ EMV stands for Europay, MasterCard and Visa, the three companies that originally created the standard.

recommended number of parking spaces at MWM for the planning period. Using these calculations, ***no additional parking space are recommended within the 20-year planning to meet forecasted demand.***

However, as previously discussed in **Section 4.3.2**, the existing parking lot is within Runway 35's Departure Surface, as part of the longer-term planning it recommended that the auto parking lot be planned to be ultimately relocated outside of the Departure Surface and new auto parking spaces be added near the ultimate planned hangar growth, which will be evaluated in **Chapter 5** as part of the hangar development alternatives analysis.

Table 4-11 – Automobile Parking Needs

	2018	2023	2028	2038
Based Aircraft	17	21	22	23
Peak Day Transient Aircraft	12	12	12	13
Recommended Parking Spaces	4	5	5	5
Existing Parking Spaces	6	6	6	6
Parking Space Surplus/Shortage	2	1	1	1

4.3.4.2 Access Roads

The Airport is located approximately three miles north of Windom's downtown district. MWM abuts public roads in two directions: to the east by 490th AVE; and to the south by CSAH 28. The primary access to MWM is via CSAH 28 on the south side of the airfield. The access roads leading to MWM are sufficient to accommodate daily traffic, even during peak periods. ***No additional access road improvements are recommended.***

However, as previously discussed in **Section 4.3.2**, the a portion of the access road is within Runway 35's Departure Surface, as part of the longer-term planning it recommended that the auto parking lot be planned to be ultimately relocated outside of the Departure Surface and new auto parking spaces be added near the ultimate planned hangar growth. This will be evaluated in **Chapter 5** as part of the hangar development alternatives analysis.

4.3.5 SRE and Maintenance Equipment

The Airport owns one truck with a snow plow attachment (2009 Freightliner) for snow removal operations. The 2009 Freightliner was purchased in 2008 FAA AIP 3-27-0113-005-08. As MWM does not currently have SRE building on site, the plow truck is currently housed at the City Street Shop. The City Street crew provides personnel for snow removal and maintenance (e.g. mowing) at the Airport. As federally funded equipment must be stored and only used at the airport, ***an SRE/Maintenance Building to house existing and future Airport equipment is recommended.*** The location for this SRE Building will be evaluated as part of the hangar development alternatives in **Chapter 5**.

According to the FAA's SRE and maintenance equipment calculations (see **Table 4-12**), MWM is eligible for federal funding to acquire two plows, one snow blower, one sweeper, and one hopper spreader to meet snow removal needs. For general aviation airports, the ADO typically recommends one carrier unit with associated attachments to cover the majority of an airport's snow removal needs. The carrier unit could include the attachments noted above, such as a blower, sweeper, and plow. If MWM moves forward with acquiring additional snow removal equipment for airport use, an SRE building will need to be constructed on site prior to acquisition

to protect and preserve the equipment's condition prior to additional equipment purchases. The SRE building will be sized according to FAA design criteria related to the existing SRE that will be stored in the building.

Table 4-12 – SRE and Maintenance Equipment Needs

Type	Existing	Eligible for FAA Funding	Recommendations
Plow	1	2	Acquire Attachment
Snow Blower	0	1	Acquire Attachment
Sweeper	0	1	Acquire Attachment
Hopper Spreader	0	1	Acquire Attachment
Front End Loader	0	0	None

At the January 23, 2018 Airport Board meeting, the City indicated the desire to show an ultimate facility to house SRE and maintenance equipment. Size and location of the future SRE Building is analyzed as part of the hangar development alternatives analysis in **Chapter 5**.

Additionally, while the City Street crew provides personnel and equipment for maintenance (e.g. mowing operations) at the Airport, the City would like to purchase a mower specifically for Airport use only. A City purchased and owned mower is currently stored at the airport within one of the hangars.

4.3.6 Airport Fencing

Currently, there is no perimeter or wildlife fencing at MWM. Minnesota Administrative Rules and the MnDOT SASP requires all licensed airports to have sufficient fencing around the Airport property to prevent people who are not engaged in aviation activities from accessing the aircraft movement areas. The FAA recommends a 10-12 foot chain-link fence topped with 3-strand barbed wire outriggers to minimize deer accessing aircraft movement areas. In certain cases, an 8-foot chain link fence with 3-strand barbed wire outriggers may be sufficient to prevent deer access. However, the FAA will not fund a project to construct a fence that is lower than 10 feet in total height (fence plus barbed wire). Additionally, a 4-foot apron skirt may be buried along the outside of the fence to prevent digging mammals (coyotes, foxes, skunks) and to prevent access points in the fencing that may occur as a result of frost heaving and may reduce the chance of wash out. **The installation of a full perimeter fence at least 8 feet tall with 3-strand barbed wire on top (minimum total height of 10 feet) with a buried 4-foot apron skirt is recommended.**

Prior to completing the fencing project, the City is required to complete and submit a Wildlife Hazard Site Visit (WHSV) Report and Wildlife Hazard Management Plan (WHP) to the FAA for approval.

4.3.7 Landside Facility Requirements and Recommendations – Summary

After taking inventory of the existing facilities of MWM and determining the future needs of the facility, the Master Plan has developed the following landside facility recommendations:

- Construct additional hangar space to accommodate 95% of the forecasted 23 based aircraft by 2038 (**Section 4.3.1.1**).

- Plan to relocate the A/D Building and Automobile Parking lot outside of the Departure Surface they have reached the end of their useful life (**Section 4.3.2 and 4.3.4.1**).
- Install fiber optic communication cable to improve telecommunications at the Airport (**Section 4.3.2**).
- Continue to monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas (**Section 4.3.3.2**)
- Install a Chip Credit Card Reader prior to October 2020 (**Section 4.3.3.2**).
- Acquire a carrier vehicle and associated snow removal equipment attachments (**Section 4.3.5**).
- Construct a SRE/Maintenance building to house future equipment (**Section 4.3.5**).
- Install a wildlife perimeter fence at least 8-feet tall with 3-strand barbed wire on top (**Section 4.3.6**).

4.4 Airspace and Obstructions

14 Code of Federal Regulations (CFR) Part 77 defines and establishes the standards for determining obstructions to an airport's imaginary surfaces. Imaginary surfaces are geometric shapes that are in relation to the Airport and each runway, as defined in 14 CFR Part 77. The size and dimensions of these imaginary surfaces are based on the category of each runway for existing and planned airport operations. The five imaginary surfaces are the Primary, Approach, Horizontal, Conical, and Transitional. Any object which penetrates these surfaces is considered an obstruction and affects navigable airspace and must be removed.

The size and dimensions of each imaginary surface is based on the category of each runway for existing and planned airport operations. In respect to 14 CFR Part 77, Runway 17 and 35 are currently considered "Utility Runways" with non-precision approaches.

The five imaginary surfaces and their dimensional criteria for MWM's existing conditions are defined below. ***The recommended Ultimate Part 77 conditions for the runway will be determined in Chapter 5 when a preferred runway length is chosen (Chapter 5).***

Primary Surface - The Primary Surface is an imaginary obstruction-limiting surface that is specified as a rectangular surface longitudinally centered about a runway. The Primary Surface extends 200 feet beyond each end of the runway. Runway 17/35's existing Primary Surface is 500 feet wide and 3,999 feet long.

Approach Surface - The Approach Surface is an imaginary obstruction-limiting surface that is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance upon the type of available or planned approach by aircraft to a runway. Runway 17 and 35's approach surface expands uniformly to a width of 2,000 feet at a distance of 5,000 feet, with a slope of 20 to 1.

Horizontal Surface - The Horizontal Surface is an imaginary obstruction-limiting surface that is specified as a portion of a horizontal plane surrounding a runway and is located 150 feet above the established airport elevation. The perimeter of which is constructed by swinging arcs of a specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs. Runway 17/35's has an arc radius of 5,000 feet at elevation of 1,560.8 feet.

Conical Surface - The Conical Surface is an imaginary obstruction-limiting surface that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Transitional Surface - The Transitional Surface is an imaginary obstruction-limiting surface that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary and approach surfaces.

4.4.1 Obstructions

Per 14 CFR Part 77, Obstructions are defined as any object of natural growth, terrain, permanent or temporary construction equipment, or permanent or temporary manmade structure that penetrates an imaginary surface. Prior to any airport development, a Part 77 evaluation must be conducted regardless of project scale to verify that there will be no hazardous effect to air navigation due to construction.

An obstruction survey was completed in August of 2016 as part of the Master Plan to determine if there are any obstructions to MWM's existing or ultimate Part 77 Imaginary Surfaces. Per Grant Assurance 20, the Airport must *"take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport [...] will be adequately cleared and protected by [...] mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards."*

As shown in **Figure 4-4**, there are no obstructions to MWM's Part 77 Imaginary Surfaces. ***The obstructions for MWM ultimate Part 77 conditions for each runway will be determined as part of the runway length alternatives analysis in Chapter 5.***

4.4.2 Terminal Instrument Procedures (TERPS) Approach Surface

The Terminal Instrument Procedures (TERPS) (Order 8260.3B) prescribes the criteria for the creation, approach, and publishing of approach and departure procedures to an airport. TERPS criteria specifies the minimum elevation for obstacle clearance to supply a satisfactory level of vertical protection for aircraft from obstructions. The standards for a TERPS surface were determined using Table 3-2 of A/C 5300/150-13A *Airport Design*. Runway 17/35 has a TERPS approach surface beginning 200 feet from the runway end with the inner edge being 400 feet wide and expand uniformly to a width of 3,400 feet at a distance of 10,000 feet, with a slope of 20:1 (Table 3-2, Row 4 EB 99). The standards for a TERPS departure surface were determined using Figure 3-4 of A/C 5300/150-13A: *Airport Design*. Runway 17/35 has a TERPS Departure Surface with the inner edge being 1,000 feet wide and expand uniformly to a width of 6,466 feet at a distance of 10,200 feet at a slope of 40:1.

Per the August 2016 AGIS Survey, only has three obstructions to Runway 35's existing TERPS Departure Surface, as shown in **Figure 4-5** are listed in **Table 4-10**. ***The obstructions for MWM ultimate TERPS Approach Surfaces are determined as part of the runway length alternatives analysis in Chapter 5.***

4.4.3 Approach and Departure Surfaces Obstacle Action Plan (OAP)

An Obstacle Action Plan (OAP) was developed for all unmitigated obstacles to maintain clear of existing Approach and Departure surfaces at MWM, as shown in Table 4-10. The OAP summarizes and details unmitigated obstacles, and identifies how and when the surfaces will be

cleared and maintained cleared. The OAP identifies obstacles as defined in: Table 3-2 of AC 150/5300-13A, *Airport Design (9/28/2012)*; FAA Order 8260.3, *United States Standard for Terminal Instrument Procedures (TERPS)*; and 14 CFR Part 77 Imaginary Surfaces.

As shown in **Table 4-10**, and **Table 4-4**, there are three obstructions to Runway 35's existing TERPS Departure Surface. The OAP, as presented in **Table 4-10**, identifies each obstacle's reference number, type, latitude, longitude, elevation (MSL), height (AGL), surface penetrated, penetration amount, runway, if the obstacle is on or off the airport, if the obstacle is under Sponsor control, proposed maintenance action, and when each of the obstacles will be cleared (i.e. date) and triggering event, if associated with a particular project.

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Table 4-13 – Obstacle Action Plan (OAP)

#	Type	Elevation (Feet, MSL)	Height (Feet, AGL)	Surface Penetrated	Part 77 Penetration Amount	TERPS Penetration	Departure Penetration	RW	Off/On Airport	Proposed Action	Clear Date	Triggering Event/ Associated Project
35-1	A/D Building	1,425.1'	23.0'	Runway 35 Departure	-	-	18.7'	35	On	To be Relocated	End of Useful Life	End of Useful Life
35-2	Fuel System Post	1,413.8'	7.3'	Runway 35 Departure			7.3'	35	On	To Remain	N/A	None
35-3	Tree Grouping	1,460.3'	56.5'	Runway 35 Departure	-	-	21.1'	35	Off	To Remain	N/A	None
35-4	Tree Grouping	1,468.1'	78.2'	Runway 35 Departure	-	-	7.3'	35	Off	To Remain	N/A	None

4.5 Airport Property, Acquisition, and Easements

As discussed in **Section 1.17**, the Airport currently owns 183.5 acres in fee, and an additional 4.79 acres in Avigation easements (see **Figure 1-14**). For more detailed information, see property descriptions in **Section 1.17** or the Exhibit 'A' Property Map of the Airport Layout Plan located in **Appendix D**.

Any airport property, when described in a grant or listed in the Exhibit 'A' Property Map, is considered to be "dedicated" or obligated property for airport purposes only and is subject to all FAA Airport Sponsor Grant Assurances. Airport Grant Assurances, in relation to airport property, require airport sponsors, such as MWM, to hold a good working title (#4), preserve all rights and powers (#5), ensure compatible land uses (#21), and to keep an updated Airport Layout Plan (ALP) showing boundaries of the Airport, all existing and proposed airport facilities, location of all existing and proposed non-aeronautical use areas (#29). When non-aeronautical uses exist on an airport, but are not properly documented and are not approved by the FAA they are considered encroachments to airport property. The following sections list the possible encroachments to airport property and the recommendations for those encroachments.

A boundary survey was not included in the scope for this project and is typically not an eligible item for federal funding. For the purpose of the Exhibit A Property Map shown in **Figure 1-14**, airport parcels and boundaries, airport easements, and airport encumbrances are computed and shown based on the best information available including the following, but not limited to: record documents, record plats, record surveys, record right of way maps and/or plats, published section corner information, G.I.S. data obtained from the local government unit. The Exhibit A Property Map does not constitute a boundary survey of any airport parcel, airport easement, or encumbrance shown thereon. ***It is recommended that the Airport acquire a Boundary Survey in order to determine surveyed property lines. If additional encroachments are found, it is recommended that the Airport facilitates preparing and filing the necessary easement documents for the possible encroachments listed.***

Possible encroachments identified through records research, as shown in **Figure 1-14**, and include:

Although no documentation was provided for CSAH 28SEH assumes a 100 foot wide right of way exists by reason of prescriptive use, as provided for in MN Statute 160.05, until proven otherwise. Similarly, no documentation was provided for 490th Avenue, and SEH assumes a 66 foot wide right of way exists by reason of prescriptive use, as provided for in MN Statute 160.05, until proven otherwise (B-4). ***Since a road right of way is a non-aeronautical use of airport land, it is recommended that MWM seek approval from FAA for a concurrent land use.***

Additionally, a Right of Way Electrical Easement with South Central Electric Association (Easement A-1, see **Figure 1-14**, and **Section 1.17**), was found south of Runway 35. The easement covers a 50.00 foot wide strip along the southern half of Parcel 1 for purposes of construction, maintenance, alterations, repair, and operation of electric lines and related facilities. Grantor reserves the right to use the surface of the easement area for cultivation or other purposes which do not interfere with the use of the easement area by the grantee. ***Since an electrical easement is a non-aeronautical use of airport land, it is recommended that MWM seek approval from FAA for a concurrent land use***

4.5.1 Concurrent Use Agreement

As discussed in the previous section (**Section 4.5**), any airport property, when described in a grant or listed in the Exhibit 'A' Property Map, is considered to be “dedicated” or obligated property for airport purposes only and is subject to FAA Grant Assurances. FAA approval is required to release any land from dedicated aeronautical use on airport property. Many of the recommendations above recommend the Airport seek approval from the FAA for a concurrent use. A concurrent land use can be an appropriate compatible land use, to meet Grant Assurance 21, if the aeronautical land is to remain in use for its primary aeronautical purpose but may also be used for a compatible revenue producing non-aeronautical purpose. Concurrent land use means that the land can be used for more than one purpose at the same time (aeronautical and non-aeronautical). For example, portions of land needed for clear approach surfaces could also be used for agriculture purposes at the same time. Concurrent use requires FAA approval, but no formal release of land is necessary. Any funds received by the airport (e.g. rent) for a concurrent use should be based on fair market rent and are considered airport revenue (Grant Assurance 25).

Any release, modification, reformation or amendment of an airport agreement between the airport owner and the United States must be based on a request made in writing and signed by a duly authorized official of the public agency that owns the airport with full concurrence of the airport owner. Evidence of such authorization must accompany the request. The FAA is not required to grant a land release or approve concurrent use. As described in Chapter 22 of Order 5190.6B, *FAA Airport Compliance Manual*, for a concurrent use request to the FAA, the Airport Sponsor will need:

1. Cover letter explaining why the land was originally purchased (such as protection) and that the proposed use will not interfere with the original “use” of the property, and explain the benefits of the proposed concurrent use;
2. Plat of the lease with a boundary description;
3. Summary Appraisal that includes a statement of fair market rent;
4. Draft copy of the lease agreement;
5. Copy of letter approving airspace study; and
6. National Environmental Policy Act (NEPA) Clearance.

4.5.2 Potential Surface Mining

In 2018, the City of Windom was approached in regards to potential surface mining at the Airport, on the northern portion of Parcel 8 (see **Figure 1-14**). The extent of possible mining operations has not been determined, soil borings will be required in order to determine if mining opportunities exist and/or what the mining limits. As of May 2019, soil borings have not been completed but would be done at a future date if the interested party would like to continue pursuing the opportunity.

If the mining opportunity advances, the mining plan would be needed. The mining plan would at minimum comprise of a grading plan, discussion of phasing, timelines and duration, and reclamation plan. The reclamation plan would include restoring the land for the future proposed crosswind runway (see **Sections 4.2.8** and **5.2**). Mining operations would be expected to include removal and stockpiling of the existing topsoil, extraction of aggregate to the extent of the plan

based on the soil borings, then replacement of topsoil and seeding once the resource is exhausted.

Mining, such as oil, gas, or mineral extraction, are compatible with airport activities as long as they follow all FAA guidance and requirements, and are permitted by state agencies and local municipalities. The FAA has prepared specific guidance on how to handle these uses on and near federally obligated airports (e.g. NPIAS airports): Advisory Circular (AC) 150/5100-20, *Guidance on the Extraction of Oil and Gas on Federally Obligated Airports*. This AC does not create new requirements, but is a compilation of existing FAA guidance and requirements applicable to airport construction for oil and gas development on airport land. Airport Sponsors are encouraged to coordinate with the local FAA Airports District or Regional offices to ensure the development of acceptable on-airport mining projects.

4.5.2.1 Guidance on the Extraction of Oil and Gas on Federally Obligated Airports

AC 150/5100-20, *Guidance on the Extraction of Oil and Gas on Federally Obligated Airports*²² discusses oil and gas development on or near federally obligated airport land, including any drilling that penetrates the property (surface and subsurface). This guidance does not encourage gas and oil leasing on-airport property and does not specifically discuss extraction of water wells, coal, ore, sand, and gravel or other solid minerals. However, the guidance within the AC are applicable to any on-airport or near-airport construction or land use. Also, this AC does not create new requirements, but is a compilation of existing FAA guidance and requirements applicable to airport construction for oil and gas development on airport land. These include, but are not limited to:

- FAA AC 70/7460-1K, Obstruction Marking and Lighting
- FAA AC 150/5070-6 Airport Master Plans
- FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
- FAA AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports
- FAA AC 150/5370-2, Operational Safety on Airports During Construction
- FAA AC 150/5200-36A, Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessment and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports
- FAA Order 1050.1, Environmental Impacts: Policies and Procedures
- FAA Order 5050.4, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects
- FAA Order 5190.6, FAA Airport Compliance Manual
- FAA Order 5200.11, FAA Airports (ARP) Safety Management System (SMS)
- FAA Order JO 7400.2, Procedures for Handling Airspace Matters
- FAA's Policy and Procedures Concerning the Use of Airport Revenue (Revenue 28 Use Policy) (64 FR 7696 February 16, 1999)

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https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5100-20

Any and all mining activities on or near airport land must comply with the Airport Sponsor's federal aid obligations and restrictions. In particular, airport sponsors must ensure that:

- the airport preserve its rights and powers over the Airport property, and maintain Good Title at all times;
- the mining activities will not conflict with current or planned aviation uses of the Airport land;
- the infrastructure meets airport design standards, are not obstructions to air navigation as defined in 14 CFR Part 77, do not create wildlife attractants, do not create light or radio signal interference, do not impair visibility or flight conditions and are constructed to ensure safe and continuous public airport operations;
- any on-airport allowable well development and related infrastructure (e.g. roads, fencing) must be shown on the approved ALP;
- the mining activities and infrastructure conform to applicable environmental standards;
- and the revenue generated from leases is collected and spent in accordance with the FAA's Revenue Use Policy and in compliance with Grant Assurances 24 (Fee and Rental Structure) and 25 (Airport Revenues), and applicable law. An acceptable lease must provide the Airport fair market value for the conveyed mineral rights and revenues must be spent on the airport.

In addition, a change in the airport's Airport Layout Plan (ALP), such change from aeronautical use to non-aeronautical (e.g. mining), requires the Airport to submit a proposed amendment, revision, or modification of their ALP for FAA approval. Certain levels of FAA approval of an ALP change require environmental evaluation under NEPA. Before the developer may occupy, construct, or operate on airport land, the Airport Sponsor must request to revise or modify the approved ALP for the proposed development in compliance to FAA requirements and standards. Any mining lease is contingent upon the FAA approval of the ALP.

AC 150/5100-20 describes a step-by-step process that an airport sponsor should use to assure compliance with FAA requirements and standards when drafting and negotiating a lease or production agreement.

Depending on the scale of the mining activities, coordination with the FAA will determine whether a Categorical Exclusion (CATEX) or if an Environmental Assessment (EA) is the appropriate NEPA review for the activity.

4.6 Zoning

Minnesota Administrative Rules, Chapter 8800 requires all licensed airports to have Airport Zoning. There are two parts to the Airport Zoning requirements: Air Space Obstruction Zoning and Land Use Safety Zoning. These are discussed further in the sections that follow.

4.6.1 Minnesota Airport Airspace Obstruction Zoning

The purpose of the Airspace Obstruction Zoning is to ensure that no objects penetrate the 14 CFR Part 77 imaginary surfaces, except when necessary to airport operations. Any object which penetrates these surfaces is considered an obstruction and affects navigable airspace and must be removed.

Windom Municipal Airport Zoning Ordinance was adopted by the City of Windom in 1979. A copy of MWM's 1979 Zoning Ordinance can be found in **Appendix B**. Existing dimensional criteria and use restrictions for MWM's Airspace Obstruction Zones are described in **Table 4-14**. At the time the zoning ordinance was adopted, the 'future' design consisted of the runway length of 3,600 feet for Runway 17/35, and future runway length of 4,200 feet for Runway 10/28. All zones prescribed in the ordinance below meet the criteria of the MnDOT zoning requirements.

Table 4-14 – 1979 MWM Airspace Obstruction Zoning Standards

Airspace Zones	Existing Dimensional Criteria	Ultimate Dimensional Criteria
Primary	RW 17/35: 500' x 4,000' RW 10/28: 500' x 4,600'	Determined as part of the Alternatives Analysis in Chapter 5 .
Approach	RW 17/35: 500' x 10,000' x 3,500' ¹ ; 40:1 Slope RW 10/28: 500' x 10,000' x 3,500' ¹ ; 40:1 Slope	
Horizontal	Arc Radius of 6,000' ²	
Conical	4,000' from Horizontal; 20:1 Slope	
Transitional	Slope of 7:1 ³	
Note ¹ : Inner Width by Length by Outer Width Note ² : 150 feet above airport elevation (1,560.8'); from the center of each end of primary surface and connecting the adjacent arcs by the lines of tangent.		

Source: Windom Municipal Airport Zoning Ordinance, 1979 (see Appendix B)

The recommended Ultimate Obstruction Zoning standards will be determined as part of the runway separation alternatives analysis in Chapter 5.

4.6.2 Minnesota Airport Safety Zoning

The purposes of the Land Use Safety Zones are to ensure that the areas around the Airport are clear of incompatible land uses, enhancing the safety of pilots and aircraft, as well as protecting people and property on the ground. There are three types of safety zones: A, B, and C.

Windom Municipal Airport's Airport Zoning Ordinance was adopted by the City of Windom in 1979. A copy of MWM's 1979 Zoning Ordinance can be found in **Appendix B**. The zoning ordinance is based on an the 'future' design consisted of the runway length of 3,600 feet for Runway 17/35, and future runway length of 4,200 feet for Runway 10/28.

Table 4-15 – MWM Safety Zone Standards

Safety Zone	Existing Dimensional Criteria	Recommended Ultimate Dimensional Criteria	Use Restrictions
A	RW 17/35: 500' x 2,400' x 1,220' ¹ RW 10/28: 500' x 2,800' x 1,340' ¹	Will be determined as part of the Alternatives Analysis in Chapter 5	Shall contain no buildings, temporary structures, exposed transmission lines, or other similar above-ground land use structural hazards, and shall be restricted to those uses which will not create, attract, or bring together an assembly of persons thereon. Permitted uses may include agriculture (seasonal crops), horticulture, animal husbandry, raising livestock, wildlife habitat, light outdoor recreation (non-spectator), cemeteries, and auto parking.
B	RW 17/35: 1,220' x 1,200' x 1,580' ¹ RW 10/28: 1,340' x 1,400' x 1,760' ¹		Land included in Zone B shall be restricted in use as follows: a. Each use shall be on a site whose area shall not be less than three acres. b. Each use shall not create, attract, or bring together a site population that would exceed 15 times that of the site acreage. c. Each site shall have no more than one building plot up which any number of structures may be erected. d. A building plot shall be a single, uniform and non-contrived area, whose shape is uncomplicated and whose area shall not exceed the minimum ratios with respect to the total site area.
C	All that land within the perimeter of the Part 77 horizontal surface, which is not included in Zone A or Zone B. Radius of 6,000' ²		No use shall be made of any land which creates or causes interference with the operation of radio or electronic facilities on the Airport, makes it difficult for pilots to distinguish between airport lights and other lights, results in glare in the eyes of pilots using the Airport, impairs visibility in the vicinity of the Airport, or otherwise endangers the landing, taking off, or maneuvering of aircraft.

Note¹: Inner Width by Length by Outer Width
Note²: From the center of each end of primary surface and connecting the adjacent arcs by the lines of tangent.

Source: Windom Municipal Airport Zoning Ordinance, 1979.

Recommended Ultimate Safety Zoning standards will be determined as part of the runway separation alternatives analysis in Chapter 5.

4.7 Sustainability Plan Recommendations for Solid and Hazardous Waste

As indicated in **Section 1.21**, no specific sustainability plan has been developed for the Airport. There can be many benefits of airport sustainability planning, including reduced energy consumption, reduced noise impacts, reduced hazardous and solid waste generation, reduced greenhouse gas emissions, improved water quality, improved community relations, and cost

savings. The following discussion focuses on the sustainability recommendations regarding hazardous and solid waste generation.

Under the current facility operations, waste generated by hanger users is looked at as separate from the waste generated in the public-accessed facilities and, as a result, the City has little control over the hangar waste. Under the recommendations outlined below, that control does not change; however, the proposed programs are meant to educate and promote proper waste management methods for all airport users.

The purpose of the proposed recommendations is to ensure waste generated at the Airport is managed in compliance with environmental regulations and reduce land disposal of waste as stipulated under Minnesota Statute §115A.02. Given the small amount of waste generated at the facility, the hazardous and solid waste sustainability efforts will probably not represent a cost savings to the City. Because the quantities of saleable materials generated at MWM is anticipated to be low, it is most cost effective to utilize the convenience of Cottonwood County programs to manage recyclable materials. As a result, the hazardous and solid waste sustainability efforts will not generate additional revenue based on recyclable commodities.

4.7.1 Waste Reduction

The Minnesota Waste Management Hierarchy (Minn. Stat. §115A.02) gives highest preference for waste reduction and reuse. Any efforts to reduce waste generation at a facility not only reduces the volume of waste requiring land disposal, it reduces the overall volume of waste generated to begin with. Waste reduction is generally recognized by packaging reduction, office paper reduction, composting, and material re-use.

Three areas have been identified to establish and meet potential waste reduction goals for the Airport:

1. Promote the use of multiple use beverage containers for water, coffee, etc.
2. Upgrade notifications to airport users from paper to electronic media using electronic mail, website notifications, etc.
3. Utilize Cottonwood County Solid Waste Department to identify potential re-use or proper disposal of site materials and equipment. Options should be explored to reduce solid waste generation through logistical changes, purchasing policies, or recycling efforts for any unique waste materials generated routinely or as part of special construction projects.

Once implemented, the programs should be evaluated annually and discussed with the Cottonwood County Solid Waste Administrator to determine if the waste reduction efforts are adequate, if there have been any regulatory changes, and whether any modifications are necessary.

4.7.2 Waste Education

Waste education can be the most important way to encourage proper management of hazardous and solid waste. The Cottonwood County Solid Waste Department has resources available to residents and businesses to help with waste education through brochures and web-based programs. People who are aware of the impacts that waste can have on the environment are more likely to seek out and use waste abatement programs.

Two areas have been identified to establish and meet potential waste education goals for MWM:

1. Obtain and display for airport users published brochures from the Cottonwood County Solid Waste Department and/or the MPCA to promote proper waste management activities. Particular efforts should be made in the proper management of maintenance waste including antifreeze, tires, vehicle batteries, oil filters, and used oil.
2. Establish site-specific airport waste abatement goals and prepare signage or notifications for airport users to assist the facility in meeting the goals.

Once implemented, the programs should be evaluated annually and discussed with the Cottonwood County Solid Waste Administrator to determine if the waste reduction efforts are adequate, if there have been any regulatory changes, and whether any modifications are necessary.

4.7.3 Waste Recycling

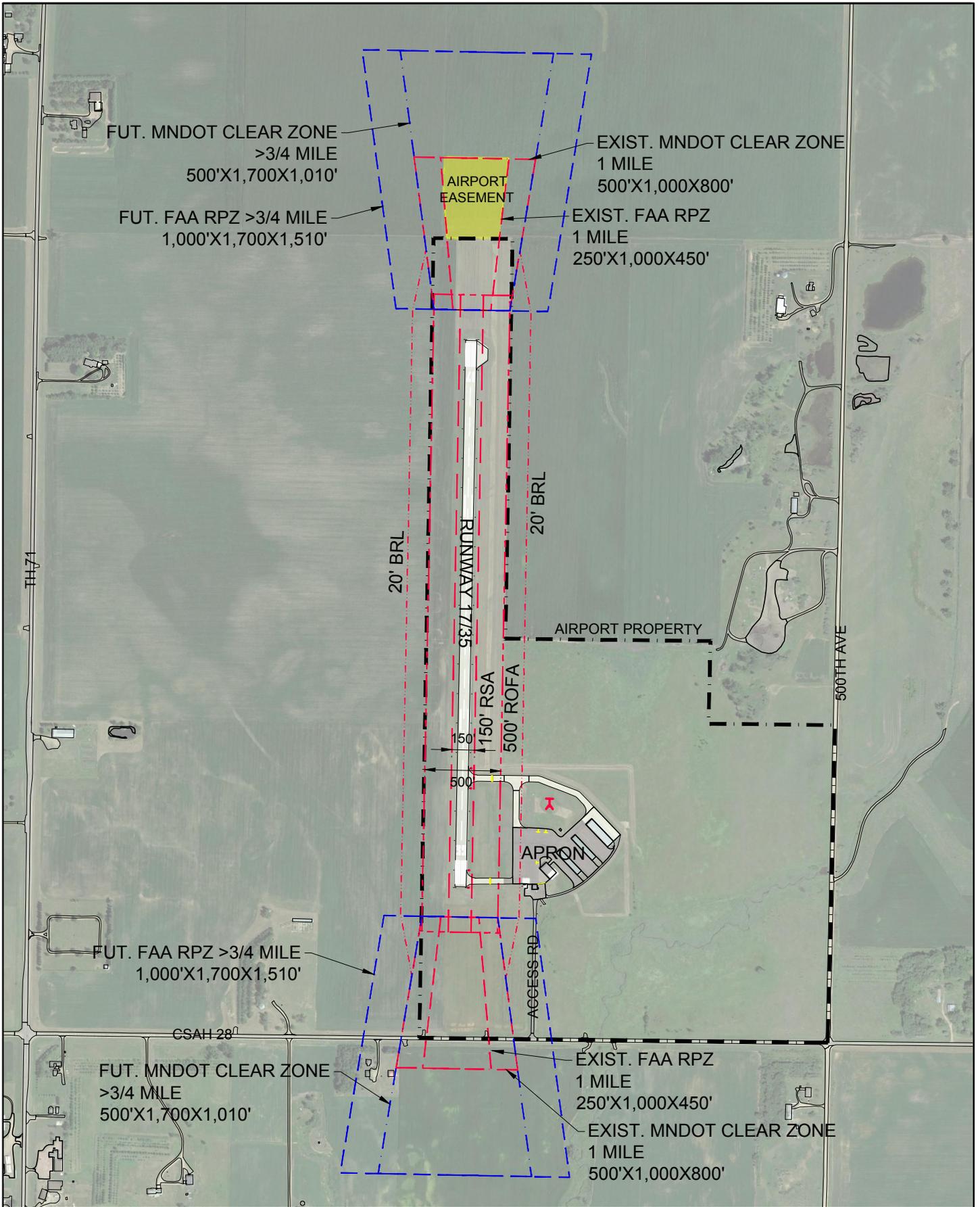
Recycling in the form of source separation has become the backbone for waste management programs. However, knowledge and convenience remain the driving force behind successful recycling programs. Knowledge in the form of waste education recommendations is presented above in **Section 4.7.2**. Convenience and availability are addressed here.

Three areas have been identified to establish and meet waste recycling goals for MWM:

1. Provide easy access, recycling bins on-site for basic recyclable material (newspaper, cardboard, cans, glass, and plastic) in order to promote recycling in areas with highest waste generation (like the A/D building) and the self-service fueling areas.
2. Provide centralized indoor storage area for the storage of problem materials, particularly those banned from land disposal including fluorescent lamps, electronics, appliances, HHW, used motor oil and motor oil filters, tires, lead acid, nickel-cadmium, and vehicle batteries.
3. Assign duties to airport personnel to monitor recycling bins and the problem material storage area and make arrangements, as necessary, to transport materials to appropriate recycling and/or drop-off locations. Records should be kept on the volume of material transported for recycling and compared to the volume of waste material generated in order to document the amount of waste that has been diverted from land disposal on an annual basis.

Once implemented, the programs should be evaluated annually and discussed with the Cottonwood County Solid Waste Administrator to determine if the waste reduction efforts are adequate, if there have been any regulatory changes, and whether any modifications are necessary.

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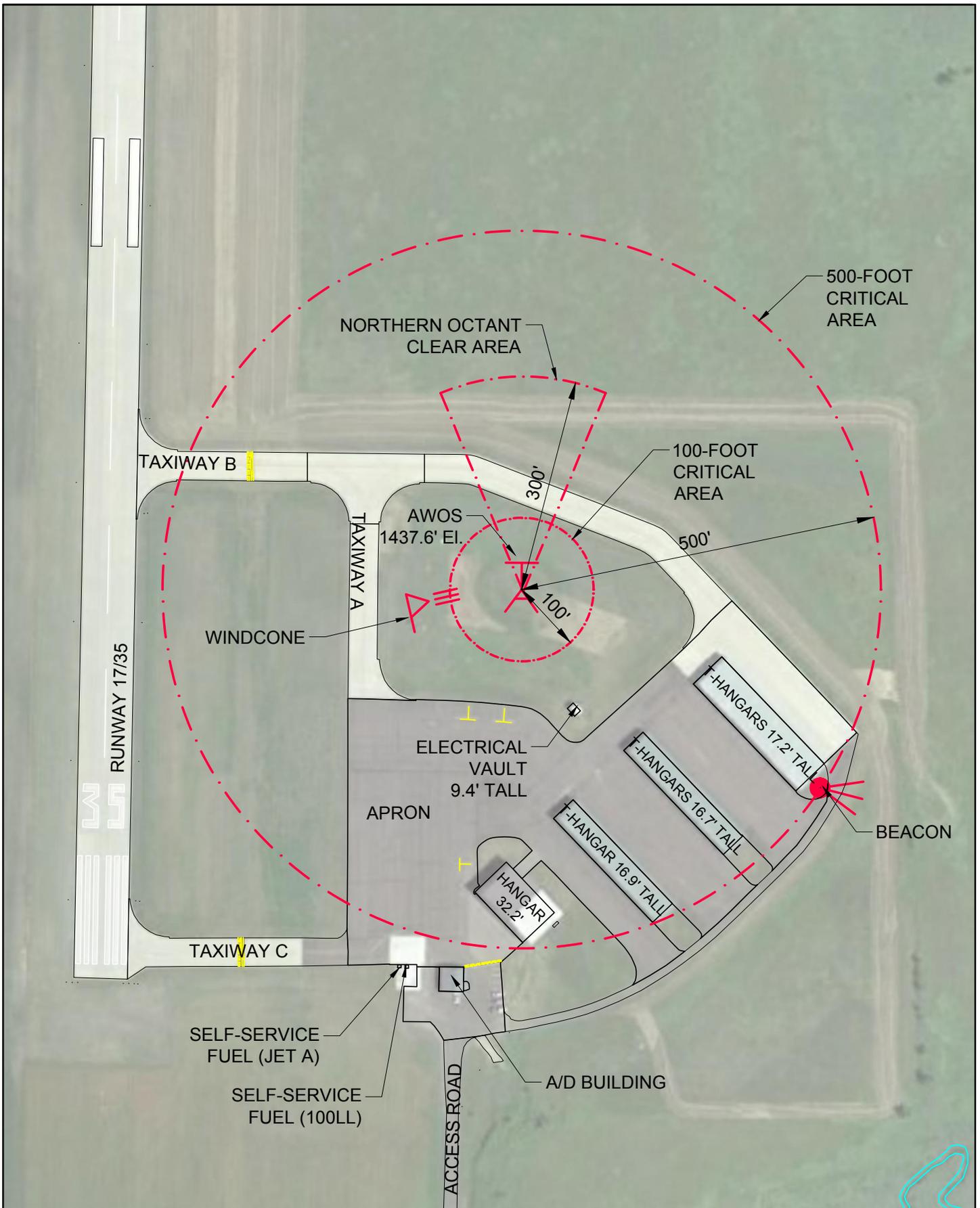
	AIRPORT MASTER PLAN
	WINDM 138969
	MARCH 2018

**WINDOM MUNICIPAL
 AIRPORT**
 DESIGN STANDARDS

Figure 4-1


 DRAWING SCALE IN FEET


S:\UZ\Windm\138969\5-final-dsgh\Master Plan\MWM_Fig 4-2 Existing AWOS Critical Area.dwg 3/29/2018 12:54 PM jzirbes



AIRPORT MASTER PLAN

WINDM 138969

MARCH 2018

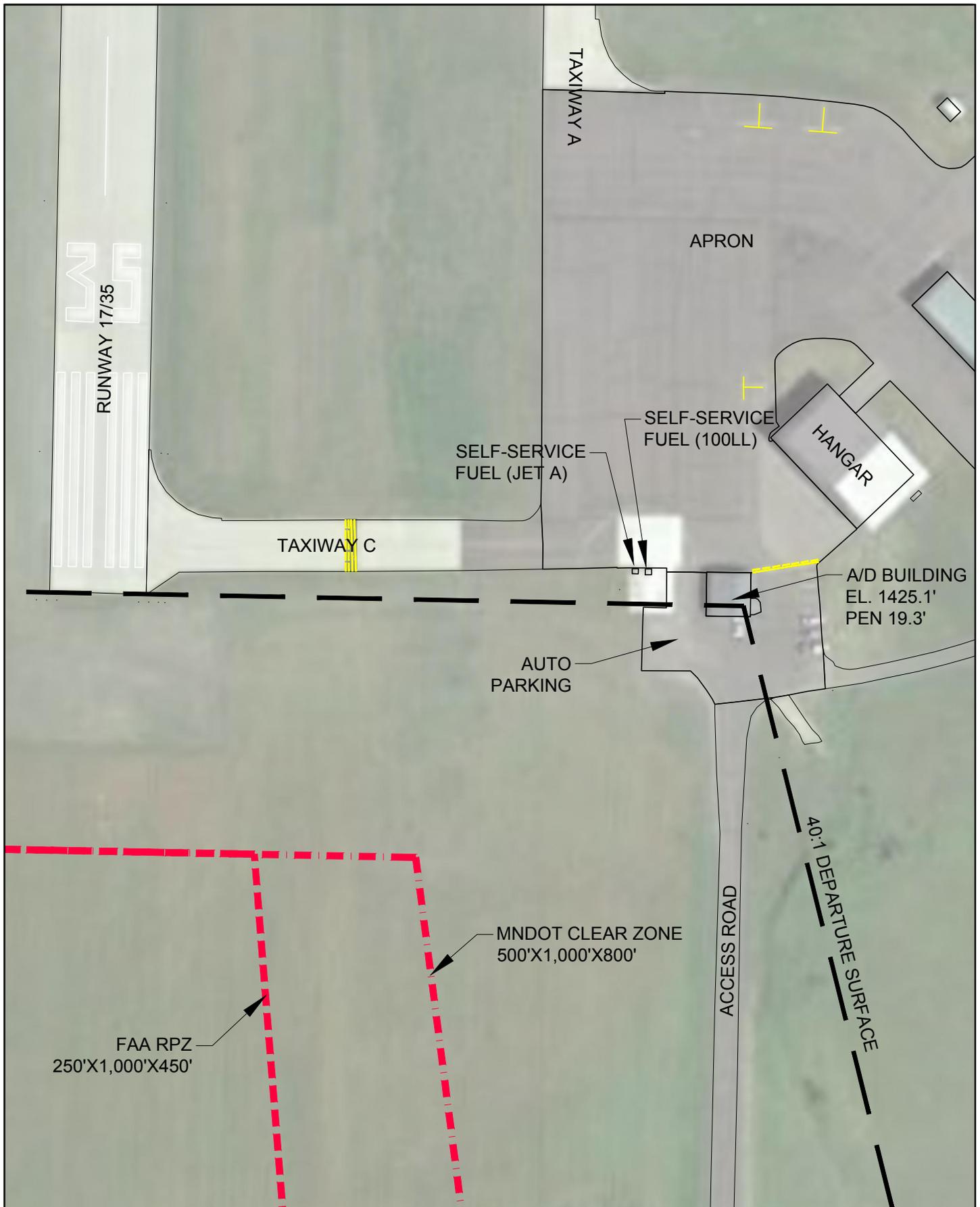
**WINDOM MUNICIPAL
AIRPORT**
EXISTING AWOS AND
CRITICAL AREAS

Figure 4-2



DRAWING SCALE IN FEET
0 90 180

S:\UZ\Windm\138969\5-final-dsgh\Master Plan\MwM_Fig 4-3 BLDG Area and Departure Surface.dwg 3/29/2018 1:50 PM jzirbes



AIRPORT MASTER PLAN

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MARCH 2018

WINDOM MUNICIPAL AIRPORT

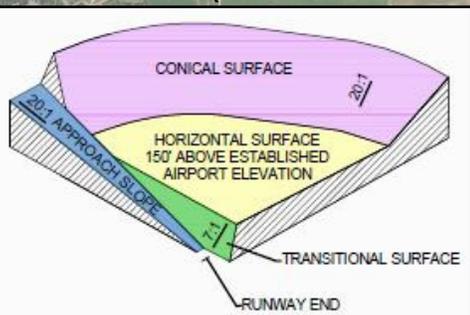
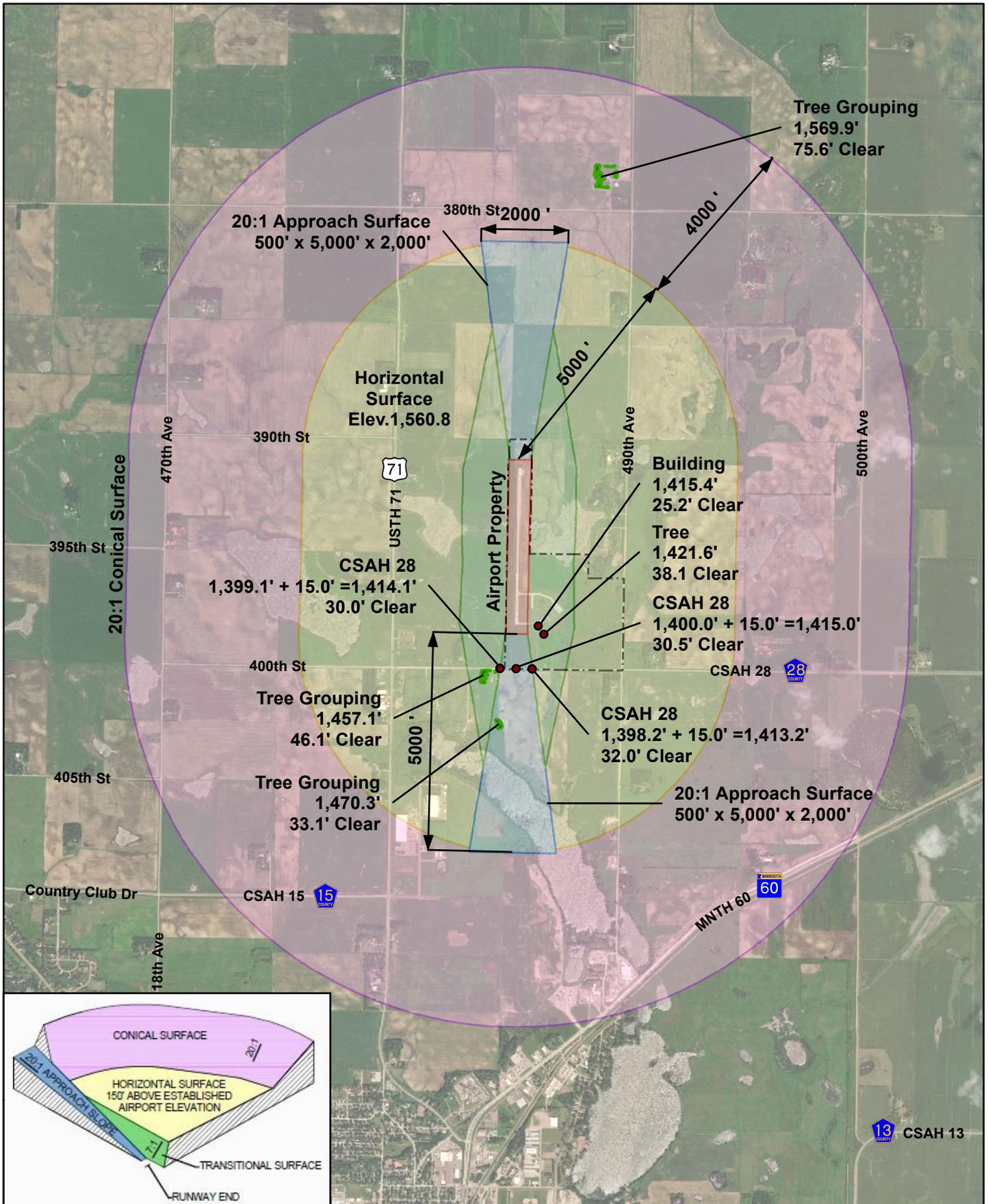
A/D BUILDING, PARKING LOT, AND ENTRANCE ROAD WITHIN RUNWAY 35 DEPARTURE SURFACE

Figure 4-3



DRAWING SCALE IN FEET
0 50 100

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CSAH 13



AIRPORT MASTER PLAN

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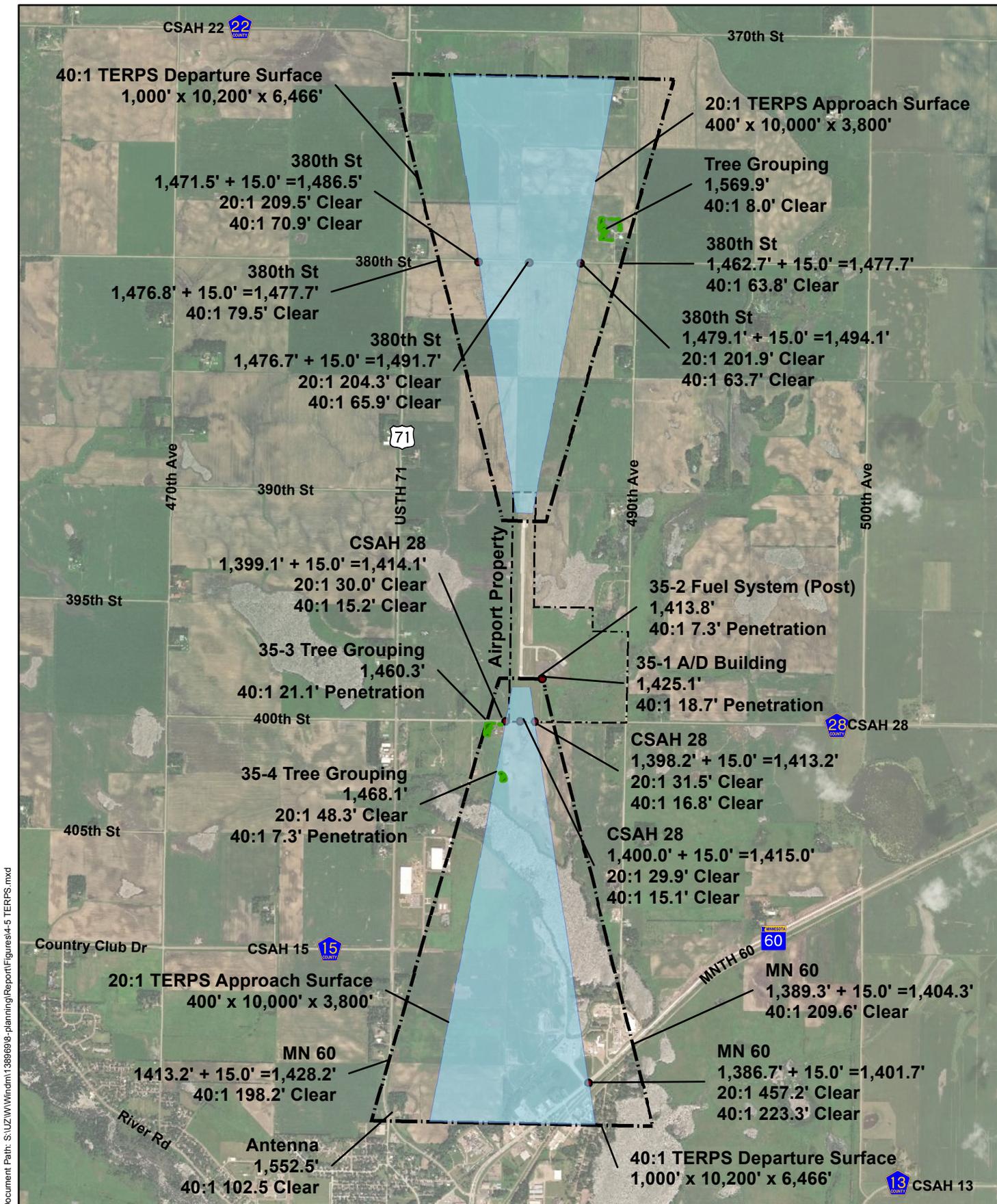
WINDOM MUNICIPAL AIRPORT

EXISTING PART 77 OBSTRUCTIONS

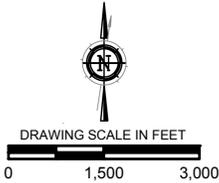
FIGURE 4-4



DRAWING SCALE IN FEET
0 1,500 3,000



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	AIRPORT MASTER PLAN	<h1 style="margin: 0;">WINDOM MUNICIPAL AIRPORT</h1> <p style="margin: 0;">EXISTING TERPS OBSTRUCTIONS</p>	<p>FIGURE 4-5</p> 
	WINDM 138969		
	APRIL 2017		

5 Alternatives Analysis

There are several key areas at Windom Municipal Airport (MWM) where improvements may be made to meet existing standards and to accommodate the existing and projected aviation demand.

Goals of the following development alternatives include:

- Comply with current FAA Design standards given in Advisory Circular (AC) 150/5300-13A, *Airport Design*
- Be compatible with other existing and proposed uses on and off the Airport
- Minimize negative environmental impacts
- Be cost effective

5.1 Runway 17/35 – Alternative Analysis 1

Runway 17/35's existing length of 3,599 feet with a pavement strength of 12,500 pounds for Single Wheel Gear (SWG) aircraft is adequate to accommodate the aircraft fleet currently using and forecasted to use MWM. The existing 2016 FAA Conditionally Approved Airport Layout Plan (ALP) shows a future length of 4,400 feet to an ultimate length of 5,000 feet. While there is currently not enough demand forecasted in the 20-year planning period to justify construction of a runway extension at this time, the City would like to evaluate if it remains appropriate and feasible that an ultimate extension for Runway 17/35 be shown on the ALP. Runway 17/35 alternatives analysis examines the ability of the existing airport site to accommodate a runway extension.

5.1.1 Considerations for Alternatives Development

There are several considerations and assumptions to developing alternatives for Runway 17/35, are discussed in detail in the sections that follow. All alternatives were designed to be comparable in the future conditions in order to provide equal comparison between the alternatives for this analysis.

- **Extensions to Runway 17** – Due to the proximity of the airfield to CSAH 28, all alternatives evaluate extensions to Runway 17 end (North), not to Runway 31 end (South).
- **Construction Cost Estimates** – For an equal comparison between alternatives, construction cost estimates developed for this alternatives analysis assumes Precision Approach Path Indicator (PAPIs) and Runway End Identifier Lights (REILs)²³ with Medium Intensity Runway Lights (MIRLs) for non-precision runways and an ILS with a Medium-Intensity Approach Lighting System (MALSR) and High Intensity Runway Lights (HIRLs) for precision approach runways. Cost estimates **do not** include costs for land or property acquisitions.
- **Wetland Impacts** - Impacting wetland areas should be minimized if upland alternatives are feasible and practicable.
- **Land and Property Acquisition** - The FAA recommends the Airport own all the land within the RPZs and Building Restriction Lines (BRLs) to ensure these areas are kept

²³ REILs are synchronized flashing lights that identify the beginning of the useable runway.

clear of incompatible land uses. As a result, the estimated land acquisition acreage estimates assumes the Airport owns or acquires land within the 20' BRL and the entire RPZs. To keep the Alternatives comparable, the land acquisition includes acquiring all land within the BRL and RPZ that is currently not owned in fee by the Airport. The cost estimates for land or property acquisitions are not included in this analysis, only the estimated acreage to be purchased.

- **MnDOT Airport Zoning** – The Airport is currently zoned for 'future' design consisting of the runway length of 3,600 feet for Runway 17/35, and future runway length of 4,200 feet for Runway 10/28. Changes in proposed airport zoning is identified.
- **Runway Design Standards** - Runway design standards are based on the Runway Design Code (RDC) of a runway. Since the future primary runway is planned to accommodate B-II Aircraft, the future condition for all runway alternatives are designed for B-II Aircraft. In order provide equal comparison between the alternatives, it is assumed the approach minimums are $>3/4$ mile visibility, *except in the case of Alternative 1D where a Precision Approach with visibility minimum at $1/2$ mile are evaluated.*
 - **Runway Safety Area (RSA)** is 150-feet wide centered on the runway centerline, and extends 300-feet beyond each runway end. RSA for Precision Approach (Alternative 1D) is 300-feet wide and end extends 600-feet beyond the runway end.
 - **Runway Object Free Area (ROFA)** is 500-feet wide centered on the runway centerline, and extends 300-feet beyond each runway end. ROFA for Precision Approach (Alternative 1D) is 800-feet wide and end extends 600-feet beyond the runway end.
 - **Runway Protection Zone (RPZ)** is 1,000 feet by 1,700 feet by 1,510 feet (inner width by length by outer width), and beginning 200-feet off each runway end. The RPZ is design for future approaches of $>3/4$ for both runway ends. RPZ for Precision Approach (Alternative 1D) is 1,000 feet by 2,500 feet by 1,750 feet.
 - **MnDOT Clear Zone** dimensions are 500 feet by 1,700 feet by 1,010 feet (inner width by length by outer width), and begin 200-feet off each runway end. Clear Zone dimensions for Precision Approach (Alternative 1D) is 1,000 feet by 2,500 feet by 1,750 feet.
- **Roads and Runway Protection Zones (RPZs)** - Per FAA Memorandum issued September 27, 2012, *Interim Guidance on Land Uses Within a Runway Protection Zone*, the FAA recommends that if any part of an airport project that changes the size or location of an RPZ, an airport should take all measures possible to remove and prevent any incompatible land uses from the RPZ. Roads are considered an incompatible land use.
- **Precision Approach** - MNDOT requires runways with a length of 5,000 feet or more to have a precision approach (e.g. Instrument Landing System) to at least one runway end (**Alternative 1D**). Improving the approach from non-precision to a precision approach increases the size safety areas (RSA, ROFA, RPZ, etc.), increases runway width from 75 feet to 100 feet, and requires the addition of an approach lighting system.
- **Part 77 Obstruction Analysis** – Prior to any airport development, a Part 77 evaluation must be conducted to verify that there will be no hazardous effect to air navigation due to construction. Obstruction data collected as part of this Master Plan only included the area within a non-precision approach to each runway end (limits of obstruction data collection are previously shown **Figures 4-4** and **4-5**), not a precision approach (which is significantly larger). An additional obstruction survey would be require to determine all possible obstructions to an ultimate precision approaches to each runway end.

5.1.2 Summary of Runway 17/35 Extension Alternatives

Runway 17/35 alternatives analysis examined the ability of the *existing airport site* to accommodate a runway extension. Four alternatives were developed for this analysis based on the FAA recommended runways as determined by AC 150/5325-4B, *Runway Length Requirements for Airport Design* (see **Section 4.2.4** of Report), as well as an alternative to evaluate the ability of MWM to better accommodate heavy multi-engine and corporate jet aircraft. Aspects of each of the ultimate runway length alternatives are summarized below and compared in **Table 1**.

- **Alternative 1A - Existing Condition:** Alternative 1A shows the existing condition of Runway 17/35 at 3,599 feet long and 75 feet wide with no ultimate improvements, see **Figure 5-1** and **5-1A**. The purpose of this alternative is to compare Runway 17/35's current length of 3,599 feet against the proposed alternative ultimate runway lengths. This alternative includes improved approaches greater than $\frac{3}{4}$ mile non-precision approaches to each runway end. Runway 17/35 is currently zoned for its existing length of 3,600 feet.
- **Alternative 1B – 4,100-feet:** Alternative 1B shows a 501-foot extension to Runway 35, for an ultimate length of 4,100 feet, as shown in **Figure 5-2** and **5-2A**. This alternative is to accommodate the minimum length need for the Citation Mustang's performance characteristics at MWM²⁴. This alternative includes greater than $\frac{3}{4}$ mile non-precision approaches to each runway end. Increasing the approach from 1-mile to $\frac{3}{4}$ -mile increases the RPZ size from 13.770 acres to 48.978 acres.
- **Alternative 1C – 4,400-feet:** Alternative 1C shows an 800-foot extension to Runway 35, for an ultimate length of 4,400 feet, as shown in **Figure 5-3** and **5-3A**. Alternative 2C is the recommended FAA Runway length to accommodate Small Airplanes with 10 or More Passenger Seats per AC 150/5325-4B, which includes the recommended takeoff length for the King Air 200.
- **Alternative 1D – 5,000-feet:** Alternative 1D shows a 1,401-foot extension to Runway 35, for an ultimate length of 5,000 feet, as shown in **Figures 5-4**, **5-4A**, and **5-4B**. The purpose of this alternative was to examine the ability of the airport sight to better accommodate heavy multi-engine and corporate aircraft. With a runway length 5,000 feet or longer, this would reclassify MWM from an Intermediate Airport to a **Key Airport**. Per the minimum system objectives in the 2012 MnDOT SASP²⁵, Key Airports' primary runway shall have a precision approach or "precision like approach" to at least one runway end with an approach lighting system. The addition of a precision approach or "precision like approach" would require a significant increase in the size of the safety areas (RSA, ROFA, RPZ, etc.), increased runway width from 75 feet to 100 feet, increased runway and parallel taxiway separation distance from 240 feet to 300 feet, and the addition of an approach lighting system.

Figure 5-4 examines the impacts of a precision approach to the Runway 17 end, and **Figure 5-4A** examines the impacts of a precision approach to the Runway 35 end. If the precision approach were added to the Runway 17 end a significant amount of excavation of an existing hillside would be required (see **Figure 5-4**). If the precision approach were added to the Runway 35 end, 400th Street would have to be closed where it lies beneath the Runway Protection Zone

²⁴ Takeoff Field Length of 4,100 feet is needed for in the Flaps 15° configuration. Length of 5,100 feet is needed for Flaps Up configuration. Takeoff Field Length, MTOW 8,645lbs, 15°Flaps, 86°F, 1,500' MSL.

²⁵ Minnesota State Airport System Plan. 2012.

(RPZ) (see **Figure 5-4**). For both options, a portion of the existing apron and building area will need to be relocated (see **Figure 5-4**).

Table 5-1 - Alternative 1 Analysis Summary

	Alternative 1A: 3,599' >3/4 Mile	Alternative 1B: 4,100' >3/4 Mile	Alternative 1C: 4,400' >3/4 Mile	Alternative 1D: 5,000' Precision
Est. Construction Cost ¹	\$40,000	\$500,000	\$700,000	\$6.5M ²
Land Acquisition ⁴ (Fee or Easement)	96 Acres	105 Acres	110 Acres	270 Acres
Re-Zoning Required	No	Yes	Yes	Yes
Zoning A + B Total Area	172 Acres	213 Acres	236 Acres	402 Acres
Roads in RPZ	CSAH 28	CSAH 28	CSAH 28	CSAH 28
Part 77 Approach Obstructions	None	None	None	Additional Data Needed ³
Wetland Impacts	0 Acres	0 Acres	0 Acres	1.5 Acres
Aircraft Types Accommodated	95% of Small Airplanes	95% of Small Airplanes + Citation 510	Small Airplanes ≥10 Passenger (e.g. King Air 200)	Heavy Multi-Engine & Corporate Jet
Misc.	None	None	None	<ul style="list-style-type: none"> • Upgrade MWM to Key Airport • Precision Approach Required • Relocate Parallel Taxiway A • Relocate CSAH 28, and portion of Hangar area

Notes:

¹Costs are in 2018 dollars, and include extensions of Runway 17/35, relocation of NAVAIDs, and addition of PAPIs.

²Costs for Alternative 1D include the installation of an ILS and Approach Lighting System. Costs do not include any wetland mitigation, or road and hangar area relocation.

³Obstruction data collected as part of the Master Plan only included the area within a non-precision approach to both runway ends, not a precision approach (which is significantly larger). An additional obstruction survey would be required to determine all possible obstructions to an ultimate precision approach.

⁴To keep the Alternatives comparable, the land acquisition includes acquire all land within the BRL and RPZ that is currently not owned in fee by the Airport.

Alternative 1C is the recommended alternative as it results in the least amount of impacts while providing the ability of Runway 17/35 to expand to an ultimate length of 4,400 feet when justified. Alternative 1C, is also the also the longest recommended length before requiring the Airport to upgrade to a Key Airport with a Precision Approach. Any planned extension to Runway 17/35 would require the Airport's Zoning Ordinance to be updated. The future zoning for each alternative are shown in **Figures 5-1A, 5-2A, 5-3A, and 5-4B**.

5.1.3 Runway 17/35 – Chosen Alternative

At the June 18th, 2018 meeting, the City chose Alternative 1C as the preferred alternative as it provides the longest justified length, at 4,400 feet, for Runway 17/35 when demand for an extension justified, without having to upgrade to a Key Airport with a Precision Approach. As a result, Alternative 1C will be shown on MWM's updated ALP.

Since Runway 17/35's extension would be shown as an ultimate condition, a Runway Protection Zone (RPZ) Analysis would not be required until such time as the project were being planned for construction.

5.2 Crosswind Runway – Alternative Analysis 2

A runway's orientation is a runway's alignment in relation to magnetic north. The prevailing wind direction(s) is the primary factor when determining runway orientation. Each aircraft has an acceptable crosswind component for takeoff and landing. Generally, the smaller the aircraft, the more it is affected. Per the FAA AC 150/5300-13A, *Airport Design*, when the current runway system provides less than 95% wind coverage for any aircraft that use the Airport on a regular basis, a crosswind(s) runway should be considered. The 95% coverage is computed on the basis of the crosswind not exceeding **10.5 knots for RDC A-I and B-I**; 13 knots for RDC A-II and B-II; 16 knots for RDC A-III, B-III, and C-I through D-III; and 20 knots for RDC A-IV through D-VI. Runway 17/35's orientation at MWM does not meet the FAA recommended 95% wind coverage (85.23%), as shown in **Table 5-2**.

Table 5-2 - MWM Wind Coverage: Runway 17/35

		10.5 knots	13 knots	16 knots
Runway 17/35	All	85.23%	91.12%	96.01%
	VFR	85.97%	91.59%	96.25%
	IFR	79.59%	87.64%	94.39%

Note¹: Calculated based on Runway 17/35 with True Bearing of 180.36°.

Source: Windom Municipal Airport AWOS 2007 to 2016. Obtained from the National Climatic Data Center.

Although MWM's Critical Aircraft is B-II Small, a crosswind runway is generally used to accommodate smaller A-I type aircraft, which have a maximum crosswind component of 10.5 knots. With this, an additional wind analysis was completed to determine the best orientation for a crosswind runway at MWM to accommodate A-I aircraft. **Table 5-3** shows that a runway orientation of 12/30 provides the highest percent of wind coverage at MWM at 97.48% at 10.5 knots. The existing 1979 Airport Zoning Ordinance indicates a future crosswind runway with an orientation of 10/28 and length of 4,200 feet. No coordinates were provided in 1979 Ordinance specifying the exact location of the future runway ends.

Table 5-3 - Crosswind Runway Orientation Analysis¹

Crosswind Runway Orientation	10.5 knots	
	All Weather	IFR
1/19	85.89%	80.45%
2/20	86.57%	81.25%
3/21	87.33%	82.04%
4/22	88.23%	82.98%
5/23	89.25%	83.95%
6/24	90.42%	85.07%
7/25	91.72%	86.44%
8/26	93.20%	88.11%
9/27	94.78%	90.18%
10/28	96.21%	92.69%
11/29	97.19%	94.98%
12/30	97.48%	96.44%
13/31	96.75%	96.46%
14/32	95.57%	95.51%
15/33	94.04%	93.71%
16/34	91.87%	90.26%
17/35	88.85%	85.15%
18/36	85.35%	79.78%

Note¹: All Weather, with Runway 17/35 at 10.5 Knots. Calculated based on primary runway of Runway 17/35 (True Bearing of 180.36°).

Source: Windom Municipal Airport AWOS. 2007 to 2016. Obtained from the National Climatic Data Center.

A crosswind runway is eligible for FAA and MnDOT funding when the recommended 95% wind coverage is not met by the primary runway at 10.5 knots (A/B-I aircraft) during all-weather conditions. A crosswind runway is justifiable when a demonstrated minimum of 500 annual operations be anticipated for crosswind runway use by A/B-I aircraft during all-weather conditions. The existing estimated 2018 annual operations at MWM is 9,383, with an estimated 8,632 operations conducted by A-I/B-I aircraft (Year 2018, see **Section 2.10, and 4.2.8**). A crosswind runway with an orientation 12/30 would increase wind coverage by 9.77% for A-I/B-I aircraft (95% - 85.23%), which would accommodate an estimated 843 annual operations by A-I/B-I aircraft in 2018 (9.77% x 8,632), and approximately 936 annual operations by A-I/B-I in 2038 (12.25% x 9,584). These estimates exceed the minimum threshold of 500 operations for a crosswind runway to be justifiable and fundable by the FAA and MnDOT. **As a result, a crosswind runway is recommended at MWM.**

5.2.2 Considerations for Alternatives Development

The 2016 Conditionally Approved ALP showed a future crosswind runway at MWM with an orientation of 11/29, at length of 3,000 feet and width 60 feet. This analysis evaluates a crosswind runway location, as well as length and width of a future crosswind runway at MWM. There are several considerations to developing alternatives for a crosswind runway at MWM, which include:

- **Runway Design Standards** – All alternatives are designed for A/B-I Small Aircraft, for Visual Approaches to each end (non-precision approaches are not ultimately needed/recommended).
- **Runway Width** – Design standards for an A/B-I runway is a runway width of 60 feet
- **Runway Length** –The majority of the A-I and B-I aircraft that will utilize the crosswind runway are agricultural spray aircraft operated by Olsem Aerial Application Service and Country Pride Services (Senex). Olsem Aerial operate a Grumman G164A and Aero Commander, and Country Pride Service (Senex) operate Air Tractors 5 and 6, and an Aero Commander. Additional small aircraft that operate regularly at MWM include, but not limited to, the Cessna 172, Cessna 208, and Piper Cherokee. The runway lengths shown in **Table 5-4** were determine using the procedures describe in Chapter 4 of AC 150/5325-4B, *Runway Length Requirements for Airport Design*. The runway length needs for these aircraft range from approximately 1,700 feet to 2,300 feet, shown in **Table 5-4**. The lengths were then increased by a factor of 1.2 due to length friction available for braking action on turf runways than paved runways, per guidance in AC 150/5300-13A, *Airport Design* Paragraph 314. In addition, Minnesota Administration Rules Chapter 8800.1600 requires a minimum runway length of 2,000 feet. Discussions with Airport Management, users, and data collected from user surveys indicated a crosswind runway length of 2,500 feet would adequately accommodated MWM existing and forecast A/B-I users. As a result, the proposed crosswind runway alternatives are designed to a length of minimum length 2,500 feet to accommodate the needs of the smaller A/B-I aircraft and to meet Chapter 8800 requirements.

Table 5-4 - Crosswind Runway Length Analysis

Aircraft	MWM Adjusted Takeoff Distance ¹	Length Increased by 20% ²
Air Tractor 5 & 6	1,690'	2,030'
Aero Commander	1,830'	2,200'
Grumman G164A	2,070'	2,490'
Cessna 172	2,360'	2,830'
Cessna 208	2,100'	2,520'
Piper Cherokee	2,300'	2,760'

¹ Max Takeoff Weight (MTOW), temperature 85.3°F, 1,410' MSL, 50' obstacle, 0% flaps, no wind.

²AC 150/5300-13A Paragraph 314, recommends that the length be increased by factor of 1.2. Lengths shown were rounded to nearest ten.

- **Crosswind Runway Orientation / Wind Coverage** - All alternatives attempt to align the crosswind runway as close to an orientation of 12/30 as possible in order to achieve maximum wind coverage.
- **Existing and Future Building Area** – The crosswind runway alternatives are designed to minimize any impacts or restrictions to the limited area available for the hangar area in order to provide the maximum amount of land available for hangar development.
- **Wetland Impacts** - Impacting wetland areas should be minimized if upland alternatives are feasible and practicable.
- **MN Airport Safety Zones** - In Minnesota, land use safety zoning is required under Minnesota Rules Chapter 8800.2400, and include Safety Zone A, Safety Zone B, and

Safety Zone C. These zones are intended to restrict land uses that may be hazardous to the operational safety of aircraft.

- **Land Acquisition** - In order to have equal comparisons between alternatives, it is assumed all land within the future BRLs, RPZs, and AWOS Critical Area will be acquired in fee or easement.
- **Potential Surface Mining** – As noted in **Section 4.5.2**, the City of Windom was approached in regards to potential surface mining at the Airport, on the northern portion of Parcel 8 (see **Figure 1-14**). AS this is the location of the proposed crosswind runway, if the mining opportunity advances, the mining plan should include a reclamation plan to restore the land for the before the future proposed crosswind runway can be constructed.

5.2.3 Summary of Crosswind Runway Alternatives

Three alternatives for possible crosswind runway locations and orientations were evaluated.

- **Alternative 2A** - crosswind runway orientation (Runway 11/29) per the 2016 ALP, see **Figure 5-5**. This alternative shows a crosswind runway with a length of 3,000 feet and orientation of 11/29.
- **Alternative 2B** - Rotates the 2016 ALP crosswind runway to an orientation of 12/30 which increases wind coverage, at a length to 2,500 feet; this reduces the amount of wetland impacts. This alternative also reduces the land acquisition required, as shown in **Figure 5-6**. This length would accommodate the majority of A/B-I aircraft that utilizes MWM.
- **Alternative 2C** –This alternative preserves the 2016 ALP crosswind runway to an orientation at 11/29, but decreases the length from 3,000 feet to 2,500 feet, as shown in **Figure 5-7**. This length would accommodate the majority of A/B-I aircraft that utilizes MWM.

Table 5-4 summarizes all the impacts and design considerations for all alternatives.

Table 5-5 - Alternative 2 Analysis Summary

Items	Alternative 2A RW 11/29 2016 ALP	Alternative 2B RW 12/30 2,100'x60'	Alternative 2C RW 11/29 2,100'x60'
Length & Width	3,000'x60'	2,500'x60'	2,500'x60'
Est. Construction Cost ¹	\$1.4M	\$1M	\$1M
Wind Coverage	97.19%	97.48%	97.19%
Increase in Wind Coverage	11.96%	12.25%	11.96%
Estimated Annual Operations Accommodated (2018)	1,032	1,057	1,032
Wetlands Impacted	0.9 Acres	0.0 Acres	0.0 Acres
Land Acquisition for RPZ, RVZ & BRLs (Easement or Fee) ²	30 .90 Acres	21.4 Acres	22.9 Acres
Land Acquisition for AWOS Critical Area (Easement or Fee) ³	7.16 Acres	4.32 Acres	7.16 Acres
Re-Zoning Required	Yes	Yes	Yes
Zoning A + B (Total Area)	37.9 Acres	28.7 Acres	28.7 Acres
Notes: ¹ Costs are in 2018 dollars, and include engineering and construction. Costs do <u>not</u> include any wetland mitigation, or land acquisition. ² To keep the Alternatives comparable, the land acquisition includes acquire <u>all</u> land within the future 20-foot BRL, RVZ, and RPZ. ³ Land acquisition estimate includes all land in the 500-foot Critical Area not already owned by the Airport.			

Alternative 2C is the recommended alternative, as it results in the most amount of runway length with minimal amount of wetland impacts while providing increased wind coverage. Any planned crosswind runway other than at an orientation of 10/28 with a length of 4,200 feet will require the Airport's Zoning Ordinance to be updated. The future zoning for each alternative are shown in Figures 5-5A, 5-6A, and 5-7A.

5.2.4 Crosswind Runway – Chosen Alternative

At the June 18th, 2018 meeting, the City chose Alternative 2B as the preferred alternative as it provides the maximum combined wind coverage of 97.48% with minimal estimated wetland impacts, at a length of 2,500 feet, which accommodates the majority of A/B-I aircraft that utilize MWM. As result, Alternative 2B will be shown on MWM's updated ALP.

5.3 Hangar Development – Alternative Analysis 3

There is a large demand for hangar space at MWM. Alternatives were examined utilizing the existing areas southeast of the existing apron area to help meet immediate and long-term hangar demands. There are several constraints that must be taken into account for any future hangar development (shown in **Figure 5-8**). The constraints include:

- **Building Restriction Line (BRL)** – A BRL is a line that identifies suitable and unsuitable locations for buildings on an airport, with a goal of preventing buildings from obstructing the Part 77 Imaginary surfaces. At MWM a 25-foot BRL is shown for the alternative analysis. This line represents the closest a 25-foot tall structure can be built adjacent to each runway.

- **AWOS 500-foot Critical Area** – Per FAA Order 6560.20B, *Siting Criteria for Automated Weather Observing Systems (AWOS)*, all structures within 500 feet of the AWOS be at least 15 feet lower than the height of the AWOS sensor, and be no greater than 10 feet above the sensor from 500 feet to 1,000 feet from sensor.
- **Runway Protection Zone (RPZ)** - A RPZ is a trapezoidal shaped area off each runway end designed to enhance the safety and protection of people and property on the ground. It is desirable that entire RPZ be clear of all above-ground objects. Airport service roads that are directly controlled by the Airport operator are permissible within the RPZ; however, public roads are discouraged.
- **MnDOT Clear Zone** – MnDOT Clear Zone is also a trapezoidal shaped area off of each runway end to restrict land uses that may be hazardous to the operational safety of aircraft, and to protect life and property in the runway approach areas.
- **Runway Visibility Zone (RVZ)** – A RVZ is the area formed by imaginary lines connecting the two runways' line of sight points. The RVZ is required to ensure clear visibility for converging aircraft when an airport has intersecting runways. The terrain needs to be graded and permanent objects need to be designed or sited so that there will be an unobstructed line of sight from any point five feet above one runway centerline to any point within the runway visibility zone. The RVZ shown reflects the chosen crosswind alternative 2B.

5.3.1 Summary of Hangar Development Alternatives

Three alternatives were developed utilizing the areas shown in blue southeast of the existing apron area to help meet hangar demands, and are shown in **Figures 5-7, 5-8, and 5-9**. Aspects of each of the hangar alternatives are summarized below and compared in **Table 5**.

- **Alternative 3A (Figure 5-9)** – Future hangar development as shown on the 2016 Airport Layout Plan (ALP). This alternative includes locations for larger/corporate sized box hangars as well as ADG Group I nested T-hangars. However, this alternative does not provide the Taxilane Object Free Area (TOFA) separation of 115 feet for direct access between the self-service fueling station and FBO hangar. This alternative also illustrates the extensive future auto parking lot expansion as shown on the 2016 ALP.
- **Alternative 3B (Figure 5-10)** – Alternative 3B provides additional locations for larger box hangars and reduces the number of T-hangar structures. Alternative 3B also shifts the tie-down and apron orientation to be parallel with existing conditions, and allows for a specific tiedown location for ADG II aircraft.
- **Alternative 3C (Figure 5-11)** – Alternative 3C is a combination of Alternative 3A and 3B. This variation takes the apron and tiedown layout of the 2016 ALP (Alternative 3A) and the building layout from Alternative 3B. Unlike the layout for Alternative 3A, this alternative provides the necessary 115 foot taxilane separation for ADG II aircraft on the northwestern taxilane.

Table 5-6 summarizes all the impacts and design considerations for all alternatives.

Table 5-6 - Alternative 3 Analysis Summary

	Alternative 3A – 2016 ALP Figure 5-9	Alternative 3B Figure 5-10	Alternative 3C Figure 5-11
Group I Hangars	3 - T-Hangar Buildings	8 - 60'x60' Box Hangars 2 - Box Hangar Buildings 1 - 80'x60' Box Hangar	8 - 60'x60' Box Hangars 2 - Box Hangar Buildings 1 - 80'x60' Box Hangar
Group II Hangars	5 - 60'x60' Box Hangars 1 - 50'x215' Box Hangar Building 1 - 60'x100' Box Hangar	4 - 80'x80' Box Hangars 1 - 50'x215' Box Hangar Building 1 - 60'x100' Box Hangar	4 - 80'x80' Box Hangars 1 - 50'x215' Box Hangar Building 1 - 60'x100' Box Hangar
Apron Expansion	North-South	Northeast-Southwest	North-South
Tiedowns	14	17 – Group I Tiedowns 3 – Group II Tiedowns	14
Misc.	<ul style="list-style-type: none"> Needs plan to relocated A/D and auto parking outside Departure Surface Needs plan for future SRE building 	<ul style="list-style-type: none"> Future SRE Building Relocated A/D Building¹ Additional automobile parking Relocate Electrical Vault² 	<ul style="list-style-type: none"> Future SRE Building Relocated A/D Building¹ Additional automobile parking Relocate Electrical Vault²
<p>Notes:</p> <p>¹Existing A/D Building is within the existing 40:1 Departure Surface (see Section 4.3.2), as a result needs to be relocated at the end its useful life.</p> <p>²Existing electrical vault is within the ADG II 115-foot TOFA. As a result needs to be relocated.</p>			

5.3.2 Hangar Development – Chosen Alternative

At the June 18th, 2018 meeting, the City chose Alternative 3C as the preferred alternative as the north-south apron layout does not required the relocation of the existing AWOS and provides the most box hangar locations. AS a result, Alternative 3C will be shown on MWM's updated ALP.

5.4 Ultimate Airspace and Obstructions

5.4.1 Part 77 Imaginary Surfaces

Previously discussed in **Section 4.4**, 14 Code of Federal Regulations (CFR) Part 77 defines and establishes the standards for determining obstructions to an airport's imaginary surfaces. Imaginary surfaces are geometric shapes that are in relation to the Airport and each runway, as defined in 14 CFR Part 77.

The ultimate size and dimensions of each imaginary surface is based on the category of each runway for existing and planned airport operations. In respect to 14 CFR Part 77, Runway 17/35 is 4,400 feet long and 75 feet wide. Runway 17 and 35 are "Utility Runways" with non-precision

instrument approaches with visibility greater than ¾ mile. Runway 11/29 is 2,500 feet long and 60 feet wide with visual approaches.

The five imaginary surfaces and their dimensional criteria for MWM's ultimate conditions are defined in **Table 5-7** and shown in **Figure 5-12**. Similarly to MWM's existing condition, there are no obstructions to MWM's Ultimate Part 77 Imaginary Surfaces, as shown in **Figure 5-12**.

Table 5-7 - Part 77 Imaginary Surfaces

Imaginary Surface	Ultimate Dimensions	Definition
Primary Surface	RW 17/35: 500' x 4,800'; extends 200' beyond each runway end RW 12/30: 250' x 2,500', ending at each runway end	Imaginary obstruction-limiting surface that is specified as a rectangular surface longitudinally centered about a runway. A surface longitudinally centered on a runway.
Approach Surface	RW 17/35: 500' x 5,000' x 2,000' ¹ ; 20:1 Slope RW 12/30: 250' x 5,000' x 1,250' ¹ ; 20:1 Slope	Imaginary obstruction-limiting surface that is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance upon the type of available or planned approach by aircraft to a runway.
Horizontal Surface	Arc Radius of 5,000' ² ; from the end of each primary surface at elevation of 1,1560.8'	Imaginary obstruction-limiting surface that is specified as a portion of a horizontal plane surrounding a runway and is located 150 feet above the established airport elevation. The perimeter of which is constructed by swinging arcs of a specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs.
Conical Surface	4,000' from Horizontal; 20:1 Slope	Imaginary obstruction-limiting surface that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
Transitional Surface	Slope of 7:1	Imaginary obstruction-limiting surface that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary and approach surfaces
<p>Note¹: Inner Width by Length by Outer Width Note²: From the center of each end of primary surface and connecting the adjacent arcs by the lines of tangent.</p>		

5.4.2 Terminal Instrument Procedures (TERPS) Approach Surface

The Terminal Instrument Procedures (TERPS) (Order 8260.3B) prescribes the criteria for the creation, approach, and publishing of approach and departure procedures to an airport, as

previously discussed in **Section 4.4.2**. The standards for a TERPS surface were determined using Table 3-2 of Engineering Brief 99.

For the ultimate condition (shown in **Figure 5-13**): Runway 17/35 has a TERPS Approach Surface with the inner edge being 400 feet wide and expand uniformly to a width of 3,400 feet at a distance of 10,000 feet at a slope of 20:1. Runway 12/30 has a TERPS approach surface with the inner edge being 250 feet wide and expand uniformly to a width of 700 feet at a distance of 2,250 feet, and then additional distance of 2,750 feet at the width of 2,250 feet. There are no obstructions to MWM's ultimate TERPS Approach Surfaces.

The ultimate conditions (shown in **Figure 5-13**): Runway 17/35 has a TERPS Departure Surface with the inner edge being 1,000 feet wide and expand uniformly to a width of 6,466 feet at a distance of 10,200 feet at a slope of 40:1. Runway 12/30, as visual runway, does not have a Departure Surface. Per the August 2016 AGIS Survey, here are two tree grouping that obstructions to Runway 35's existing and ultimate TERPS Departure Surface and one tree grouping obstructs Runway 17's ultimate TERPS Departure Surface, as shown in **Figure 4-5** are previously listed in **Table 4-10**.

5.5 Ultimate Zoning

5.5.1 Minnesota Airport Obstruction Zoning

As previously discussed in **Section 4.6**, the purpose of the Airspace Obstruction Zoning is to ensure that no objects penetrate the 14 CFR Part 77 imaginary surfaces, except when necessary to airport operations. **Table 5-5** shows the existing Obstruction Zoning per the 1979 Windom Municipal Airport Zoning Ordinance, recommended ultimate dimensional criteria, and use restrictions for MWM's Airspace Obstruction Zones. The current zoning is based off an ultimate runway length of 4,400 feet for Runway 17/35 (see **Section 4.2.4** and **5.1**), and 2,500 feet for Runway 12/30 (**Section 5.2**). All zones prescribed in the ordinance below meet the criteria of the MnDOT zoning requirements.

As shown in **Table 5-8**, *it is recommended that zoning ordinance be updated to reflect the ultimate extension of Runway 17/35 to 4,400 feet and future crosswind Runway 12/30 at a length of 2,500 feet.*

Table 5-8 - MWM Airspace Obstruction Zoning Standards

Airspace Zones	Existing Dimensional Criteria	Ultimate Dimensional Criteria
Primary	RW 17/35: 500' x 4,000' RW 10/28: 500' x 4,600'	RW 17/35: 500' x 4,800' RW 12/30: 250' x 2,500'
Approach ¹	RW 17/35: 500' x 10,000' x 3,500' ¹ ; 40:1 Slope RW 10/28: 500' x 10,000' x 3,500' ¹ ; 40:1 Slope	RW 17/35: 500' x 5,000' x 2,000' ¹ ; 20:1 Slope RW 12/30: 250' x 5,000' x 1,250' ¹ ; 20:1 Slope
Horizontal	Arc Radius of 6,000' ²	Arc Radius of 5,000' ³
Conical	4,000' from Horizontal; 20:1 Slope	Same
Transitional ⁴	Slope of 7:1 ³	Same
<p>Note¹: Inner Width by Length by Outer Width Note²: 150 feet above airport elevation (1,561.0'); from the center of each end of primary surface and connecting the adjacent arcs by the lines of tangent. Note³: 150 feet above airport elevation (1,1560.8'); from the center of each end of primary surface and connecting the adjacent arcs by the lines of tangent. Note⁴: Extending upward and outward from the sides of the primary zones and from the sides of the approach zones until they intersect the horizontal surface.</p>		

Source: Windom Municipal Airport Zoning Ordinance, 1979 (see Appendix B)

5.5.2 Minnesota Airport Safety Zoning

As discussed in **Section 4.6**, the purposes of the Land Use Safety Zones are to ensure that the areas around the Airport are clear of incompatible land uses, enhancing the safety of pilots and aircraft, as well as protecting people and property on the ground. **Table 5-6** shows the existing Safety Zones per the 1979 Windom Municipal Airport Zoning Ordinance and ultimate Safety Zones A, B, and C. The existing zoning ordinance is based on an ultimate runway length of 4,400 feet for Runway 17/35 and 2,500 feet for Runway 12/30, and are described in **Table 5-9**.

As shown in **Table 5-9**, **it is recommended that zoning ordinance be updated to reflect the ultimate extension of Runway 17/35 to 4,400 feet and future crosswind Runway 12/30 at a length of 2,500 feet.**

Table 5-9 - MWM Safety Zone Standards

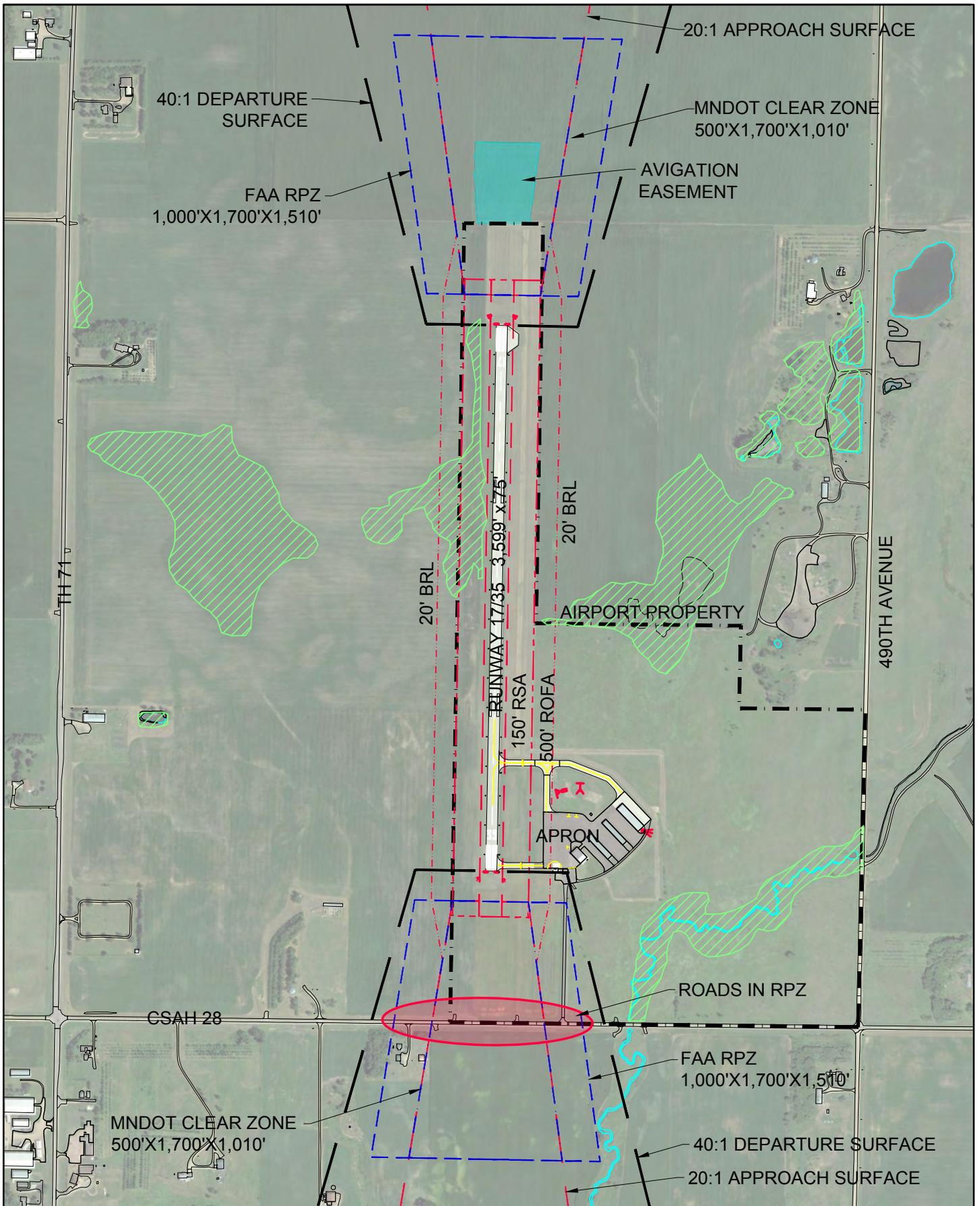
Zone	Existing Dimensional Criteria	Ultimate Dimensional Criteria	Use Restrictions
A	RW 17/35: 500' x 2,400' x 1,220' ¹ RW 10/28: 500' x 2,800' x 1,340' ¹	RW 17/35: 500' x 2,933' x 1,380.0' ¹ RW 12/30: 250' x 1,667' x 583.3' ¹	Shall contain no buildings, temporary structures, exposed transmission lines, or other similar above-ground land use structural hazards, and shall be restricted to those uses which will not create, attract, or bring together an assembly of persons thereon. Permitted uses may include agriculture (seasonal corps), horticulture, animal husbandry, raising livestock, wildlife habitat, light outdoor recreation (non-spectator), cemeteries, and auto parking.
B	RW 17/35: 1,220' x 1,200' x 1,580' ¹ RW 10/28: 1,340' x 1,400' x 1,760' ¹	RW 17/35: 1,380' x 1,467' x 1,820' ¹ RW 12/30: 583.3' x 833' x 750' ¹	Land included in Zone B shall be restricted in use as follows: a. Each use shall be on a site whose area shall not be less than three acres. b. Each use shall not create, attract, or bring together a site population that would exceed 15 times that of the site acreage. c. Each site shall have no more than one building plot up which any number of structures may be erected. A building plot shall be a single, uniform and non-contrived area, whose shape is uncomplicated and whose area shall not exceed the minim ratios with respect to the total site area.
C	All that land within the perimeter of the Part 77 horizontal surface, which is not included in Zone A or Zone B. Radius of 6,000' ²	Same Radius of 5,000' ²	No use shall be made of any land which creates or causes interference with the operation of radio or electronic facilities on the Airport, makes it difficult for pilots to distinguish between airport lights and other lights, results in glare in the eyes of pilots using the Airport, impairs visibility in the vicinity of the Airport, or otherwise endangers the landing, taking off, or maneuvering of aircraft.
Note ¹ : Inner Width by Length by Outer Width Note ² : From the center of each end of primary surface and connecting the adjacent arcs by the lines of tangent.			

Source: Windom Municipal Airport Zoning Ordinance, 1979 (see Appendix B)

5.6 Summary of Alternative Analysis Recommendations

Below is a summary of the chosen and recommended airport improvements as a result of the alternatives analyses:

- Show an ultimate extension to 4,400 feet to the north for Runway 17/35 (Alternative 1C, **Section 5.1.3**).
- Shown a future turf crosswind Runway 12/30 (Alternative 2B, **Section 5.2.4**).
- Show future and ultimate hangar development (Alternative 3C) on Airport Layout Plan (**Section 5.3.2**).
- Acquire all land within the existing and future RPZs and BRLs (in fee or easement) to ensure these areas are kept clear of incompatible land uses (**Sections 4.2.7, 5.1.3, and 5.3.2**).
- Mitigate obstructions to MWM's existing and ultimate Part 77 and TERPS surfaces (**Sections 4.4 and 5.4**).
- Update zoning ordinance to reflect the ultimate extension of Runway 17/35 to 4,400 feet and future turf crosswind Runway 12/30 at a length of 2,500 feet (**Section 5.5**).




AIRPORT MASTER PLAN

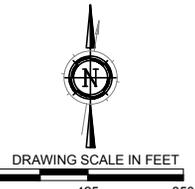
WINDM 138969

JUN 2018

WINDOM MUNICIPAL AIRPORT

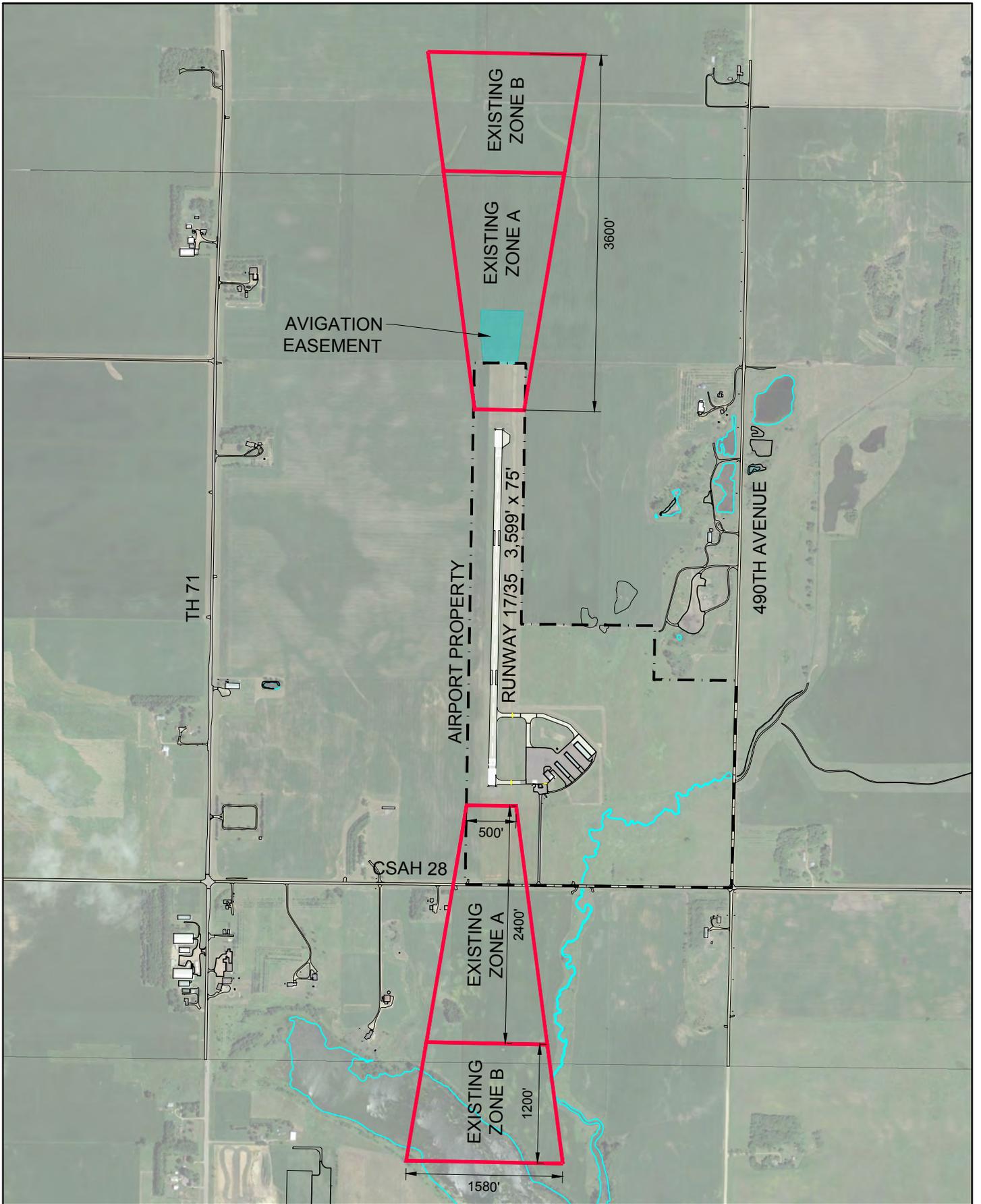
ALTERNATIVE 1A
EXISTING LENGTH: 3,599'
B-II SMALL, 3/4 MILE, UTILITY

Figure 5-1



DRAWING SCALE IN FEET

0 425 850



AIRPORT MASTER PLAN

WINDM 138969

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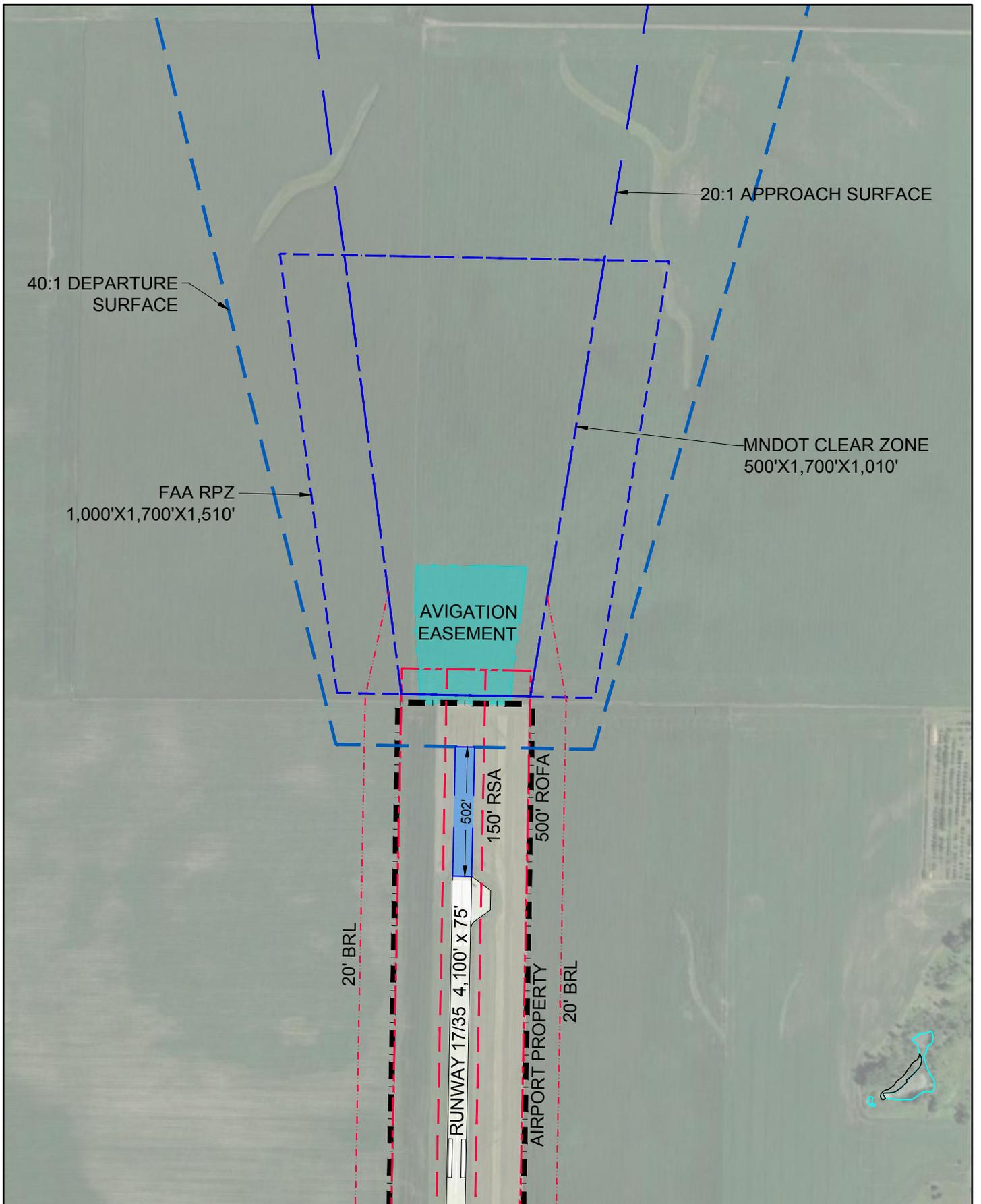
**WINDOM MUNICIPAL
AIRPORT**
ALTERNATIVE 1A
EXISTING LENGTH: 3,599'
B-II SMALL, 3/4 MILE, UTILITY

Figure 5-1A



DRAWING SCALE IN FEET





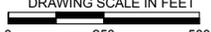
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	JUNE 2018

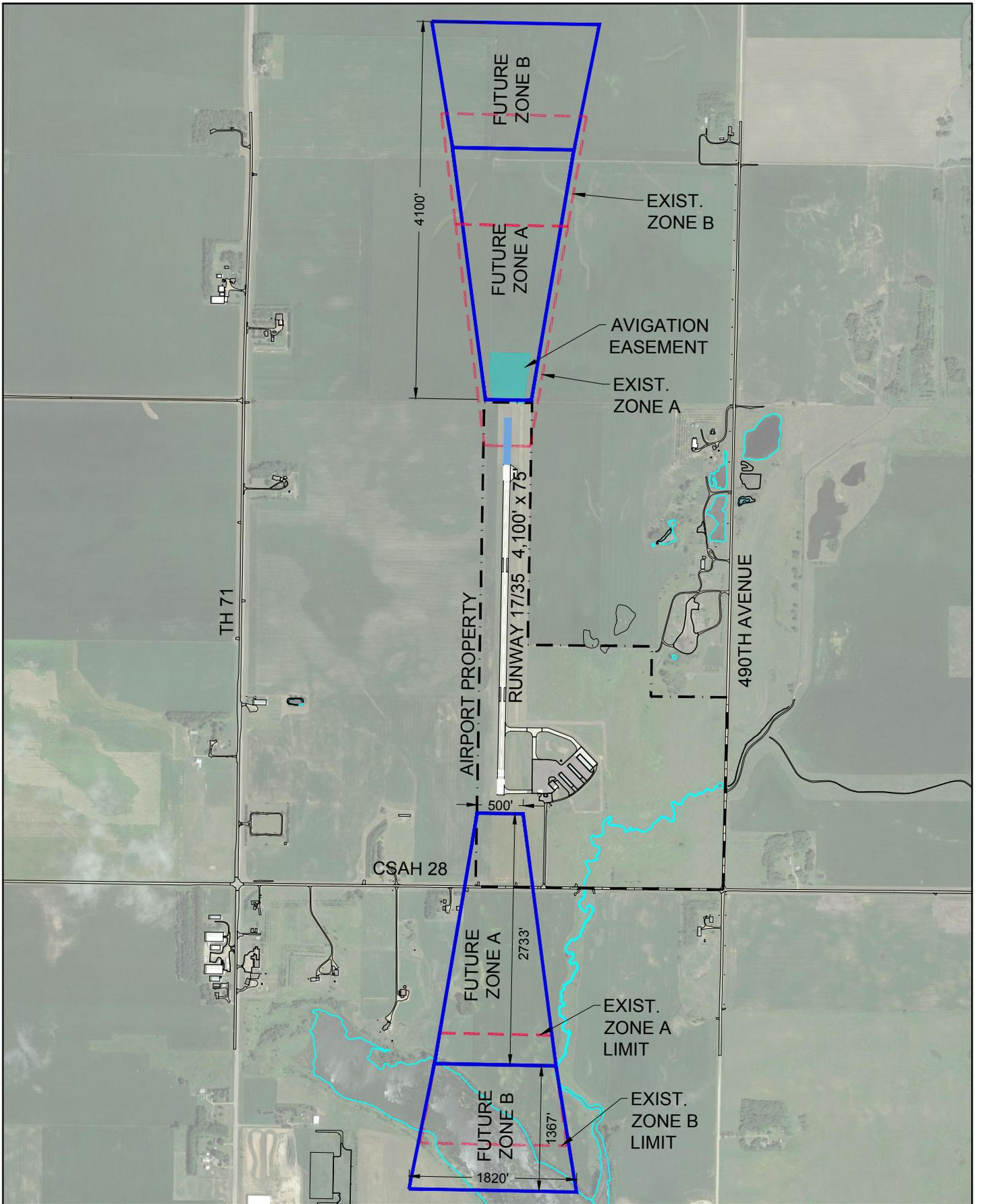
WINDOM MUNICIPAL AIRPORT
 ALTERNATIVE 1B
 500-FOOT EXTENSION: 4,100'
 B-II SMALL, >³/₄ MILE, UTILITY

Figure 5-2



DRAWING SCALE IN FEET





AIRPORT MASTER PLAN

WINDM 138969

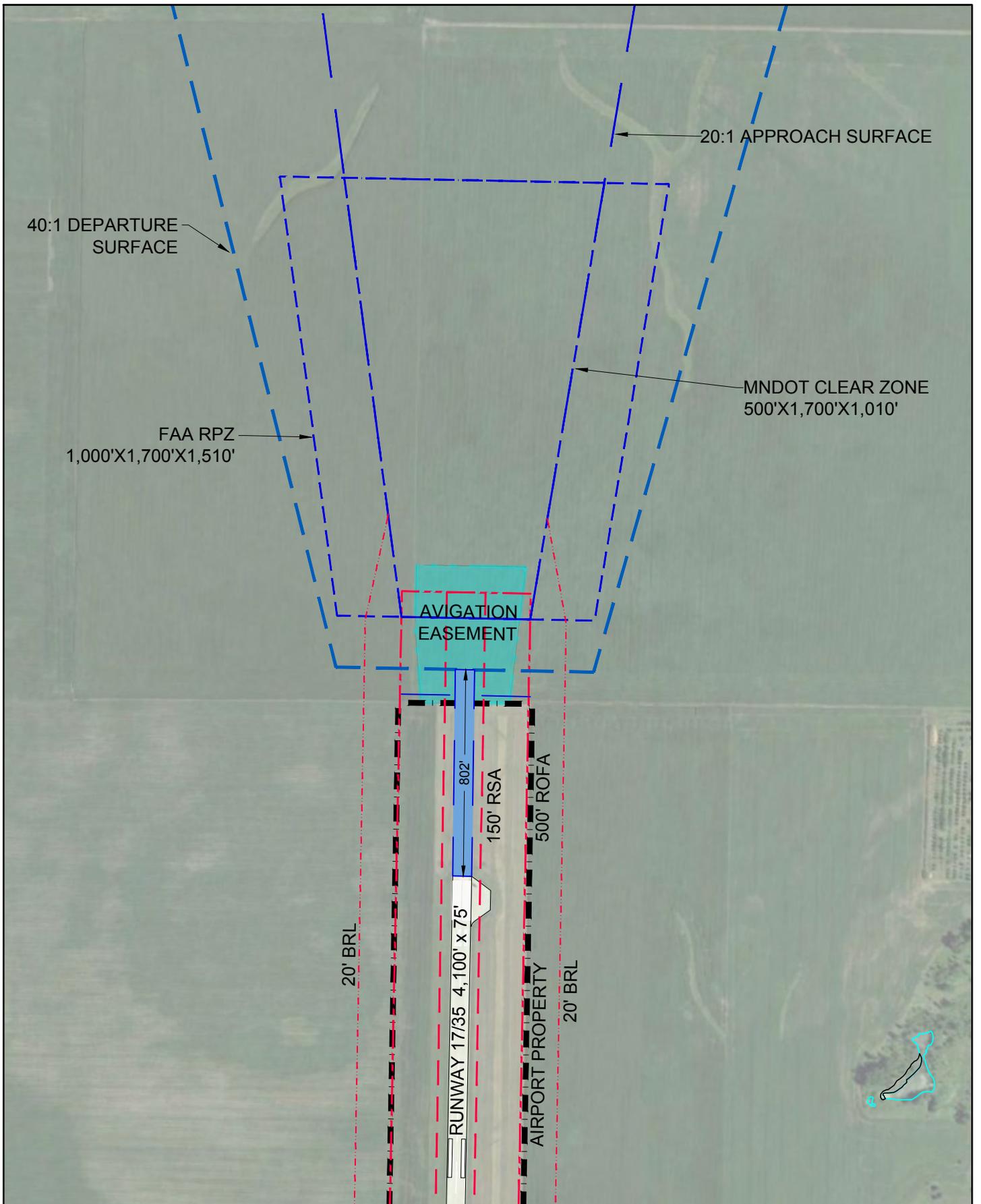
JUNE 2018

**WINDOM MUNICIPAL
AIRPORT**
ALTERNATIVE 1B
500-FOOT EXTENSION: 4,100'
B-II SMALL, >3/4 MILE, UTILITY

Figure 5-2A



DRAWING SCALE IN FEET
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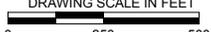
	AIRPORT MASTER PLAN
	WINDM 138969
	JUN 2018

WINDOM MUNICIPAL AIRPORT
 ALTERNATIVE 1C
 500-FOOT EXTENSION: 4,400'
 B-II SMALL, 3/4 MILE, UTILITY

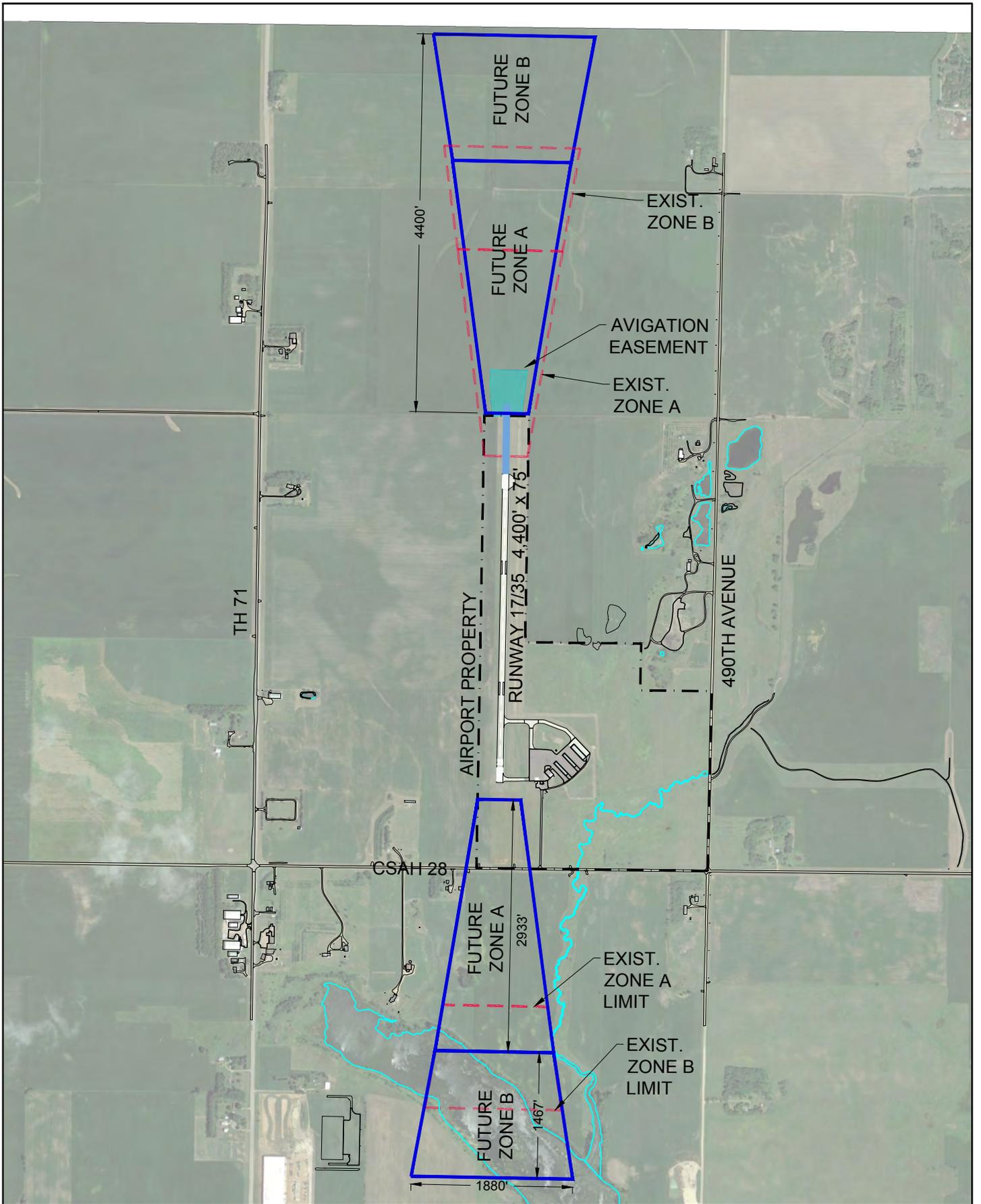
Figure 5-3



DRAWING SCALE IN FEET



0 250 500



AIRPORT MASTER PLAN

WINDM 138969

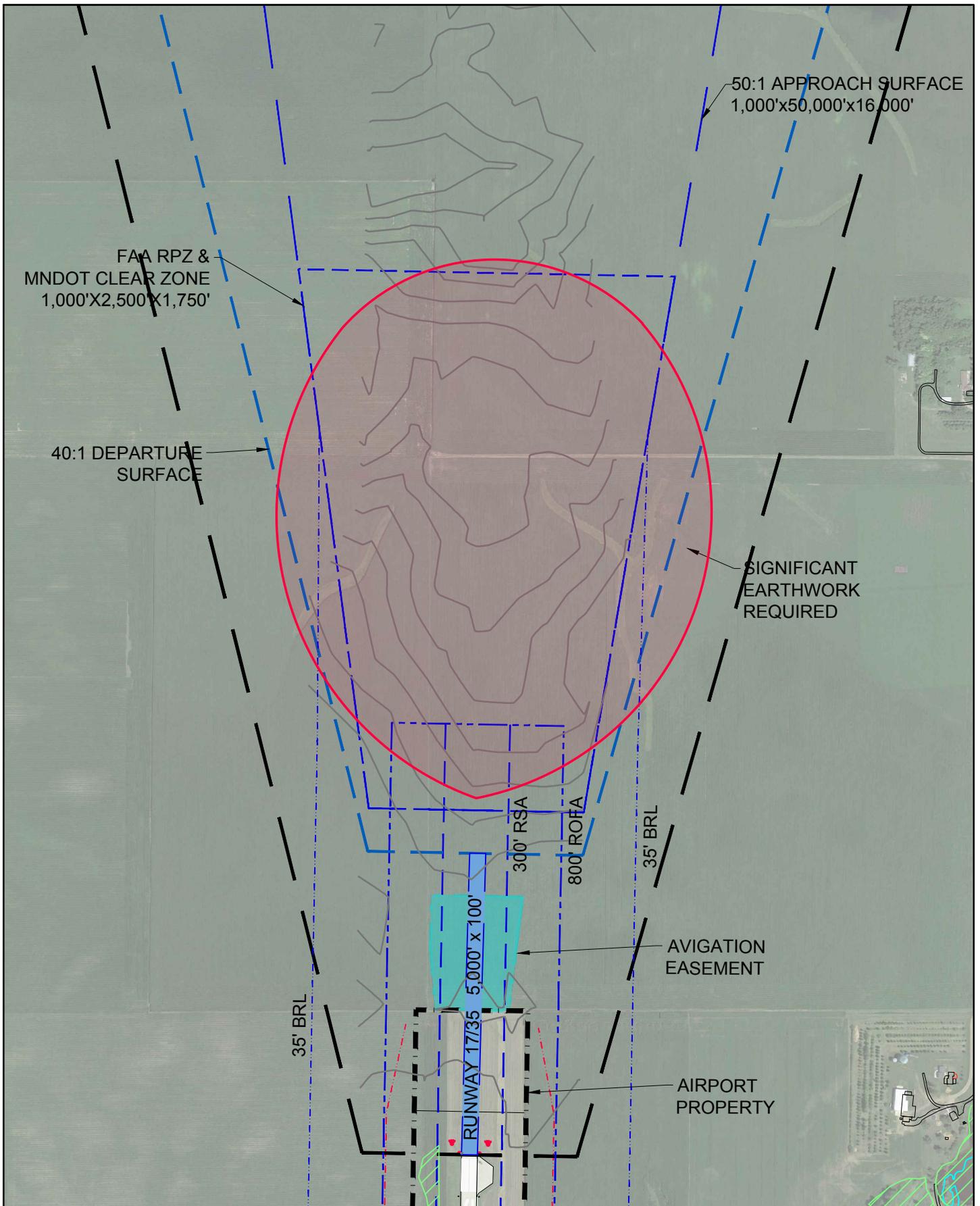
JUN 2018

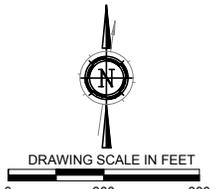
**WINDOM MUNICIPAL
AIRPORT**
ALTERNATIVE 1C
500-FOOT EXTENSION: 4,400'
B-II SMALL, 3/4 MILE, UTILITY

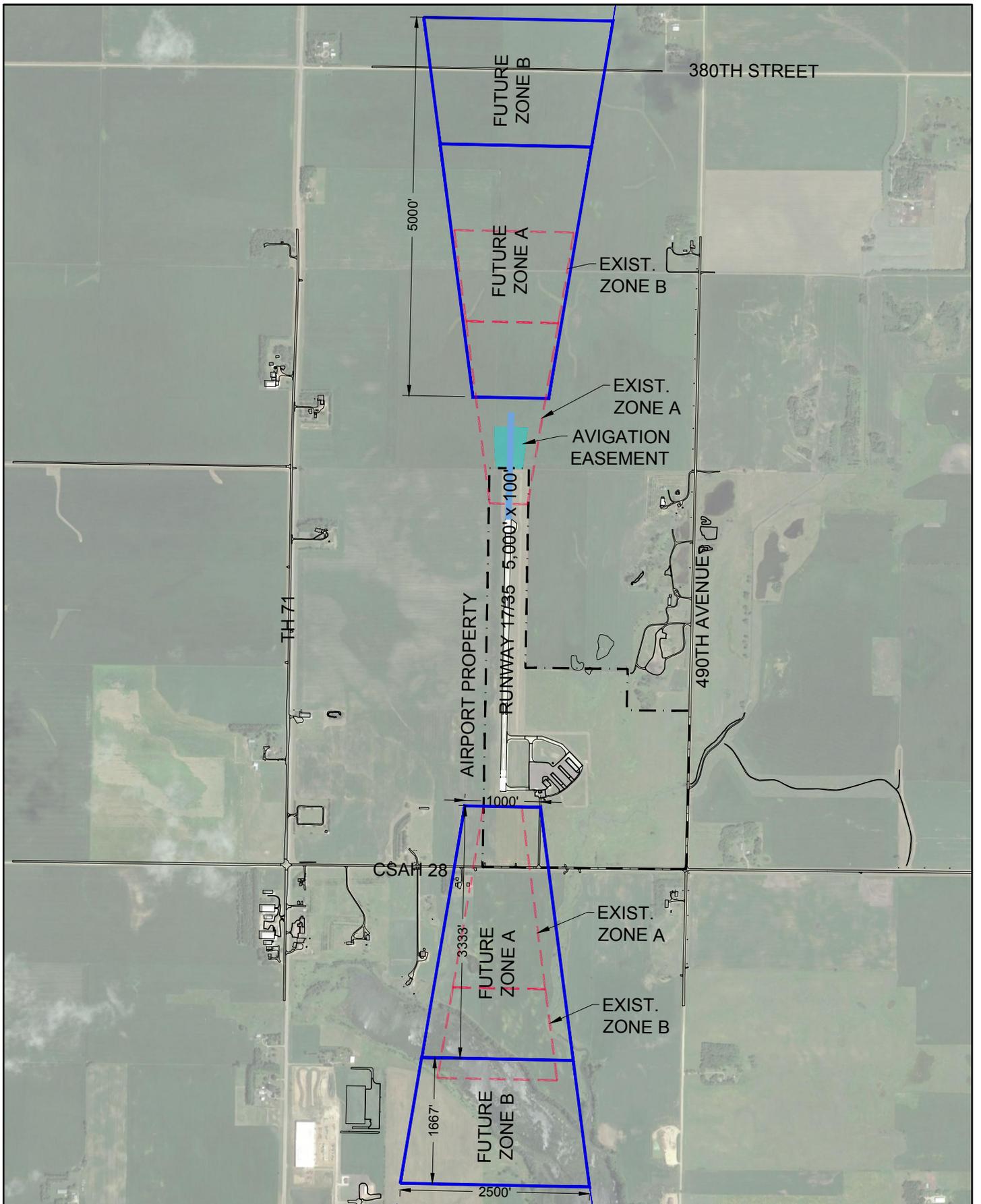
Figure 5-3A



DRAWING SCALE IN FEET
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	AIRPORT MASTER PLAN	WINDOM MUNICIPAL AIRPORT ALTERNATIVE D 1,401-FOOT EXTENSION: 5,500' B-II SMALL, UTILITY, PRECISION	Figure 5-4 
	WINDM 138969		
	JUNE 2018		



AIRPORT MASTER PLAN

WINDM 138969

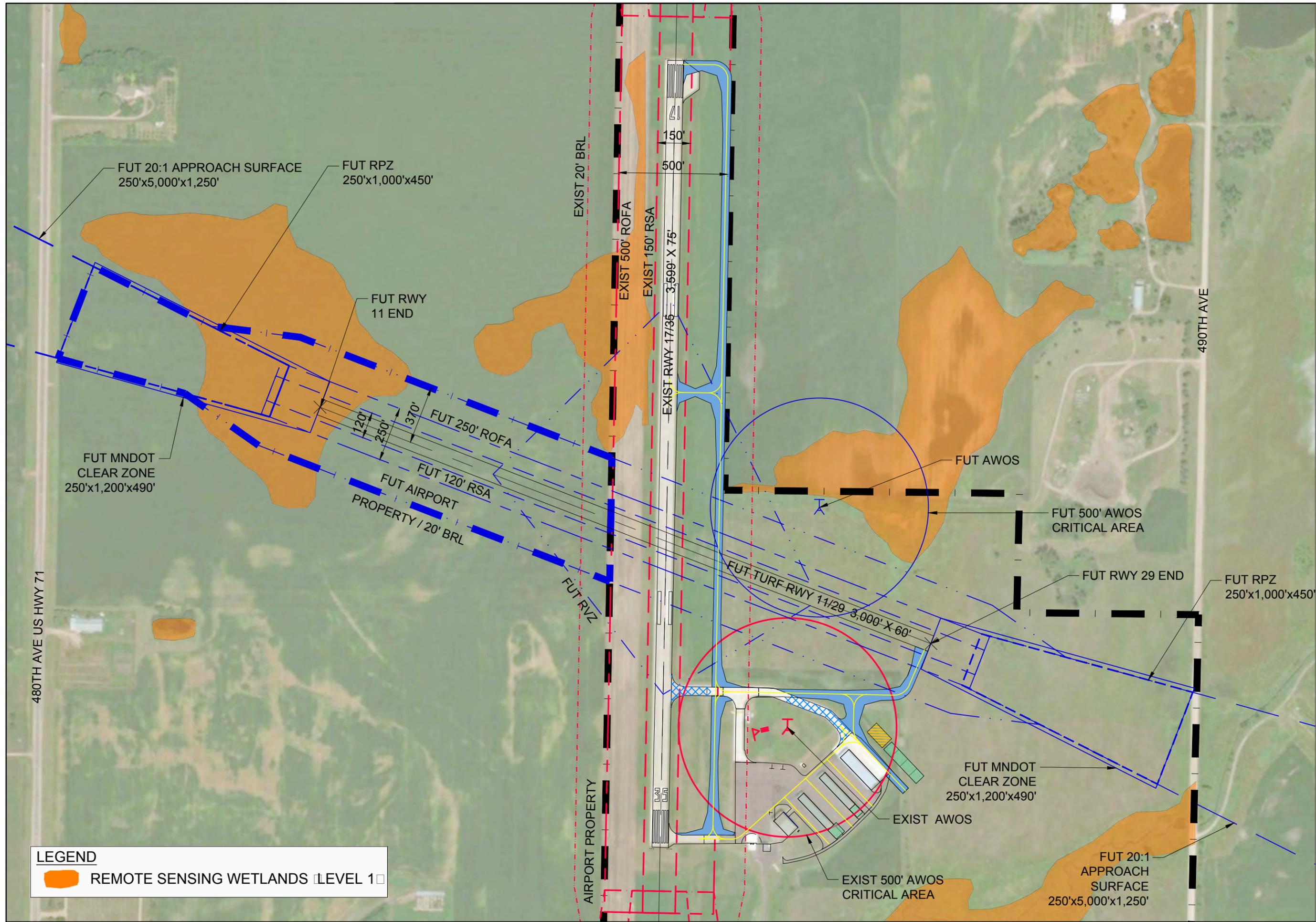
JUNE 2018

**WINDOM MUNICIPAL
AIRPORT**
ALTERNATIVE D
1,401-FOOT EXTENSION: 5,500'
B-II SMALL, UTILITY, PRECISION

Figure 5-4B



DRAWING SCALE IN FEET
0 850 1700

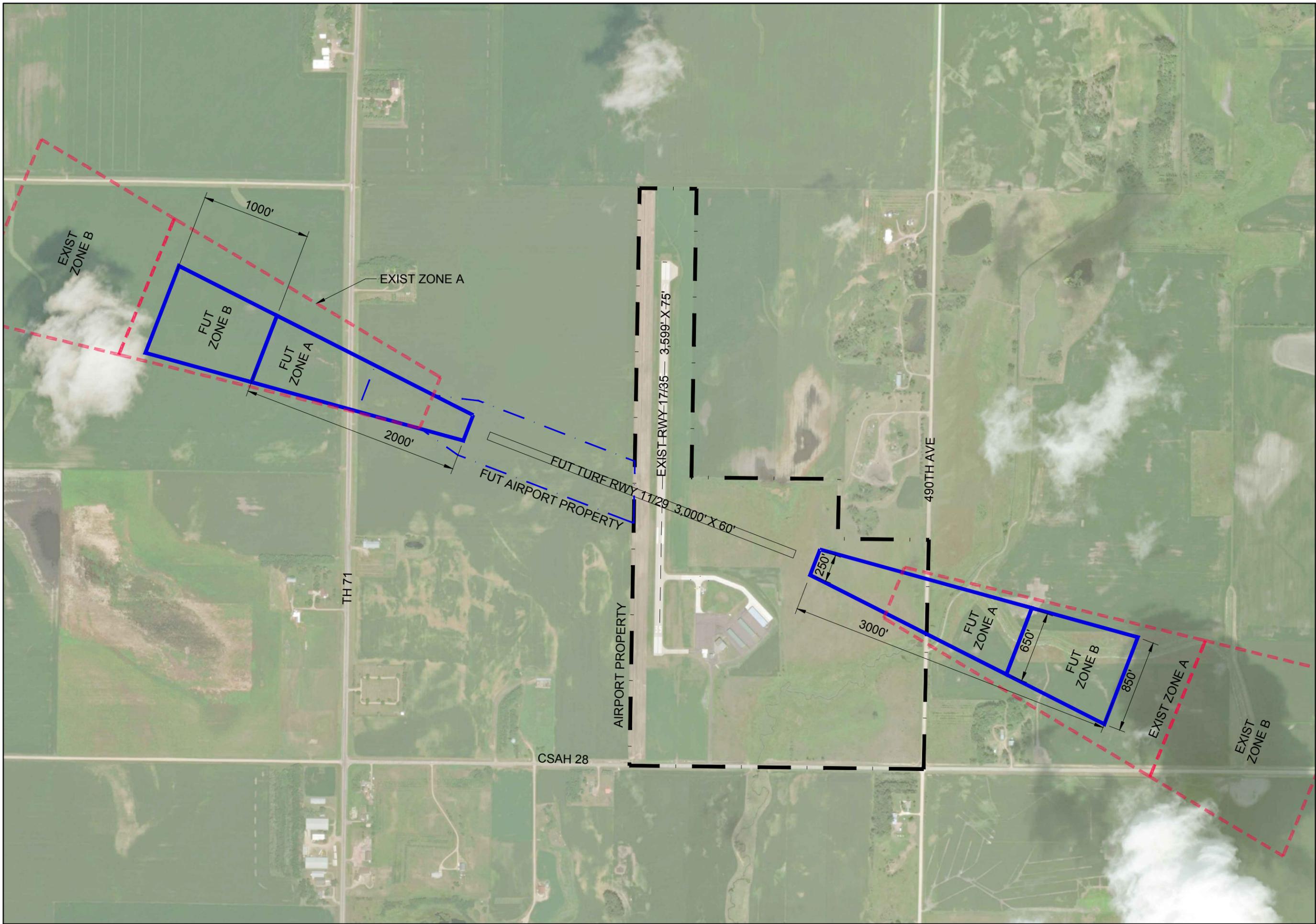


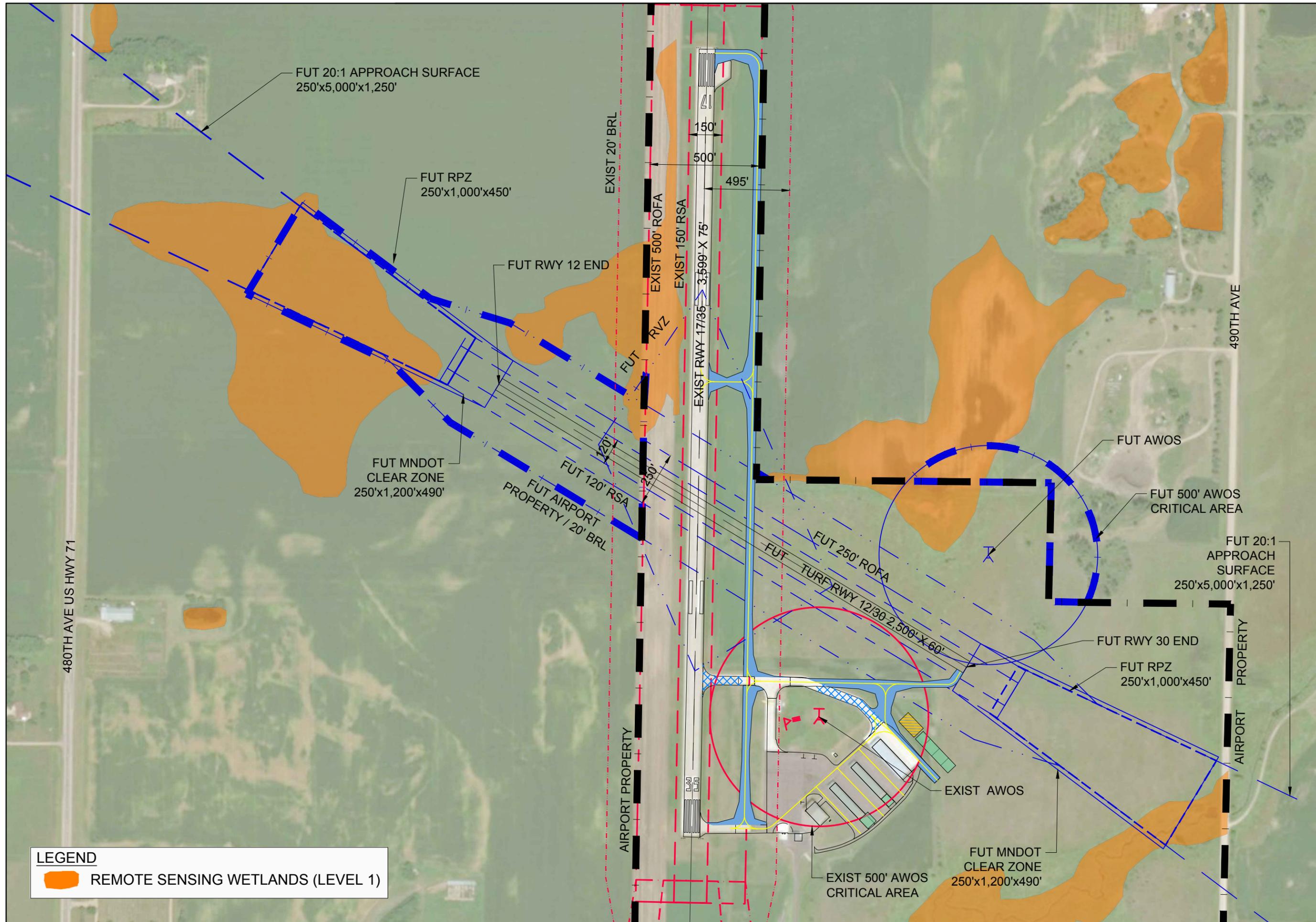
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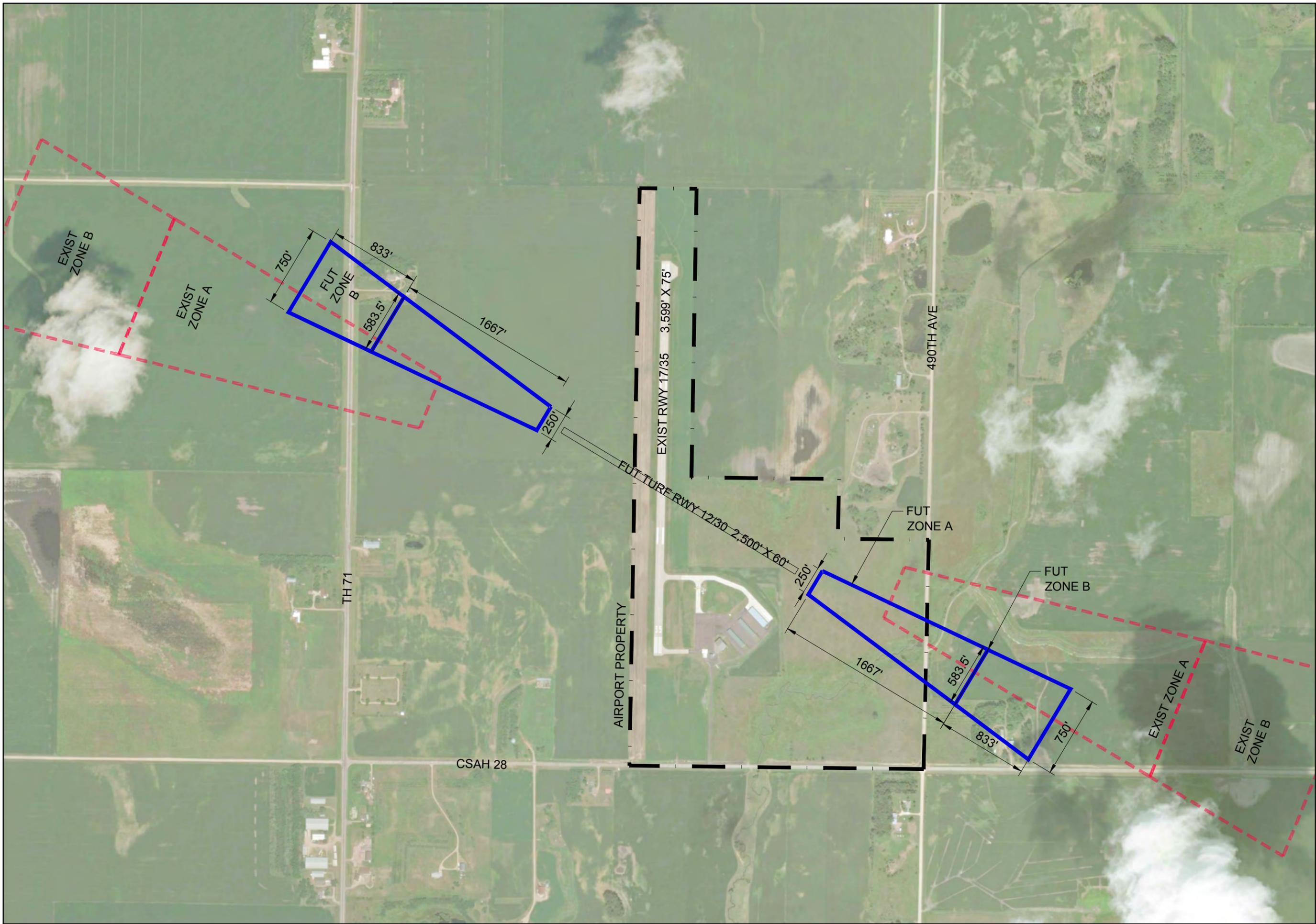
REMOTE SENSING WETLANDS LEVEL 1

SEH FILE NO.	VNDM 19869
STATE PROJECT NO.	JUNE 2018
ISSUE DATE	JUNE 2018
DESIGNED BY	JMZ
DRAWN BY	JMZ
Short Elliott Hendrickson, Inc. © (SEH) © 2018 Short Elliott Hendrickson, Inc.	

FIGURE TITLE
CROSSWIND
RUNWAY
ALTERNATIVE 2A:
2016 ALP CROSSWIND
RUNWAY 11/29 3,000' x 60'



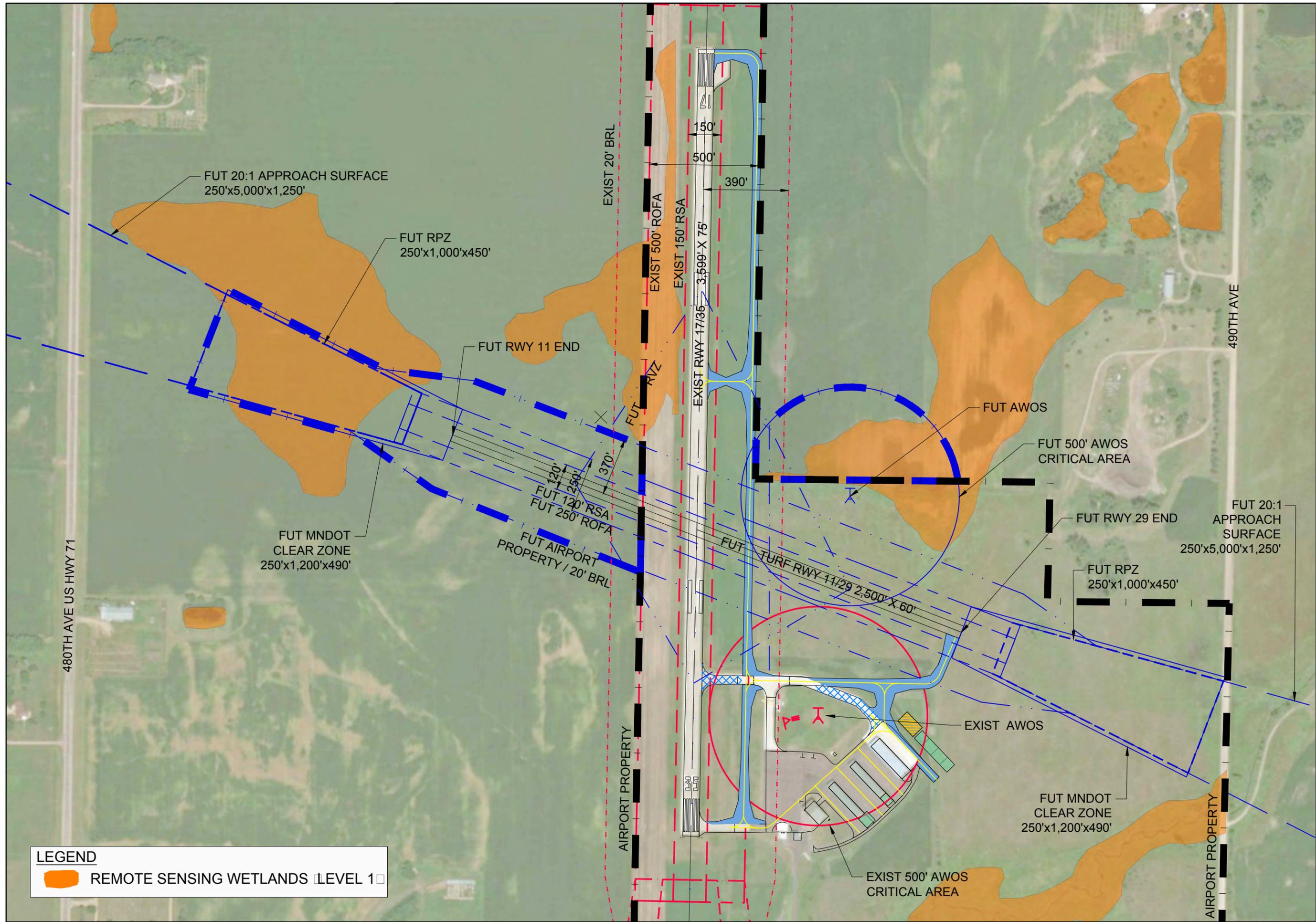




WINDOM MUNICIPAL AIRPORT
 AIRPORT MASTER PLAN

SEH FILE NO. VDMW 18969
 STATE PROJECT NO. JUNE 2018 JHZ
 ISSUE DATE JUNE 2018 JHZ
 DESIGNED BY JHZ
 DRAWN BY JHZ
 Short Elliott Hendrickson, Inc. © (SEH)
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FIGURE TITLE
 CROSSWIND
 RUNWAY
 ALTERNATIVE 2B:
 ZONING

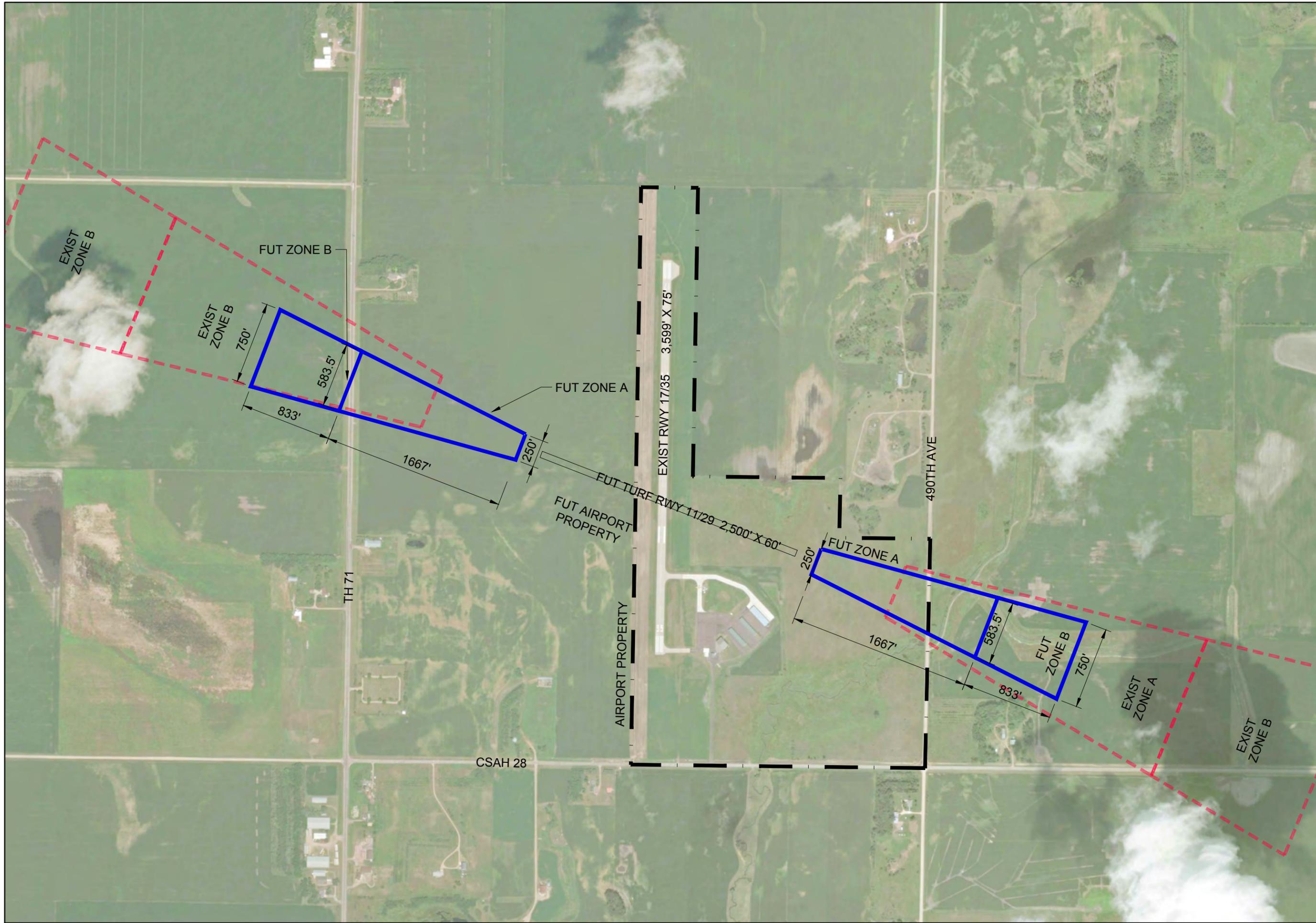


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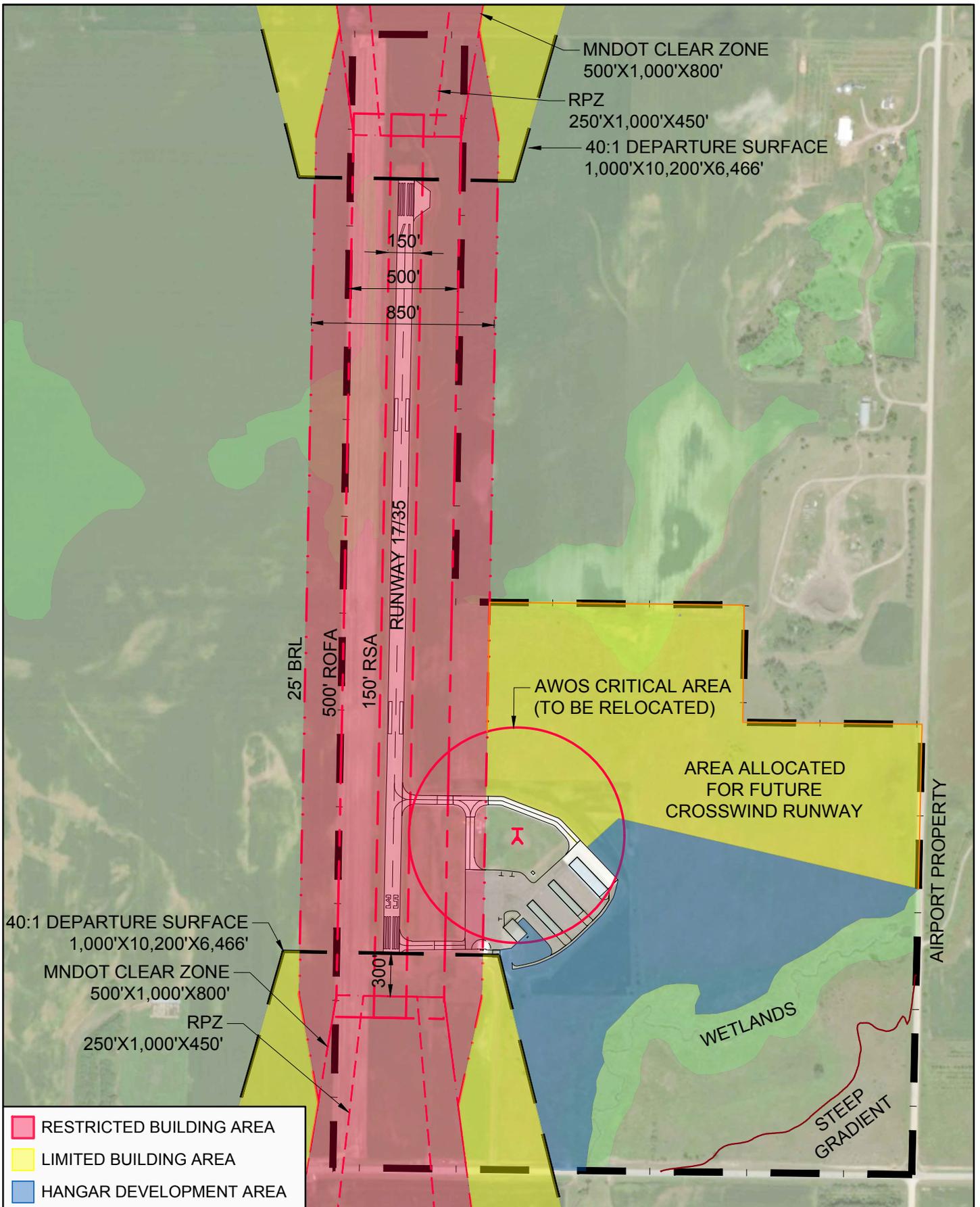
REMOTE SENSING WETLANDS LEVEL 1

SEH FILE NO.	WINDM 138969
STATE PROJECT NO.	JUNE 2018
ISSUE DATE	JMZ
DESIGNED BY	JMZ
DRAWN BY	Short Elliott Hendrickson, Inc. © (SEH) © 2018 Short Elliott Hendrickson, Inc.

FIGURE TITLE
CROSSWIND
RUNWAY
ALTERNATIVE 2C:
RUNWAY 11/29 2,500' x 60'



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- RESTRICTED BUILDING AREA
- LIMITED BUILDING AREA
- HANGAR DEVELOPMENT AREA

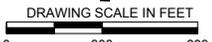
	AIRPORT MASTER PLAN
	WINDM 138969
	May 2018

**WINDOM MUNICIPAL
AIRPORT**
HANGAR DEVELOPMENT
CONSTRAINTS

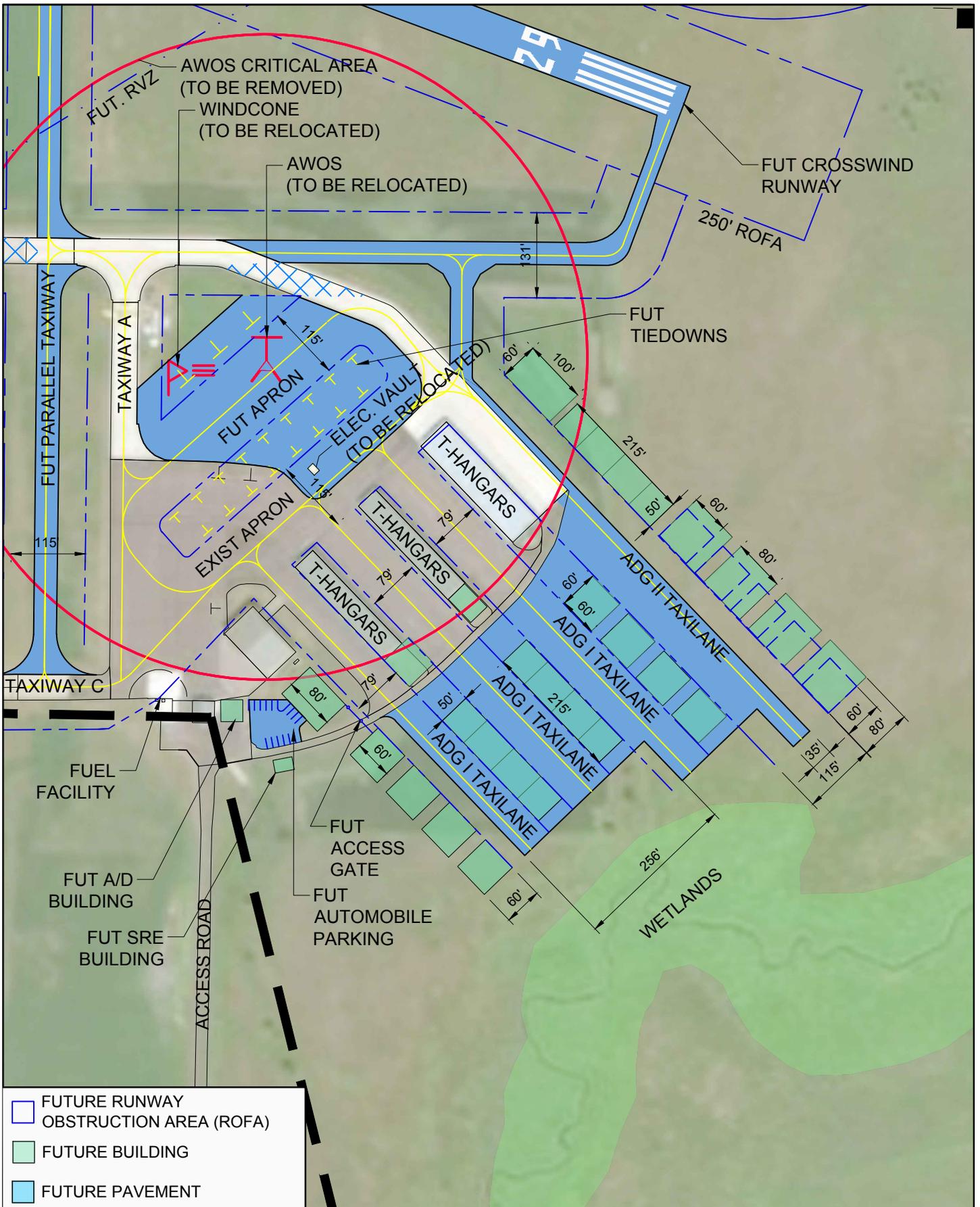
Figure 5-8



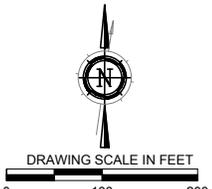
DRAWING SCALE IN FEET



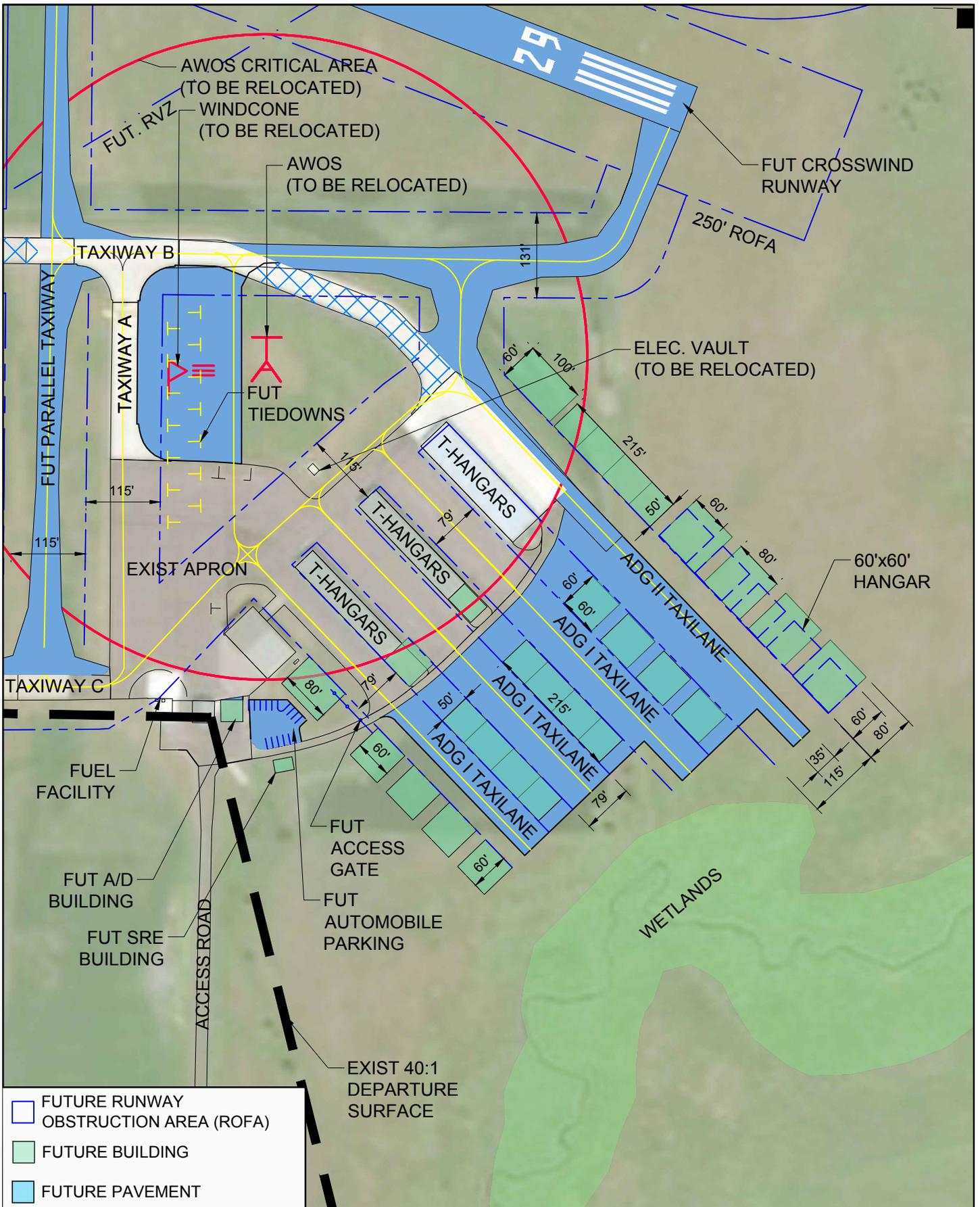
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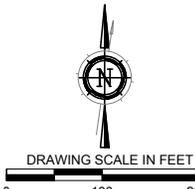
- FUTURE RUNWAY OBSTRUCTION AREA (ROFA)
- FUTURE BUILDING
- FUTURE PAVEMENT

	AIRPORT MASTER PLAN	<h2 style="margin: 0;">WINDOM MUNICIPAL AIRPORT</h2> <h3 style="margin: 0;">HANGAR DEVELOPMENT</h3> <h4 style="margin: 0;">ALTERNATIVE 3B</h4>	Figure 5-10 
	WINDM 138969		
	MARCH 2019		

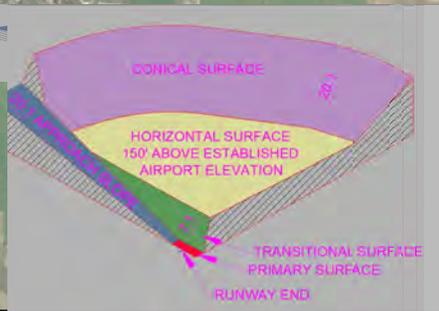
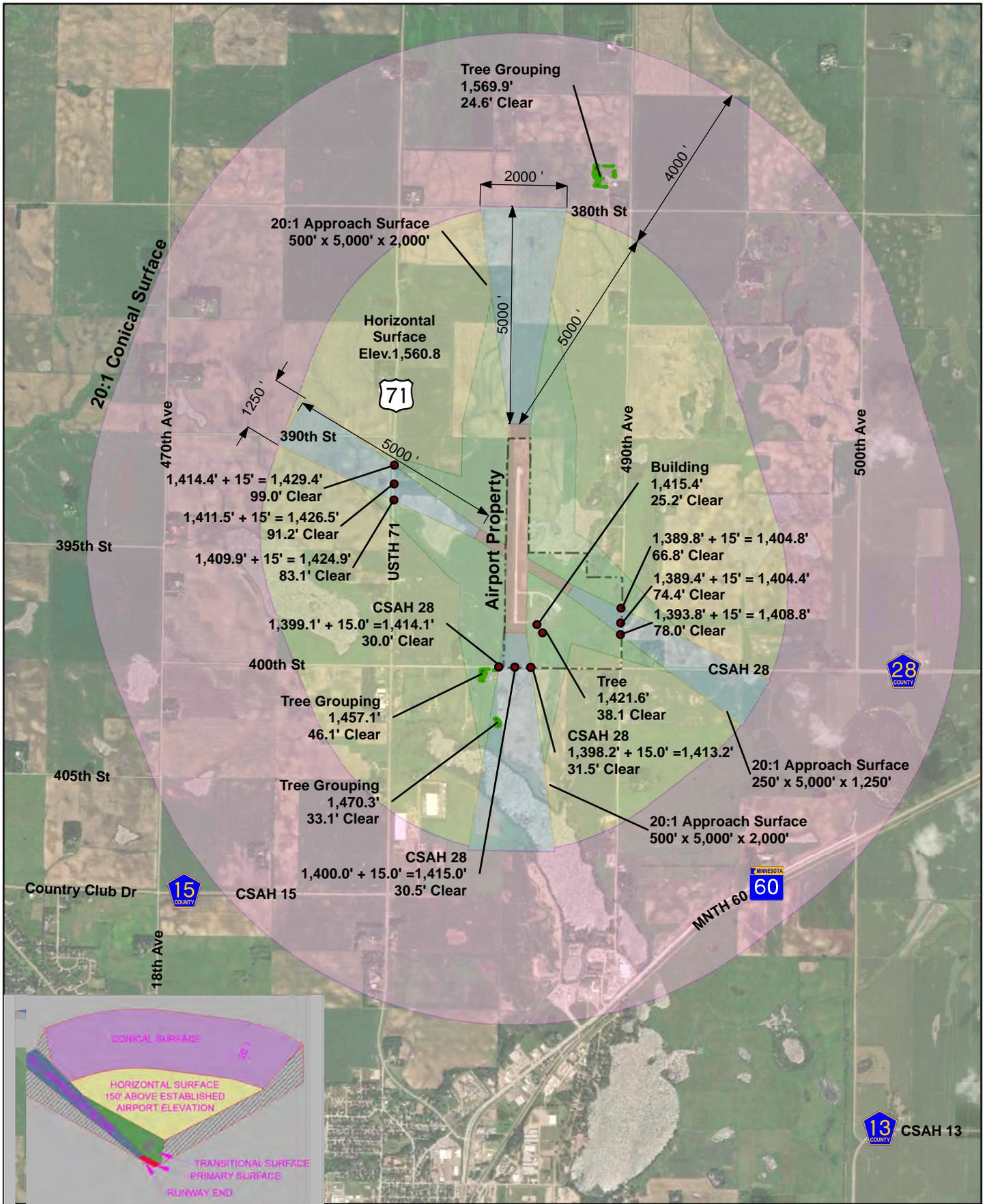
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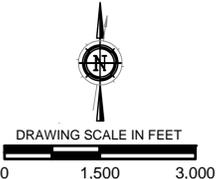


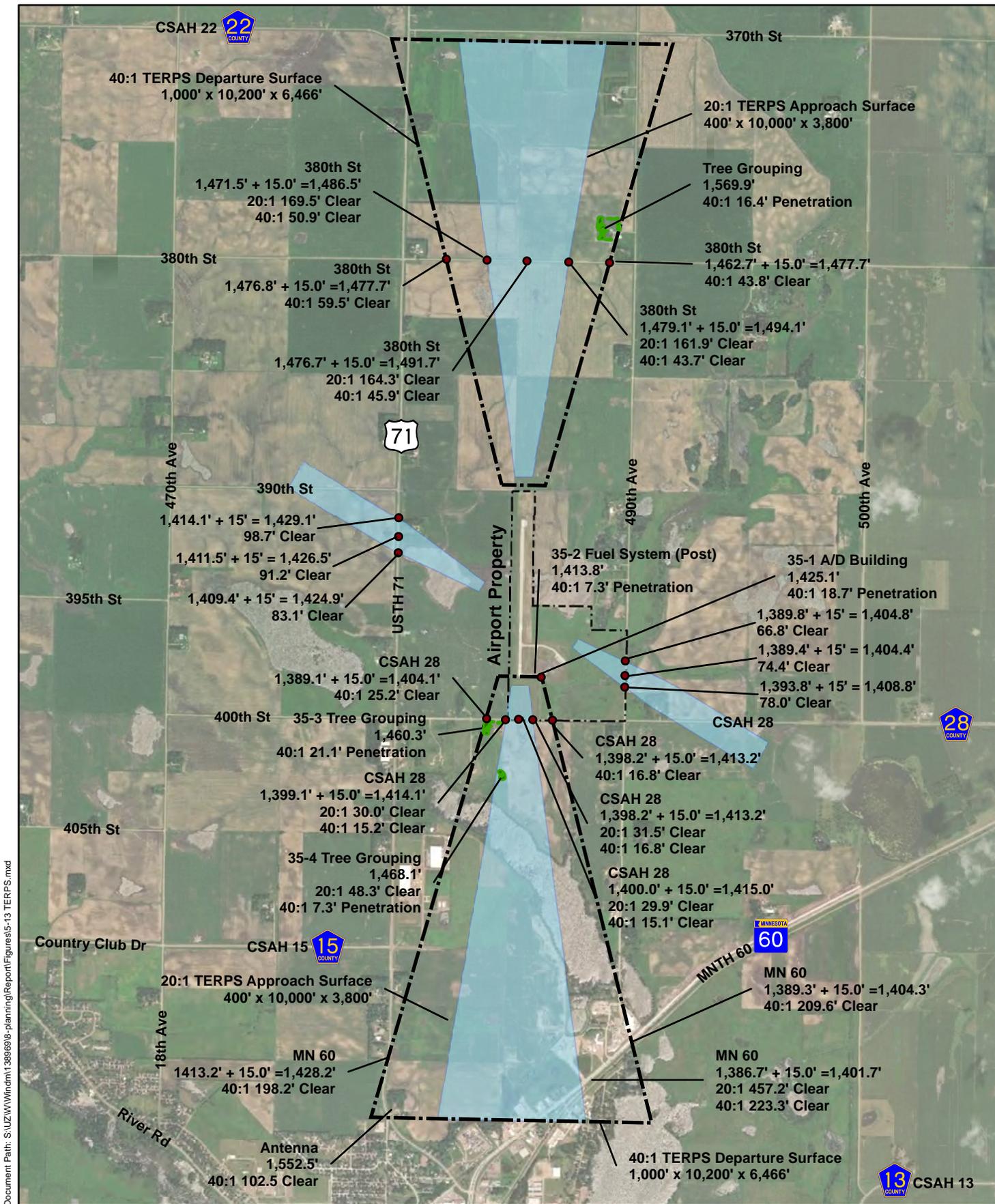
- FUTURE RUNWAY OBSTRUCTION AREA (ROFA)
- FUTURE BUILDING
- FUTURE PAVEMENT

	AIRPORT MASTER PLAN	<h2 style="margin: 0;">WINDOM MUNICIPAL AIRPORT</h2> <h3 style="margin: 0;">HANGAR DEVELOPMENT</h3> <h4 style="margin: 0;">ALTERNATIVE 3C</h4>	<p>Figure 5-11</p> 
	WINDM 138969		
	MARCH 2019		

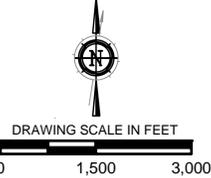
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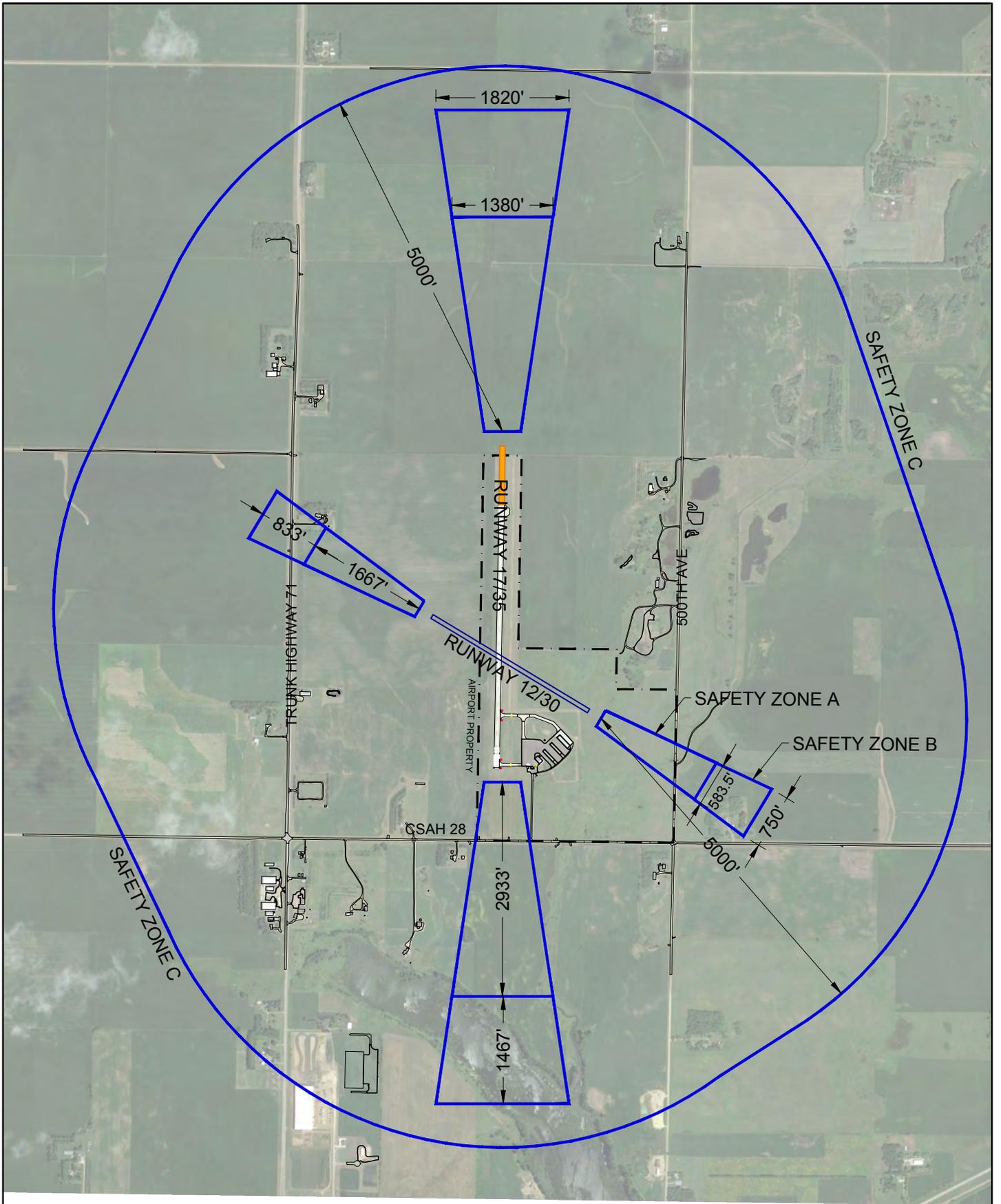
	AIRPORT MASTER PLAN	<h1 style="text-align: center;">WINDOM MUNICIPAL AIRPORT</h1>	FIGURE 5-12	
	WINDM 138969			
	JUNE, 2019			



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	AIRPORT MASTER PLAN	<h1 style="text-align: center;">WINDOM MUNICIPAL AIRPORT</h1> <h2 style="text-align: center;">FUTURE TERPS OBSTRUCTIONS</h2>	 <p style="text-align: center;">DRAWING SCALE IN FEET 0 1,500 3,000</p>
	WINDM 138969		
JUNE, 2019			

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AIRPORT MASTER PLAN

WINDM 138969

MAY 2010

WINDOM MUNICIPAL AIRPORT

FUTURE AIRPORT SAFETY ZONES

Figure 5-14



DRAWING SCALE IN FEET



6 Environmental Overview

The National Environmental Policy Act of 1969 (NEPA) requires that environmental impacts of proposed airport development be considered throughout the planning period. Three categories of environmental actions relevant to airport development are outlined in 40 Code of Federal Regulations (CFR) Parts 1500 – 1508. Every project proposed for an airport is categorized into one of these three actions:

- **Categorical Exclusions** – Projects categorically excluded are those actions that have been found under normal circumstances to have no potential for significant environmental impact.
- **Actions Normally Requiring an Environmental Assessment (EA)** – Projects normally requiring an EA are actions that have been found by experience to sometimes have significant environmental impacts.
- **Actions Normally Requiring an Environmental Impact Statement (EIS)** – The purpose of an EA is to determine whether or not a project will have significant impacts. Based on the results reported in an EA, the FAA then prepares either a finding of no significant impact (FONSI) or an EIS. An EIS further investigates a project's potential environmental impacts.

The major product of the Master Plan process is the ALP, which shows an airport's existing and planned development (Phase II). Federal Aviation Regulations require that an airport operator undertake an environmental analysis for the planned development for FAA review and approval if it plans to apply for federal grants to fund development depicted on the ALP. Due to the limited shelf-life of environmental studies, a formal EA or Categorical Exclusion documentation is typically developed at such time to ensure the environmental work is current within the timeframe during which the actual project would be undertaken.

The following areas of possible environmental impact must be addressed in detail in the planning phase for the improvements recommended in **Chapter 4** and **Figures 4-1** through **4-5**.

6.1 Compatible Land Use & Zoning

Land-use compatibility conflicts are a common problem around many airports in the United States, both for large transport airports and smaller GA facilities. In urban areas, as well as some rural settings, airport owners find that essential expansion to meet the demands of airport traffic is difficult to achieve due to the nearby development of incompatible land uses.

These incompatible uses typically consist of medium to high density residential areas, built closely to an existing airfield prior to enactment of suitable land-use zoning legislation. The residents of these developments, with substantial investments in their homes, may view the Airport and its activities as a threat to their health, safety, and quality of life. The issue of airport noise is generally the most apparent perceived environmental impact upon the surrounding community. Conflicts may also exist in the protection of runway approach and transition zones to assure the safety of the flying public and the adjacent property owners.

The land use adjacent to the Airport property primarily includes agricultural/open space directly adjacent to the airport on all sides, with few nearby residences. The city of Windom is approximately three miles south of the airport property. Windom Memorial Gardens is located approximately 2,000 feet west of the Airport.

Division Creek (MnDNR Public Water Watercourse #I-037-031) traverses the southeast corner of the Airport property. The creek flows south to Warren Lake (MnDNR Public Water Basin # 17002101), and ultimately the Des Moines River (MnDNR Public Water Watercourse #I-037).

Proposed developments requiring property acquisition will likely alter land-use for area surrounding the Airport property. Evaluation of land-use impacts will be required in the environmental assessment process, but are anticipated to be relatively low under the recommended improvements.

6.2 Noise

The FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of yearly day/night average sound level (DNL). Noise exposure is considered significant if the 65 DNL or greater encroaches on any noise sensitive area.

None of the future recommended development at the Airport will alter the current noise levels at the Airport. As a result, a noise analysis is not necessary.

6.3 Social Impacts

Airport development has the potential to impact not only the natural environment but also the human environment. These impacts are judged as significant if they cause the relocation of any resident or business, alteration of surface transportation patterns, division or disruption of established communities, disruption of orderly, planned development, or an appreciable change in employment.

There is potential for future recommended developments to require acquisition of one home south of the Airport. The magnitude of social impacts resulting from home displacement will require evaluation in the environmental review process.

6.4 Induced Socioeconomic Impacts

These secondary or indirect impacts involve shifts in population, changes in economic climate, or shifts in levels of public service demand. Assessment of socioeconomic impacts is usually associated with major development at air carrier airports, which involve terminal building development, major roadway alignments, and similar work. The extent of indirect socioeconomic impacts of the future recommended development are not of the magnitude that would normally be considered significant.

6.5 Environmental Justice and Children's Environmental Health and Safety Risks

Environmental health risks and safety risks include risks to health or safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to.

The future recommended development would not result in changes to these substances, nor would these projects result in additional exposure of these substances to children; therefore, effects to this impact category are assumed not to be significant.

6.5.1 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and the accompanying Presidential Memorandum, and Order DOT 5610.2, Environmental Justice, require FAA to provide for meaningful public involvement by minority and low-income populations and analysis, including demographic analysis, that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse.

Recommended future developments at the Airport will need to evaluate if there is possibility any unwilling participants, low income or otherwise, will be displaced from residences as a result of the improvements. The impacts will need to be analyzed during the environmental review process.

6.5.2 Children's Environmental Health and Safety Risks

Environmental health risks and safety risks include risks to health or safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to.

The areas for the future recommended development would not result in changes to these substances, nor would these projects result in additional exposure of these substances to children, therefore effects to this impact category are assumed not to be significant.

6.6 Conversion of Farmland

Federal conversion of farmland to non-agricultural uses is regulated by the Farmland Protection Policy Act (FPPA) through the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS). Farmland is defined by the underlying soil type (not the use of the land) and is classified by the USDA as "prime farmland", "prime farmland if drained", or "farmland of statewide importance." Preservation of prime farmland is a priority for the USDA, and the sponsors of projects funded with federal support are required to assess the effects of the projects on prime farmland.

The majority of the soils within the Airport property are loams and generally considered "Prime farmland if drained", "Not prime farmland", or "Prime farmland if protected from flooding". There are also small inclusions of "Farmland of statewide importance" and "All areas are prime farmland" within the property. Soils located near the Airport are similar to those listed within the project location, with "Prime farmland if drained" and "Not prime farmland" occurring most frequently.

Because none of the proposed projects include land acquisition, it is not anticipated that farmland conversion will result at the airport property. Formal evaluation of farmland impacts will be required in the environmental assessment process. Any proposed developments requiring property acquisition will likely require conversion of farmland and need further review to determine cumulative impacts.

6.7 Fish, Wildlife, and Plants

The Fish and Wildlife Coordination Act requires that agencies consult with the State wildlife agencies and the Department of the Interior (FWS) concerning the conservation of wildlife

resources. The Fish and Wildlife Conservation Act also encourages conservation of non-game fish and wildlife and their habitats.

An “An Endangered Species” is defined as any member of the animal or plant kingdom determined to be in danger of extinction throughout all or a significant portion of its range. A “Threatened Species” is defined as any member of the plant or animal kingdom likely to become endangered in the foreseeable future.

Although the Airport is within the breeding range of the Northern long-eared bat (*Myotis septentrionalis* - Endangered). The Northern long-eared bat hibernates in caves and mines, which are not located within 10 miles of the Airport property. Minimal tree clearing and trimming is anticipated, therefore no impacts to the Northern long-eared bat are likely negligible.

The Airport is also within the distributional range of the federally-listed prairie bush-clover (*Lespedeza leptostachya* - Threatened). There have been no reported sightings of the species within the Airport property. It is a plant in the pea family and is native to tallgrass prairies in Minnesota. There is no mapped critical habitat of the prairie bush-clover within a 1-mile buffer of the Airport.

There are no species listed in the National Heritage Information System from the MnDNR. There are two critical habitats located near the Airport, however they are both outside of the 1-mile buffer zone and will not be impacted.

The nature of all other the future recommended development are such that no effects on federal threatened or endangered species are anticipated.

6.8 Affected Areas under the Protection of USDOT Act, Section 4(f)

Section 4(f) of the Department of Transportation (DOT) Act provides protection for publicly owned land in parks, recreation areas, or wildlife and waterfowl refuges of national, State, or local significance or lands from an historic site of national, State, or local significance.

There are no publicly funded parks, recreation areas, or wildlife refuges within or adjacent to the Airport that are potentially eligible to meet the provisions of the U.S. Department of Transportation Act of 1966, section 4(f) [48 U.S.C. 303(C)]. Nearby public recreational type land includes the Carpenter WMA, the Wolf Lake WMA, the Banks WMA, and the Bennet WMA; all of which are state owned land located between 2 and 5.5 miles away from the Airport. None of the future recommended development are located on existing parks, waterfowl/wildlife refuges or recreation areas; therefore, no impacts to any Section 4(f) properties can be expected as part of the proposed development.

6.9 Wetlands

Wetlands as defined in Executive Order 11990, “Protection of Wetlands”, as “those areas that are inundated by surface or ground water with frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, and natural ponds.”

All of the wetlands on Airport are anticipated to be under the jurisdiction of the U.S. Army Corps of Engineers (USACE) implementing Section 404 of the Clean Water Act and the Cottonwood

County Soil and Water Conservation District (SWCD) implementing the Minnesota Wetland Conservation Act (WCA).

A GIS based Wetland Delineation (Level 1) has occurred for the property and has identified several large wetland basins within and surrounding the Airport property (**Figure 1-12**). It is also likely there are several small pot-hole wetlands throughout the property that have not been identified. None of the future recommended development alternatives propose permanent impacts to wetlands identified within or near the project area. This level 1 wetland delineation is to be used for planning purposes only, and a formal wetland delineation should be completed for any work proposed within the site. It is not anticipated permits from the USACE or Cottonwood County SWCD implementing the WCA will be required.

6.10 Floodplains

Floodplains are defined by Executive Order 11988, "Floodplain Management", as "the lowland and relatively flat areas adjoining coastal waters...including at a minimum, that area subject to a one percent or greater change of flooding in any given year...", that is, an area which would be inundated by a 100-year floodplain, mitigating measures must be investigated in order to avoid significant changes to the drainage system.

Division Creek traverses the southeast corner of the Airport property. The 100-year floodplain (Zone A) of Division Creek is located approximately 0.5 miles to the east of the existing runway. This floodplain (Zone A) is located within the existing airport property, but has not been digitized for the Airport and surrounding vicinity yet. **Figure 1-13** is a copy of the FEMA FIRM map for the Airport and surrounding area.

A Conditional Use Permit (CUP) is required for any work within any designated floodplain. Impacts to the floodplain are not anticipated, however proposed developments will need further investigation during the environmental review process to determine if a CUP is ultimately needed.

6.11 Coastal Zone Management Programs and Coastal Barriers

The Coastal Barrier Resources System contains undeveloped coastal barriers along the Atlantic and Gulf coasts and Great Lakes. The Coastal Zone Management Act applies to the States having an approved Coastal Zone Management (CZM) plan.

The Airport is not located within a coastal area and would not affect coastal resources governed by the Coastal Barriers Resources Act (CBRA) or the Coastal Zone Management Act (CZMA). Therefore, none of the future recommended development would result in impacts to this environmental category.

6.12 Wild and Scenic Rivers

Wild and scenic rivers are designated as part of the National Wild and Scenic River Programs by the U.S. Department of the Interior under the Wild and Scenic River Act to protect the most beautiful and unspoiled rivers in the nation. River segments are designated based on their outstandingly remarkable scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values and are to be preserved in free-flowing condition for the benefit and enjoyment of present and future generations. Several river segments are also state-designated as wild and scenic in the State of Minnesota.

There are no Wild and Scenic Rivers in the Airport property. The closest designated river to the Airport is the Minnesota River, which is located greater than 40 miles to the north. None of the future recommended development will result in impacts to Wild and Scenic Rivers.

6.13 Water Quality

The Federal Water Pollution Control Act, as amended (commonly referred to as the Clean Water Act), provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, location with regard to an aquifer or sensitive ecological area such as a wetlands area, and regulate other issues concerning water quality. Additionally, a National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act is required for point-source discharges into waters of the U.S. and for construction activities to protection from construction related erosion and sedimentation. A 404 permit is required to place dredged or fill material in waters of the U.S. including jurisdictional wetlands.

Typically, pollutants carried in airport runoff include spilled fuel and oil, deposits from rubber tires, and accidentally discharged chemicals, i.e. agricultural spray operations, aircraft de-icing, and washing agents. For most airport improvements, design, control during construction, and other mitigation measures can avoid significant impacts to water quality.

For aerial spray wash and deicing facilities at airports, water quality standards require the collection of materials to prevent distribution into storm water runoff. The deicing materials may be recycled from a runoff tank.

A Storm Water Pollution Prevention Plan (SWPPP) is required to identify the Airport operations having the potential to affect storm water and the appropriate Best Management Practices (BMPs) to eliminate or minimize surface water contamination. Erosion and sedimentation control and management of runoff during construction is typically designed during specific improvement projects and reviewed and approved during the NPDES permitting process.

A SWPPP may be required for several recommended future developments, including extension of Runway 17/35, construction of the crosswind runway, additional hangar space, and other potential improvements. These impacts and required permits will be evaluated in the environmental assessment process.

6.14 Historical, Architectural, Archeological, and Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, as amended, establishes the Advisory Council on Historic Preservation (ACHP) and the National Register of Historic Places (NRHP). Section 106 of the NHPA requires consideration of the effects of undertaking on properties that are eligible for inclusion in the NRHP. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO) if there is a potential adverse effect to historic properties on or eligible for listing on the National Register of Historic Places.

The Archeological and Historic Preservation act of 1974 provides for the preservation of historic American sites, buildings, objects, and antiquities of national significance by providing for the survey, recovery, and preservation of historical and archeological data which might otherwise be destroyed or irreparably lost due to a development project.

The archeology search was conducted for properties listed in the City of Windom. The State Historic Preservation Office (SHPO) documentation lists one historic property in the City, the Cottonwood County Courthouse, which is located over 3 miles south of the existing Airport property.

An online review within the Office of the State Archaeologist (OSA) Portal was completed on April 1, 2019 to identify known archaeological sites within Minnesota. The Portal provides a summary of the number of identified sites within each section of the state without providing details regarding specific site location. There are no known sites listed within the same section as the Airport.

The State of Minnesota may require that an archeological survey be undertaken prior to major construction on an undisturbed site, and the State Historical Society should be contacted as a function of the EA in order to determine the existence of any impacts to the sites of historical/cultural significance.

Traditional Cultural Places (TCPs) may be eligible for listing on the NRHP and thus may become the subject of Section 106. The potential for the existence of protected tribal resources or TCPs should be confirmed through information consultation with the seven tribes in the State of Minnesota. Development on the airfield may require consultation with tribal interests. The City should coordinate with the FAA during completion of the NEPA review for each project to determine what type, if any, of tribal coordination is needed.

6.15 Air Quality

The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) for six pollutants, termed “criteria pollutants” and requires each State to adopt a plan to achieve the NAAQS for each pollutant within specific timeframes. These air quality plans are known as State Implementation Plans (SIP). The State of Minnesota has developed a SIP, which contains the rules and programs the State will use to help ensure air quality continues to meet the NAAQS.

The potentially significant impact of future recommended development on the attainment and maintenance of air quality standards must be disclosed. Conformity with the SIP must also be demonstrated. Currently there are no non-attainment or maintenance areas in Cottonwood County.

Because Cottonwood County is not located in a non-attainment or maintenance area and the future recommended development outlined in **Chapter 4** and **5** conforms to the SIP, no air quality analysis will be required (FAA Order 5050.4B).

6.16 Energy Supply and Natural Resources

The effects of Airport development on energy and natural resources are generally related to the amount of energy required for stationary facilities (i.e., terminal building cooling or heating equipment, electrical lighting for the interior of buildings and the airfield, and approach or radar control systems). For most GA and non-hub air carrier airports, changes in energy demands or other natural resource consumption will normally not result in significant impacts.

None of the future recommended development are considered to be significant and demand on energy will not exceed supply.

6.17 Light Emissions

Aviation lighting required for the purposes of obstruction marking, security of parked aircraft and vehicles, and visual aids to navigation are the main source of light emissions emanating from airports. An analysis is necessary only if a proposal would intrude new airport lighting facilities that might affect residential or other sensitive land uses.

Currently, the apron area and all taxiways at MWM do not have any retroreflector markers or lighting. It is recommended (**Section 4.2.10**) that the Airport install Medium Intensity Runway Lights on all taxiways, and retroreflector markers in the apron area meet the FAA and SASP standards. These improvements will have no effect on residential or other sensitive land uses and so no impact is anticipated in this category.

6.18 Solid Waste Impacts

Airport improvements, which consist of development such as runways, taxiways, and terminal buildings, do not normally have a direct significant effect on solid waste collection or disposal. The future recommended development do not include uses that will significantly increase the solid waste generated at the site.

6.19 Construction Impacts

Construction activities can create environmental impacts at the construction site and in the surrounding area. These impacts are generally temporary in nature, and subside once construction is completed. Through prudent engineering and construction practices, construction impacts associated with future recommended development can be minimized.

The environmental categories that can be affected by construction often include construction noise, dust and noise from heavy equipment traffic, disposal of construction debris, and air and water pollution. Many of the specific types of impacts that could occur and permits or certificates that may be required are covered in the descriptions of other appropriate impact categories.

7 Financial and Implementation Plan

There are many projects planned for the Windom Municipal Airport (MWM) in the upcoming years, as discussed throughout this Master Plan. Understanding the costs of these projects and particulars of the funding partners (FAA, MnDOT, Hangar Loan Program, etc.) is essential to determine the feasibility of the plan. This chapter will discuss the various sources of potential funding, provide a brief description of the planned projects, and summarize the Capital Improvement Plan (CIP) for all of the planned development.

7.1 Funding Sources

In Minnesota, airport development projects are usually funded by several sources, including the FAA Airport Improvement Program (AIP), Minnesota Airport Construction Grant Program, Airport Maintenance and Operations Program, Hangar Loan Revolving Account Program, local (Airport and/or City) funding, and private investment.

7.1.1 FAA Airport Improvement Program (AIP)

The FAA AIP was created by the Airport and Airways Act of 1982 to assist in the development of a nationwide system of public-use airports. AIP replaced the previous programs, including the Airport Development Aid Program (ADAP) and the earlier Federal Aid to Airports Program (FAAP). AIP provides an increased level of funding, higher federal participation rate, and greater project eligibility. Amendments to the program since 1982 have consistently increased funding levels, participation rate, and eligibility.

The AIP has limits on eligibility. Generally, grant eligible items include airfield and aeronautical related facilities, such as: runways, taxiways, aprons, lighting, and visual aids, as well as land acquisition, planning, and environmental tasks needed to accomplish the Airport improvement projects. Most revenue producing items like hangars, fuel farms, and FBO facilities are not eligible for AIP funds. Additionally, equipment eligibility is limited to safety equipment like Aircraft Rescue and Firefighting (ARFF) trucks and snow removal equipment (SRE). Mowers, earth moving equipment, and airport operations vehicles are not eligible for funding. The FAA utilizes a priority system to rank development items. Generally, the smaller the Airport and the farther the item is from the runway, the lower priority it receives (e.g. runways have priority over taxiways, which have greater priority than aprons, which have priority over roads, etc.). However, development or equipment required by rule or law has a high priority.

Currently, federal participation in the AIP is 90% of the eligible cost of airport projects, leaving the Airport sponsor responsible for the other 10%. In Minnesota, MnDOT Aeronautics has typically provided a grant for 50% of the sponsors share on AIP grants. All funding from both State and Federal agencies must be for planning, design, construction, or pavement maintenance projects, and cannot be used to supplement the operating expenses of the airport.

There are two types of AIP funds that an airport will receive: entitlement and discretionary.

7.1.1.1 Entitlement Funds

All NPIAS²⁶ General Aviation airports receive an entitlement of \$150,000 per year. General aviation airports are defined as airports that do not offer commercial airline service, are open to the public, have at least 10 based aircraft, and are located 20 miles outside of the nearest NPIAS airport. If an airport desires to receive discretionary funds (**Section 7.1.1.2**) for a development item, the airport's CIP should include at least two years of entitlement funds dedicated to the project. An airport can use entitlement funds on any eligible item; however, excessive use of entitlements on low priority work can have a negative effect on the FAA's discretionary funding plans for that airport. Currently, as of March 2019, MWM's existing FAA Entitlement balance is \$404,373.

7.1.1.2 Discretionary Funds

Approximately half of the AIP appropriations each year can be dispersed by the FAA at their discretion, rather than the fixed entitlement grants. The FAA has many priority programs they fund each year; examples are runway safety areas, runway surface treatments, and projects which improve overall system capacity (e.g. new runways at hub airports). Airports, such as MWM, compete best for discretionary funding for safety, security, and pavement preservation projects.

7.1.2 Minnesota State Airport Funding

In order for an airport to be eligible for Minnesota State funding, it must be included in the State Aviation System, established in a Commissioner's Order by the Commissioner of Transportation and approved by the Governor of Minnesota, subject to determination of relative priority of any proposed project in the MnDOT's State System CIP. MWM is listed in the Minnesota's Aviation System as an Intermediate Airport. The construction and maintenance of an airport can be funded through the State by three primary methods: Airport Construction Grant Program, Airport Maintenance and Operation Program, and Hangar Loan Revolving Account Program. These programs are described below.

Per Minnesota Statutes, MnDOT participation rates for funding airports and navigation are set annually by the Commissioner of Transportation by June 1st²⁷. If the Commissioner does not establish local contribution rates by June 1, the previous year's rates apply.

7.1.2.1 Airport Construction Grant Program

The State Construction Grant Program funds most capital improvements at state system airports. Funding for this program is based on a determination that the Airport improvement is a justifiable benefit to the air-traveling public. For these projects, the State has historically provided funding at an 80%/20% basis for State/Local projects. However, projects that have revenue-generating potential are funded at 50%/50%. Grants are issued for planning, land acquisition, construction and rehabilitation of runways, taxiways, aprons, hangar areas, vehicle parking areas, entrance roads, arrival/departure buildings, maintenance buildings, utilities, drainage facilities, aviation fuel

²⁶ National Plan of Integrated Airport Systems. See **Section 1.6.1**.

²⁷ Minnesota Statute 360.305 Subdivision 4.

facilities, and airfield lighting systems. This program also funds airport maintenance equipment at a 2/3 State and 1/3 local participation rate.

7.1.2.2 Airport Maintenance and Operations Program

The State Airport Maintenance and Operation Grant program has historically provided 2/3 reimbursement to the state system airports for their documented, routine maintenance. The day-to-day labor, material, equipment, and utility expenses of maintaining airport pavements, airport grounds, lighting systems, buildings, and maintenance equipment are eligible costs for this program. There is a maximum amount of reimbursement available from MnDOT, with that dollar value being based on the size of the airport and total area of pavement. The total fundable amount is also based on the size of the airport and total area of pavement.

7.1.2.3 Hangar Loan Revolving Account Program

The State of Minnesota may finance up to 80% of the cost of hangar construction under the State Hangar Loan Revolving Account Program. The sponsor is required to fund the initial 20% of the total costs, with the remaining 80% issued as a no-interest loan with a pay-back period of twenty years.

7.2 Capital Improvement Plan

A Capital Improvement Program (CIP) is developed for each airport in the State of Minnesota that qualifies for state and/or federal funding. Airports typically develop a CIP to show their development plans and the anticipated funding sources. The CIP is updated every year to help state officials plan for upcoming construction projects at airports. A quality CIP must be realistic and reflect the maximum practical amount of funds available from the FAA AIP, MnDOT Aeronautics grants, Hangar Loan program, local funding, etc. The CIP should also reflect eligibility and priorities of the federal and state programs. The result is a CIP with a higher probability for accomplishment. Past participation rates and eligibility rules are the best available guide to develop a CIP for MWM.

Future development at MWM as included in this Master Plan study, covers a 20-year period (2019-2039). Estimated development costs based on the Airport Layout Plan are included in the CIP. Projects are based on the recommended facility requirements as discussed in **Chapter 4** and the selected alternatives in **Chapter 5**. Demand for certain facilities, especially in the later time frame, and the economic feasibility of their development are the prime factors influencing the implementation of a project's timeframe. Estimated costs are expressed in 2017 dollars with no adjustments for inflation and include design, construction, and construction administration. All projects programmed beyond 2019 will need to account for escalation for the year they are accomplished.

MWM receives \$150,000 annually in FAA Entitlement funds to pay for the FAA portion of federally eligible projects. The CIP for MWM is shown in **Table 7-1** and discussed in the sections that follow, use MWM's beginning entitlement balance of \$404,373 (March 2019). As discussed in **Section 7.1.2**, the CIP also assumes MnDOT provides funding for 50% of the Sponsor's share of federally eligible projects through 2023. When reorganizing and prioritizing projects in MWM's CIP, the available FAA Entitlement funds, as well as the local participation required for each project were kept in mind. It is important that the CIP be as realistic as possible for the first five years of the CIP. Projects included on the CIP are also shown visually on **Figures 7-1, 7-2, and 7-3**. See **Section 7.2.4** for projects not included in the 20-year CIP.

7.2.1 5 Year CIP (2019 – 2023)

The 5 Year CIP is the short-term plan discussing the capital improvements planned at MWM for the next five years (2019 to 2023). The following plans are shown on **Figure 7-1**.

7.2.1.1 2019 Mower Acquisition

The City would like to purchase a mower specifically for Airport use to aid in vegetation maintenance at the Airport. This equipment is estimated to cost \$25,000 (2019 dollars). The mower is eligible for MnDOT equipment funds at a ratio of MnDOT 75% and Airport 25%.

7.2.1.2 2019 T-Hangar Additions

MWM has a large demand for hangar space and requires additional hangar space for existing based aircraft (**Section 4.3.1.1**). This project consists of extending two existing t-hangar buildings, as shown in **Figure 7-1**. This project will cost \$503,567 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.1.3 2020 Entitlement Payback to Red Wing (RGK)

In 2020, MWM will repay \$150,000 of their own FAA Non-Primary Entitlement funds to the Red Wing Regional Airport (RGK). MWM borrowed this amount of Entitlement funding from RGW to fund the 2019 T-Hangar Additions project.

7.2.1.4 2020 Update Airport Zoning (RW 17/35 Extension & Runway 12/30)

Minnesota Administrative Rules, Chapter 8800 requires all publicly-owned licensed airports in the State of Minnesota to have height and safety zoning that reflects the future/ultimate runway development as shown on the approved ALP. MWM's Airport Airspace Obstruction and Safety Zoning should be updated to reflect an ultimate length of 4,400 for Runway 17/35 and a future turf crosswind runway, Runway 12/30, with a future length of 2,500 feet. (**Sections 5.1, 5.2, and 5.5**).

This project is estimated to cost \$50,000 (2019 dollars). Portions of zoning costs are eligible for 75% State funding, with other portions 100% the responsibility of the Airport Sponsor. As a result, a 50% State and 50% Local funding ratio was assumed for the inclusion in the CIP. MnDOT is currently in the process of updating the rules and statutes for airport zoning. The Airport should ensure MnDOT is complete with this process before initiating a zoning update. As such, implementation of this project may need to be adjusted.

7.2.1.5 2020 Install Credit Card Chip Reader (by Oct 2020)

EMV²⁸ credit cards are smart cards which store data on computer chips versus magnetic strips. On October 1, 2020 the fraud liability shift will take effect for transactions generated from automated fuel dispensers (**Section 4.3.3.2**). This project is estimated to cost \$20,000 (2019 dollars). This project is projected to be eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

²⁸ EMV stands for Europay, MasterCard, and Visa, the three companies that originally created the standard.

7.2.1.6 2020 Improve Telecommunications – Install Fiber

Currently the Airport only has a single copper communication line for the telecommunications at the airport. Fiber optic communication is desired by the City to improve quality and reliability of the telecommunications at the Airport. This improvement is estimated to cost \$50,000 (2019 dollars). It is anticipated this project is eligible for MnDOT equipment funds at a ratio of MnDOT 75% and Airport 25%

7.2.1.7 2020 Update MIRLS & Threshold Lights (5010 Inspection)

Runway 17/35 currently has non-standard MIRLS and threshold lighting configuration (see **Section 4.2.10**). Runway 17/35 currently has six threshold lights on each runway end and MIRLS with clear or white globes along the length of the runway. As a non-precision runway, the runway is required to have eight threshold lights on each runway end and MIRLS with yellow globes in the last 2,000 feet or one-half of the runway length (whichever is less). This project is estimated to cost \$50,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.1.8 2021 Borrow Entitlements for Snow Blower (3 years)

The City would like to purchase a Snow Blower attachment and carrier vehicle to assist in snow removal operations (**Section 4.3.5**). Due to the cost of the equipment, it is estimated three years of non-primary entitlements will be required for the purchase of this equipment.

7.2.1.9 2021 Acquire SRE – Snow Blower and Carrier Vehicle

According to the FAA's SRE and maintenance equipment calculations, the Airport is eligible for a snow blower to assist in snow removal operations (**Section 4.3.5**). For general aviation airports, the ADO typically recommends one carrier unit with associated attachments to cover the majority of an airport's snow removal needs. The carrier unit could include the attachments noted above, such as a blower, sweeper, and plow. The City would like to purchase a Snow Blower attachment and carrier vehicle. This equipment is estimated to cost \$600,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%. Due to the cost of the snow blower, it is estimated three years of non-primary entitlements will be required for the purchase of this equipment.

7.2.1.10 2021 Install PAPIs on Runway 17 & 35

The SASP recommends PAPIs²⁹ be installed on primary runway for Intermediate Airports. This project consists of installing PAPIs for both Runway 17 and 35. This project is estimated to cost \$200,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.1.11 2022 Pavement Maintenance - Apron, Taxiways, & Hangar Access Road (Bituminous Pavements)

Joint and crack sealing is recommended approximately every five years, or as needed based on the pavement condition. It is anticipated that in 2022 all bituminous pavements at the Airport (Apron, Taxiways, and Hangar Access Road) will require joint and crack sealing. The repairs will

²⁹ PAPIs provide color-coded descent guidance to a runway.

include routing and sealing new cracks in the pavement and re-sealing previously sealed joints and cracks as part of this project. This project is estimated to cost \$75,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.1.12 2022 Hangar Site Prep (4-Unit Hangar)

MWM has a large demand for hangar space, and requires additional hangar space for existing based aircraft (**Section 4.3.1.1**). There is interest for a private developer to construct a 4-unit hangar building to store their aircraft, as shown in **Figure 7-2**. It is anticipated this site preparation for this 4-unit hangar will take place in 2022, which includes grading and paving of the hangar area. The hangar will be a 4-unit hangar with all doors facing the taxilane. This project is estimated to cost \$75,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.1.13 2022 Taxilane Widening & Extension

This project consists of extending the existing taxilane by 110' in length and 35-feet in width to accommodate the future 4-unit hangar, as shown in **Figure 7-2**. The project also includes widening the existing taxilane to 35 feet to accommodate group II aircraft. This project is estimated to cost \$150,000 (2019 dollars) and will be included as part of the Hangar Site Prep project (**Section 7.2.1.12**). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.1.14 2023 AWOS Relocation

This project is to relocate the AWOS to remove hangar obstructions from its 500-foot Critical Area (**Section 4.2.12**). Discussions were had with Airport Management and MnDOT Navigation Systems about the possibility of raising MWM's AWOS Sensor from 33-feet AGL to 40 feet AGL, instead of relocating it outside the existing Hangar Area. MnDOT's best practices recommends that no structures are within the AWOS 500-foot Critical Area. This project is estimated to cost \$70,000 (2019 dollars). The AWOS Relocation is eligible for MnDOT Navigational Aids funding at a ratio of 100% MnDOT.

Planning a future relocation of AWOS does not commit the City to relocating the AWOS. MnDOT also indicated the cost to raise the height of the AWOS Sensor from 33-feet AGL to 40 feet AGL is approximately \$25,000. If, in the future, the City so chooses this project can be adjusted from an AWOS Relocation to raising the AWOS Sensor.

7.2.1.15 2023 Pavement Maintenance - Runway 17/35 & Taxiways (Concrete Pavements)

Joint and crack sealing is recommended approximately every five years, or as needed based on the pavement condition. It is anticipated that in 2023 all concrete pavements at the Airport (Runway 17/35 and Taxiways) will require joint and crack sealing and repair as part of this project. The pavement maintenance will include repairing and resealing the previously sealed concrete joints and prepping and sealing new cracks in the concrete pavement. Replacement and patching of concrete panels is also expected to be part of the project. This project is estimated to cost \$300,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.2 10 Year CIP (2024 – 2028)

The 10 Year CIP is the mid-term plan discussing the capital improvements planned at MWM (2024 to 2028). The 10 Year CIP projects are shown on **Figure 7-2**.

7.2.2.1 2024 Pavement Rehabilitation - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)

Pavement rehabilitation or reconstruction is recommended approximately every 20 years, and MWM's bituminous pavement was last reconstructed in 2005. This project consists of the rehabilitation of all bituminous pavement at the Airport (apron, taxilane, and hangar access road). It is expected that this project includes design and construction. This project is estimated to cost \$800,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90% and Airport 10%. Due to the timing and estimated high cost of the project, approximately \$396,837 in State Apportionment or FAA Discretionary funds will be needed.

7.2.2.2 2024 Install MITLs on Taxiways & Retroreflectors in Apron Area

This project consist of installing Medium Intensity Taxiway Lights (MITLs) on all taxiways, and retroreflector markers in the apron area (**Section 4.2.10**). Currently, the apron area and all taxiways at MWM do not have any retroreflector markers or lighting. The SASP recommends MITLs for all Intermediate Airports (such as MWM), and Advisory Circular (AC) 150/5340-30G recommends MITLs for taxiways at airports where a runway lighting system are installed. This project is estimated to cost \$150,000 (2019 dollars) and will be included as part of the bituminous pavement rehabilitation project (**Section 7.2.2.1**). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90% and Airport 10%. Due to the timing and estimated high cost of the project, approximately \$135,000 in State Apportionment or FAA Discretionary funds will be needed.

7.2.2.3 2025 Entitlement Payback

It is assumed three years of entitlement transfers will be needed to acquire the Snow Blower in 2021 (**Section 7.2.1.9**). This project consists of paying back one year's of FAA Non-Primary Entitlement funds (\$150,000) back to the borrowed airport.

7.2.2.4 2026 Entitlement Payback

It is assumed three years of entitlement transfers will be needed to acquire the Snow Blower in 2021 (**Section 7.2.1.9**). This project consists of paying back one year's of FAA Non-Primary Entitlement funds (\$150,000) back to the borrowed airport.

7.2.2.5 2027 Entitlement Payback

It is assumed three years of entitlement transfers will be needed to acquire the Snow Blower in 2021 (**Section 7.2.1.9**). This project consists of paying back one year's of FAA Non-Primary Entitlement funds (\$150,000) back to the borrowed airport.

7.2.2.6 2028 Pavement Maintenance - Runway 17/35 & Taxiways (Concrete Pavements)

Joint and crack sealing is recommended approximately every five years, or as needed based on the pavement condition. It is anticipated that in 2028 all concrete pavements at the Airport (Runway 17/35 and Taxiways) will require joint and crack sealing and repair as part of this project. The pavement maintenance will include repairing and resealing the previously sealed

concrete joints and prepping and sealing new cracks in the concrete pavement. Replacement and patching of concrete panels is also expected to be part of the project. This project is estimated to cost \$300,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.3 20 Year CIP (2029 – 2039)

The 20 Year CIP is the long-term plan discussing the capital improvements planned at MWM (2029 to 2039). The 20 Year CIP projects are shown on **Figure 7-3**.

7.2.3.1 2029 Environmental Assessment - Crosswind Runway 12/30

Runway 17/35 currently provides less than the FAA recommended 95% wind coverage, and as a result a turf crosswind runway is recommend to meet the needs of MWM's users (**Section 5.2**). This first step to construction of Runway 12/30, is the completion of an Environmental Assessment (EA).

The EA will evaluate the environmental impacts of the construction of the runway (both positive and negative), and, if necessary, will propose measures to minimize or mitigate any impacts as a result of or during the project construction. Based on current information, it is anticipated that the EA will result in a Finding of No Significant Impact (FONSI). An EA normally takes about one to two years to complete. To allow for sufficient time to complete, the construction of Runway 12/30 is anticipated for 2031. The EA is estimated to cost \$100,000 (2019 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90% and Airport 10%. Due to the timing and estimated cost of the project, approximately \$90,000 in State Apportionment or FAA Discretionary funds will be needed.

7.2.3.2 2029 Land Acquisition - Crosswind Runway 12/30

Crosswind Runway 12/30 recommend to meet the needs of MWM's users (**Section 5.2**). Approximately 21.4 acres will be required before constructing the future crosswind Runway 12/30 (**see Figure 5-6**). At this time, it is estimated the land acquisition will cost approximately \$150,000 (2019 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90% and Airport 10%. Due to the timing and estimated cost of the project, approximately \$135,000 in State Apportionment or FAA Discretionary funds will be needed.

7.2.3.3 2030 Pavement Maintenance - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)

Joint and crack sealing is recommended approximately every five years, or as needed based on the pavement condition. It is anticipated that in 2030 all bituminous pavements at the Airport (Apron, Taxilanes, and Hangar Access Road) will require joint and crack sealing. The repairs will include routing and sealing new cracks in the pavement and re-sealing previously sealed joints and cracks as part of this project. This project is estimated to cost \$75,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.3.4 2031 Design & Construction - Crosswind Runway 12/30

Runway 17/35 currently provides less than the FAA recommended 95% wind coverage, and as a result a turf crosswind runway is recommend to meet the needs of MWM's users (**Section 5.2**). This project consists of the design and construction of tur Runway 12/30. It is anticipated the EA

and Land acquisition for Runway 12/30 will have been completed in 2029. This project is estimated to cost \$1,100,000 (2019 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90% and Airport 10%. Due to the timing and estimated cost of the project, approximately \$990,000 in State Apportionment or FAA Discretionary funds will be needed.

7.2.3.5 2032 No Project - Save Entitlements

There are no projects planned for 2032. The Airport will save their \$150,000 annual FAA Non-Primary Entitlement funds for future projects.

7.2.3.6 2033 Master Plan Update

The Minnesota State System Plan (SASP) recommends that Intermediate Airports (such as MWM) update their Master Plan approximately every 15 years. The last Master Plan (this Master Plan) is anticipated to have been completed in 2019. The Master Plan Update is estimated to cost \$275,000 (2019 dollars), and is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90% and Airport 10%.

7.2.3.7 2034 No Project - Save Entitlements

There are no projects planned for 2034. The Airport will save their \$150,000 annual FAA Non-Primary Entitlement funds for future projects.

7.2.3.8 2035 Pavement Maintenance - Runway 17/35 & Taxiways (Concrete Pavements)

Joint and crack sealing is recommended approximately every five years, or as needed based on the pavement condition. It is anticipated that in 2035 all concrete pavements at the Airport (Runway 17/35 and Taxiways) will require joint and crack sealing and repair as part of this project. The pavement maintenance will include repairing and resealing the previously sealed concrete joints and prepping and sealing new cracks in the concrete pavement. Replacement and patching of concrete panels is also expected to be part of the project. This project is estimated to cost \$300,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.3.9 2036 Pavement Maintenance - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)

Joint and crack sealing is recommended approximately every five years, or as needed based on the pavement condition. It is anticipated that in 2036 all bituminous pavements at the Airport (Apron, Taxilanes, and Hangar Access Road) will require joint and crack sealing. The repairs will include routing and sealing new cracks in the pavement and re-sealing previously sealed joints and cracks as part of this project. This project is estimated to cost \$75,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90%, MnDOT 5%, and Airport 5%.

7.2.3.10 2037 No Project - Save Entitlements

There are no projects planned for 2037. The Airport will save their \$150,000 annual FAA Non-Primary Entitlement funds for future projects.

7.2.3.11 2038 Pavement Rehabilitation - Runway 17/35 & Taxiways (Concrete Pavements)

Pavement rehabilitation or reconstruction is recommended approximately every 20 years, and MWM's concrete pavement was last reconstructed in 2009. This project consists of the rehabilitation of all concrete pavement at the Airport (Runway 17/35 and Taxiways). It is expected that this project includes design and construction. This project is estimated to cost \$3,500,000 (2019 dollars). This project is eligible for FAA AIP funds, with the project funding ratio of FAA 90% and Airport 10%. Due to the timing and estimated high cost of the project, approximately \$3,150,000 in State Apportionment or FAA Discretionary funds will be needed.

7.2.3.12 2039 No Project - Save Entitlements

There are no projects planned for 2039. The Airport will save their \$150,000 annual FAA Non-Primary Entitlement funds for future projects.

7.2.4 Recommended Projects Not Included in the 20-Year CIP

There are several recommended projects and airport improvements in **Chapter 4**, Facility Recommendations that are not shown in the 20-Year CIP. This is due to either the project being the responsibility of the Airport Sponsor, or the project is estimated to occur beyond the 20-year period. These recommended projects are described in detail in the sections that follow.

7.2.4.1 Airport Sponsor Projects

There are recommended projects within this Master Plan that are the responsibility of the Airport Sponsor. As a result, the projects listed below are not included in the 20-Year Capital Improvement Plan, since no Federal or State funding will be used for these projects.

- **Update Runway 17/35 Designation (Section 4.2.2)**
 - Runway 17/35 designation needs to be updated to 18/36 to reflect the runway's current magnetic headings. FAA Flight Standards will determine the appropriate time to make this change (i.e. update instrument approach procedures, airport facility directory, etc.), and will coordinate the change with the Airport.
- **Request New Procedure for 7/8 Mile (Section 4.2.6)**
 - A 7/8 mile approach is recommended for Runway 17 and 35 to better accommodate the Airport's user in inclement weather conditions. Once the AGIS data is uploaded and verified on the FAA website (see **Section 4.4**), the Airport Sponsor should request a new instrument approach procedure (IAP) FAA Flight Procedures. It takes approximately three years for FAA Flight Procedure to develop a new IAP.
 - Please note, if approach procedures were increased to $\frac{3}{4}$ mile or less, the Approach Surfaces and Primary Surface would increase to a size that would require redesign of the existing apron (see **Section 4.4**), as well as relocation of several hangars. As a result, improved approaches of $\frac{3}{4}$ mile or less are not recommended.
- **RPZ & BRL Land Acquisition (Section 4.2.7, Figure 4-1)**
 - All the land included in the RPZ and Building Restriction Line (BRL) should be owned in fee or controlled by an airport sponsor. The Airport should to acquire all land, through easement or fee, within Runway 35's future, not lower than $\frac{3}{4}$ mile RPZ and Runway 17/35's 20-foot BRL.
- **Monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas (Section 4.3.3.1)**

- AvGas is the only transportation fuel that still contains lead. Lead is a toxic substance that can be inhaled or absorbed in the blood stream. The FAA, Environmental Protection Agency (EPA), and the aviation industry are working to remove lead from aviation fuels. It is recommended that the Sponsor monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas (**Section 4.3.3.1**).
- Mitigate obstructions to MWM's existing and ultimate Part 77 and TERPS surfaces (**Sections 4.4 and 5.4**).
 - Currently there are no obstructions to MWM's Approach Surfaces. The City should continue to monitor tree growth off the end of the existing and proposed runway to ensure no obstructions occur.
- **Acquire a boundary survey and mitigate possible encroachments to Airport Property (Section 4.5)**
 - **Sections 1.17 and 4.5** list possible encroachments and recommendations to remedy the encroachments to Airport Property. It is recommended that the Sponsor first acquire a Boundary Survey and then remedy the encroachments found.
- **Implement sustainability initiatives (Section 4.7)**
 - Currently, no specific sustainability plan has been developed for the Airport. The City should implement sustainability initiatives as discussed in **Section 4.7** to reduce energy consumption, reduce hazardous and solid waste generation, and improve water quality at the Airport.

7.2.4.2 Projects Beyond 20-Years

There are projects recommended in this Master Plan that are not anticipated to be completed within the 20-year planning period (2019-3039). This is either due to not enough demand forecasted in the 20-year planning period to justify the recommended improvement (but recommended to be shown on Airport Layout Plan (ALP) as ultimate condition), or due to project priority and cost. These projects are anticipated to occur after 2039.

- **Extend Runway 17/35 to ultimate length of 4,400 feet (Section 5.1).**
 - This project will require justification, an EA, and the acquisition of approximately 110 acres of land before Runway 17/35 can be extended 800 feet to the north. This extension is estimated to cost \$900,000 in 2019 dollars.
- **Construction Full-Parallel Taxiway (Section 4.2.9.1).**
 - A full-length parallel taxiway is recommended for Runway 17/35 once the runway is extended. Construction of the full-length parallel taxiway is estimated to cost \$1,900,000 in 2019 dollars.
- **Install 8-foot wildlife fencing around the perimeter of the Airport property (Section 4.3.6).**
 - Currently, there is no perimeter or wildlife fencing at MWM. Installation of a full perimeter fence is recommended in order to prevent unauthorized persons and deer from entering the Airport operating area.
 - Minnesota Administrative Rules and the MnDOT SASP requires all licensed airports to have sufficient fencing around the Airport property to prevent people who are not engaged in aviation activities from accessing the aircraft movement areas. The FAA recommends a 10-12 foot chain-link fence topped with 3-strand barbed wire outriggers to minimize deer accessing aircraft movement areas. In certain cases, an 8-foot chain link fence with 3-strand barbed wire outriggers may be sufficient to

prevent deer access. However, the FAA will not fund a project to construct a fence that is lower than 10 feet in total height (fence plus barbed wire).

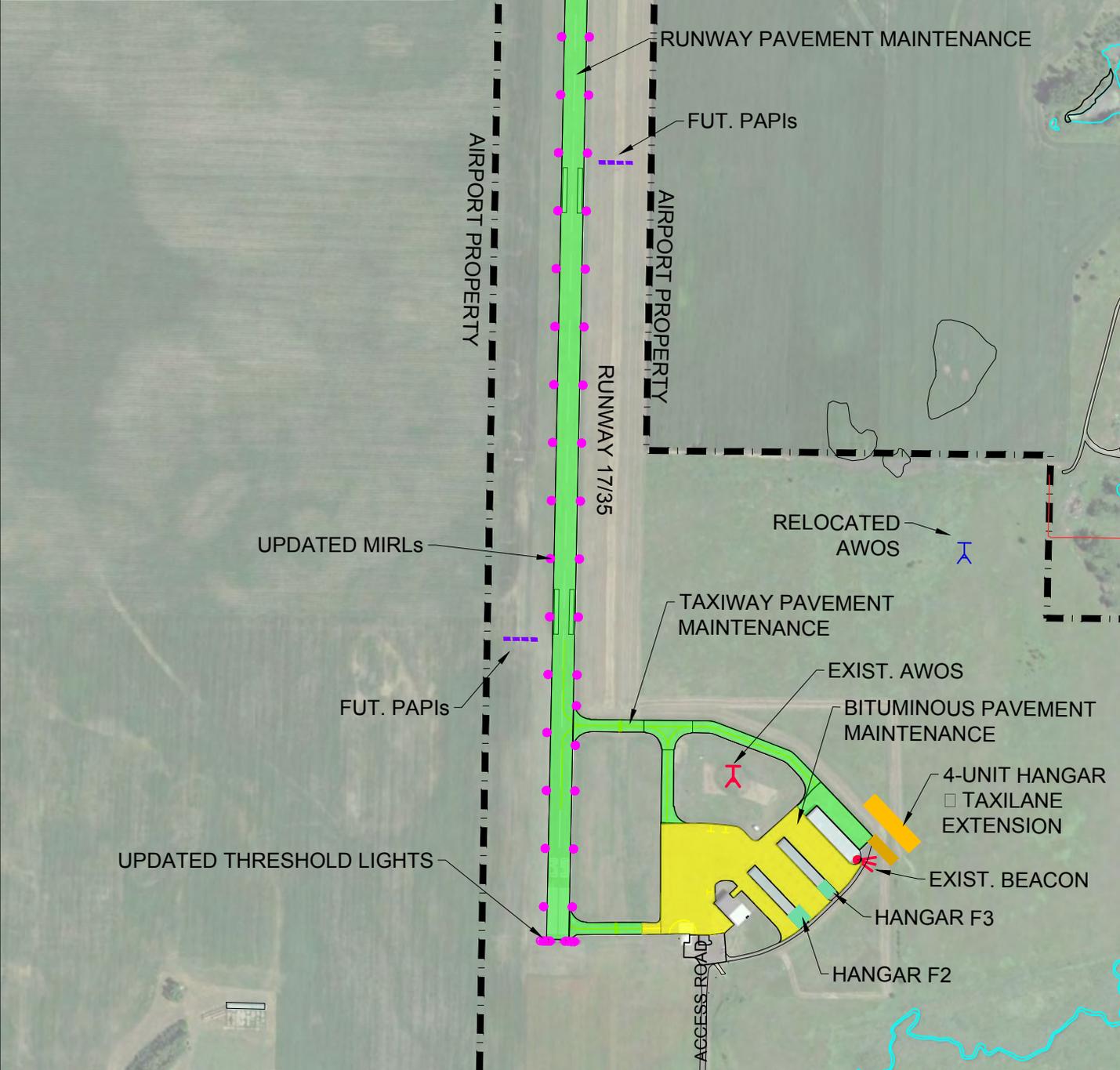
- The Airport will need to complete a Wildlife Hazard Site Visit (WHSV) and a Wildlife Hazard Management Plan (WHMP) prior to the implementation of the fencing project.
- **Future and ultimate hangar development (Alternative 3C) (Section 5.3.2).**
 - Longer-term hangar development, including apron expansion, additional tiedowns and automobile parking, as shown in the preferred Hangar Development Alternative B (shown in, see **Sections 5.3.2**). All hangar development and apron expansion will be constructed when demand warrants.
- **Relocate the A/D Building and Automobile Parking lot outside of the Departure Surface (Section 4.3.2, 4.3.4.1, and 5.3.2).**
 - It is recommended the A/D Building and Automobile Parking lot be relocated outside of the Departure Surface once they have reached the end of their useful life. The existing A/D building was completed in 2005, and parking lot and are in good condition. It is not anticipated the A/D Building will reach the end of its useful life until beyond 2039.
- **Construct a SRE/Maintenance building to house future equipment (Section 4.3.5).**
 - MWM's existing equipment is currently housed at the City Street Shop, as the City Street crew provides personnel for snow removal and maintenance (e.g. mowing) at the Airport. An SRE building is needed on site to protect and preserve the equipment's condition prior to additional equipment purchases.

MWM 20-Year Capital Improvement Plan

Calendar Year	Project	Estimated Cost (2019 Dollars)	Funding Rates			FAA Funding Entitlement	FAA Discretionary/ Apportionment	State Funding	Local Funding	Hangar Loan Program	Annual Entitlement / Transfer	Remaining AIP Balance
			FAA	State	Local							
Beginning Entitlement Balance											\$404,373	
2019											Annual Non-Primary Entitlement	\$150,000
2019	Mower Acquisition	\$25,000	0%	75%	25%	\$0	\$0	\$18,750	\$6,250			\$554,373
2019	T-Hangar Additions - F2 & F3	\$503,567	90%	5%	5%	\$453,210	\$0	\$25,178	\$25,178			\$101,163
2020											Annual Non-Primary Entitlement	\$150,000
2020	Entitlement Payback - Red Wing (RGK)	\$150,000										-\$150,000
2020	Update Airport Zoning (RW 17/35 Extension & Runway 12/30)	\$50,000	0%	75%	25%	\$0	\$0	\$37,500	\$12,500			\$101,163
2020	Install Credit Card Chip Reader (by Oct 2020)	\$20,000	90%	5%	5%	\$18,000	\$0	\$1,000	\$1,000			\$83,163
2020	Improve Telecommunications - Fiber	\$50,000	0%	75%	25%	\$0	\$0	\$37,500	\$12,500			\$83,163
2020	Update MIRLs & Threshold Lights (5010 Inspection)	\$50,000	90%	5%	5%	\$45,000	\$0	\$2,500	\$2,500			\$38,163
2021											Annual Non-Primary Entitlement	\$150,000
2021	Borrow Entitlements for Snowblower (3 years)	\$450,000										\$450,000
2021	SRE / Snowblower Acquisition	\$600,000	90%	5%	5%	\$540,000	\$0	\$30,000	\$30,000			\$98,163
2021	Install PAPIs on Runway 17 & 35	\$200,000	90%	5%	5%	\$180,000	\$0	\$10,000	\$10,000			\$458,163
2022											Annual Non-Primary Entitlement	\$150,000
2022	Pavement Maintenance - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)	\$75,000	90%	5%	5%	\$67,500	\$0	\$3,750	\$3,750			\$540,663
2022	Hangar Site Prep (4-unit hangar)	\$125,000	90%	5%	5%	\$112,500	\$0	\$6,250	\$6,250			\$428,163
2022	Taxilane Widening & Extensions	\$150,000	90%	5%	5%	\$135,000	\$0	\$7,500	\$7,500			\$293,163
2023											Annual Non-Primary Entitlement	\$150,000
2023	AWOS Relocation	\$70,000	0%	75%	25%	\$0	\$0	\$52,500	\$17,500			\$443,163
2023	Pavement Maintenance - Runway 17/35 & Taxiways (Concrete Pavements)	\$300,000	90%	5%	5%	\$270,000	\$0	\$15,000	\$15,000			\$173,163
2019-2023 Totals		\$2,818,567				\$1,821,210	\$0	\$247,428	\$149,928		Ending Balance	\$173,163
2024											Annual Non-Primary Entitlement	\$150,000
2024	Pavement Rehabilitation - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)	\$800,000	90%	0%	10%	\$323,163	\$396,837	\$0	\$80,000			\$0
2024	Install MITLs on Taxiways & Retroreflectors in Apron Area	\$150,000	90%	0%	10%	\$0	\$135,000	\$0	\$15,000			\$0
2025											Annual Non-Primary Entitlement	\$150,000
2025	Entitlement Payback	\$150,000										-\$150,000
2026											Annual Non-Primary Entitlement	\$150,000
2026	Entitlement Payback	\$150,000										-\$150,000
2027											Annual Non-Primary Entitlement	\$150,000
2027	Entitlement Payback	\$150,000										-\$150,000
2028											Annual Non-Primary Entitlement	\$150,000
2028	Pavement Maintenance - Runway 17/35 & Taxiways (Concrete Pavements)	\$300,000	90%	0%	10%	\$150,000	\$120,000	\$0	\$30,000			\$0
2024-2028 Totals		\$1,700,000				\$473,163	\$651,837	\$0	\$125,000		Ending Balance	\$0
2029											Annual Non-Primary Entitlement	\$150,000
2029	Environmental Assessment - Crosswind Runway 12/30	\$100,000	90%	0%	10%	\$150,000	-\$60,000	\$0	\$10,000			\$0
2029	Land Acquisition - Crosswind Runway 12/30	\$150,000	90%	0%	10%	\$0	\$135,000	\$0	\$15,000			\$0
2030											Annual Non-Primary Entitlement	\$150,000
2030	Pavement Maintenance - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)	\$75,000	90%	0%	10%	\$67,500	\$0	\$0	\$7,500			\$82,500
2031											Annual Non-Primary Entitlement	\$150,000
2031	Design & Construction - Crosswind Runway 12/30	\$1,100,000	90%	0%	10%	\$232,500	\$757,500	\$0	\$110,000			\$0
2032											Annual Non-Primary Entitlement	\$150,000
2032	No Project - Save Entitlements											\$150,000
2033											Annual Non-Primary Entitlement	\$150,000
2033	Master Plan Update	\$275,000	90%	0%	10%	\$247,500	\$0	\$0	\$27,500			\$52,500
2034											Annual Non-Primary Entitlement	\$150,000
2034	No Project - Save Entitlements											\$202,500
2035											Annual Non-Primary Entitlement	\$150,000
2035	Pavement Maintenance - Runway 17/35 & Taxiways (Concrete Pavements)	\$300,000	90%	0%	10%	\$270,000	\$0	\$0	\$30,000			\$82,500
2036											Annual Non-Primary Entitlement	\$150,000
2036	Pavement Maintenance - Apron, Taxilanes, & Hangar Access Road (Bituminous Pavements)	\$75,000	90%	0%	10%	\$67,500	\$0	\$0	\$7,500			\$165,000
2037											Annual Non-Primary Entitlement	\$150,000
2037	No Project - Save Entitlements											\$315,000
2038											Annual Non-Primary Entitlement	\$150,000
2038	Pavement Rehabilitation - Runway 17/35 & Taxiways (Concrete Pavements)	\$3,500,000	90%	0%	10%	\$465,000	\$2,685,000	\$0	\$350,000			\$0
2039											Annual Non-Primary Entitlement	\$150,000
2039	No Project - Save Entitlements											\$150,000
2029-2039 Totals		\$5,575,000				\$1,500,000	\$3,517,500	\$0	\$557,500		Ending Balance	\$150,000
20 Year Totals		\$10,093,567				\$3,794,373	\$4,169,337	\$247,428	\$832,428			

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- 2019 MOWER ACQUISITION
- 2019 T-HANGAR ADDITIONS - F2 □ F3
- 2020 UPDATE AIRPORT ZONING
- 2020 INSTALL CREDIT CARD CHIP READER
- 2020 IMPROVE TELECOMMUNICATIONS - FIBER
- 2020 UPDATED MIRLS □ THRESHOLD LIGHTS
- 2021 SRE / SNOW BLOWER ACQUISITION
- 2021 INSTALL PAPIs ON RUNWAY 17 □ 35
- 2022 PAVEMENT MAINTENANCE
- APRON, TAXILANES, AND ACCESS ROAD
- 2022 HANGAR SITE PREP □ 4-UNIT HANGAR □
- 2022 TAXILANE WIDENING □ EXTENSION
- ⏏ 2023 AWOS RELOCATION
- 2023 PAVEMENT MAINTENANCE
- RUNWAY 17/35 □ TAXIWAYS

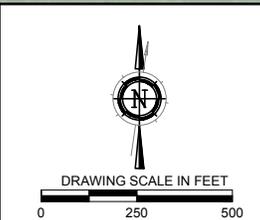


AIRPORT MASTER PLAN
WINDM 138969
MAY 201 □

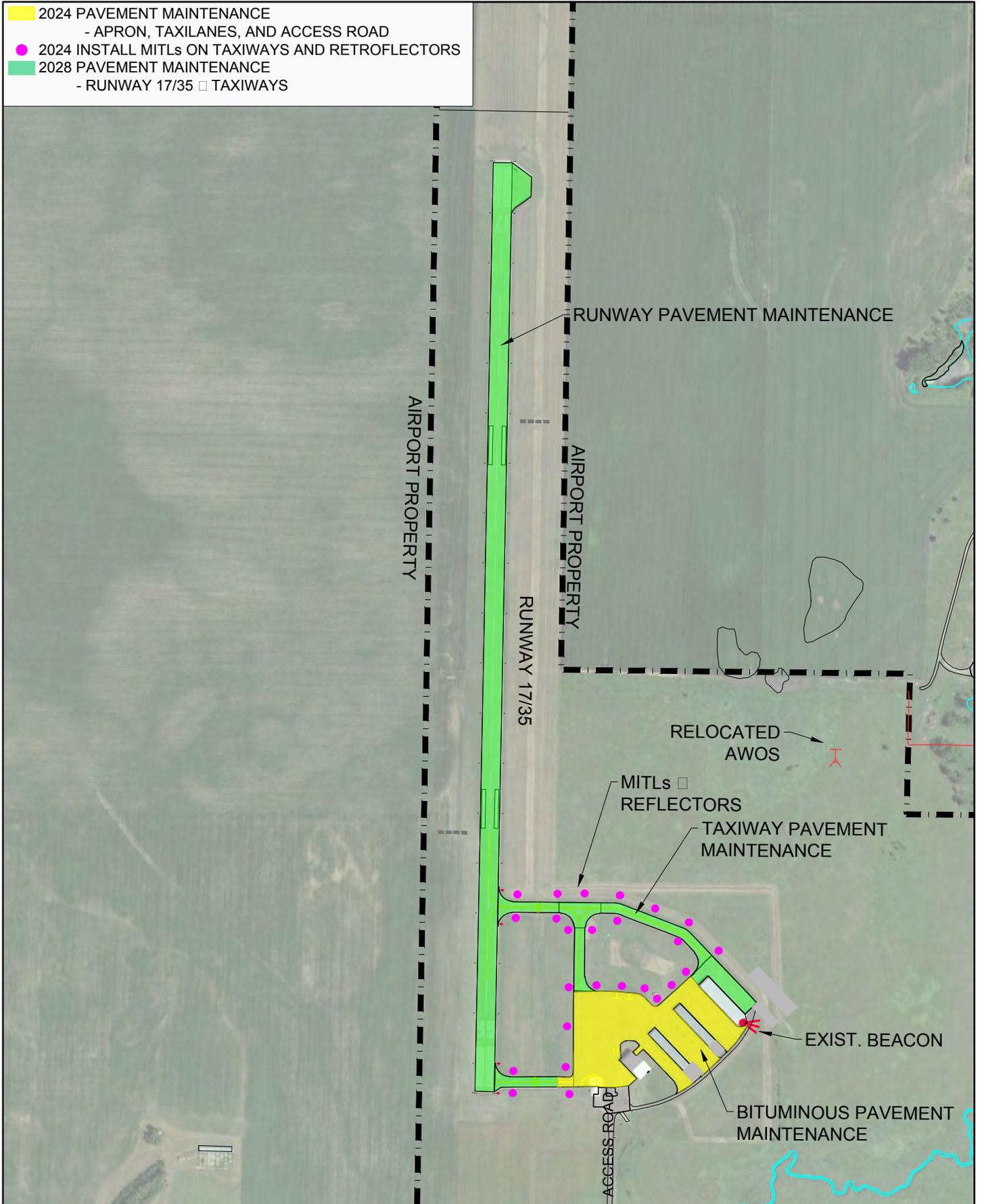
WINDOM MUNICIPAL AIRPORT

5 YEAR CIP

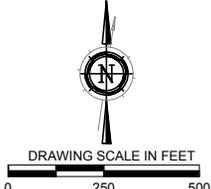
Figure 7-1



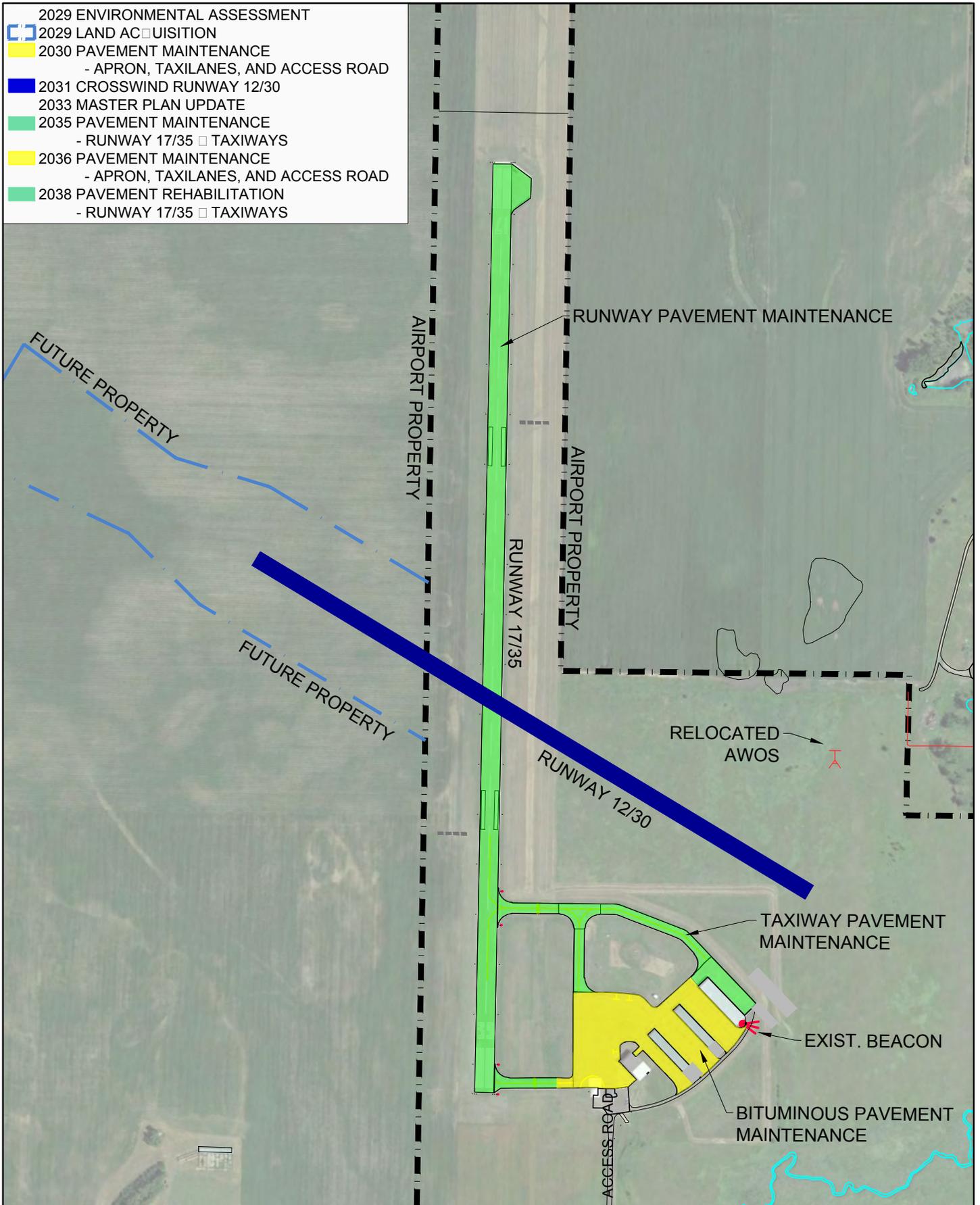
- 2024 PAVEMENT MAINTENANCE
- APRON, TAXILANES, AND ACCESS ROAD
- 2024 INSTALL MITLs ON TAXIWAYS AND RETROFLECTORS
- 2028 PAVEMENT MAINTENANCE
- RUNWAY 17/35 □ TAXIWAYS



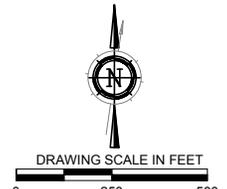
S:\UZ\W\Windom\138969\5-final-dsgn\Master Plan\MWM_Fig 7-1 10 YEAR CIP.dwg 5/14/2019 2:42 PM jzirbes

	AIRPORT MASTER PLAN	<h2 style="margin: 0;">WINDOM MUNICIPAL AIRPORT</h2> <p style="margin: 0;">10 YEAR CIP</p>	<p style="font-size: 24px; margin: 0;">Figure 7-2</p>	
	WINDM 138969			
	MAY 201 □			

- 2029 ENVIRONMENTAL ASSESSMENT
- 2029 LAND ACQUISITION
- 2030 PAVEMENT MAINTENANCE
- APRON, TAXILANES, AND ACCESS ROAD
- 2031 CROSSWIND RUNWAY 12/30
- 2033 MASTER PLAN UPDATE
- 2035 PAVEMENT MAINTENANCE
- RUNWAY 17/35 TAXIWAYS
- 2036 PAVEMENT MAINTENANCE
- APRON, TAXILANES, AND ACCESS ROAD
- 2038 PAVEMENT REHABILITATION
- RUNWAY 17/35 TAXIWAYS



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	AIRPORT MASTER PLAN	<h2 style="margin: 0;">WINDOM MUNICIPAL AIRPORT</h2> <p style="margin: 0;">20 YEAR CIP</p>	<p style="font-size: 1.2em; margin: 0;">Figure 7-3</p>	
	WINDM 138969			
	MAY 2010			

Appendix A

User Surveys

Windom Municipal Airport

BUSINESS USER SURVEY

Your business has been identified as an existing or potential future user of the Windom Municipal Airport (MWM) in Windom, MN. The Airport is preparing a Master Plan study for improvements to the Airport. You can provide valuable information on airport facilities & services – whether a ‘direct’ or ‘indirect’ user of the Airport. This is important information as it helps us plan for needed improvements to facilities and services at the Airport. If you are not the appropriate contact person, we will be happy to re-direct this questionnaire to the correct contact person and welcome your call if there are any questions. Please return the survey in the enclosed postage-paid, self-addressed envelope, via fax to 888.908.8166 or scan and email to jgamet@sehinc.com. This information will be used as one source to ascertain the current and future use and needs of MWM. For any additional questions you may also contact the Airport Manager, Brian Underwood at 507.830.0273.

Please Return This Survey By December 30, 2016

The survey may also be found online at: bit.ly/WindomBusiness

Thank You,
Short-Elliott-Hendrickson, Inc.
Jacque Gamet, Airport Consultant

Name of Respondent: _____

Business Name: _____

Address: _____

City: _____ Zip: _____ Phone: (_____) _____

Aircraft make and model / Parent or Affiliate Company headquarters location(s)

Aircraft: _____ N# _____ City: _____ State: _____

Aircraft: _____ N# _____ City: _____ State: _____

Aircraft: _____ N# _____ City: _____ State: _____

AIRPORT USE & ACTIVITY

1. Does your company travel to conduct business in Windom, MN area? Yes No

If yes, which airport(s) do you use?

Windom, MN Worthington, MN Marshall, MN Sioux Falls, SD

Other _____

How many times per year does your company travel to the Windom, MN area to conduct business? _____

2. Does your clientele or suppliers travel to the Windom, MN area to conduct business? Yes No

If yes, which airport(s) do they use?

Windom, MN Worthington, MN Marshall, MN Sioux Falls, SD

Other _____

How many times per year does your clientele or suppliers travel to the Windom area? _____



3. If you and/or clientele utilize another airport other than Windom Municipal Airport, why? Please explain.

4. What is your company or clientele's flight activity?

Average business-related flights to/from Windom area per month? _____

Average number of passengers per flight? _____

Average flight distance? _____ miles

5. What is the most frequent flight destinations to-and-from Windom area:

_____, _____, _____
_____, _____, _____

6. What is the minimum runway length required at MWM for your aircraft? _____ Feet

7. Does your company plan on purchasing or using a different aircraft in the future? Yes No

Future aircraft make/model or type: _____

Runway length required to this/these aircraft to operate at MWM: _____ Feet

AIRPORT/TRAVEL PURPOSES

8. What type of business/work is connected to your flights to the Windom area?

Manufacturing Wholesale/Distribution Retail Services/Tourism

Construction Real Estate/Finance Government Energy/Utilities

Other: _____

9. What is the purpose of visits connected to your flights the Windom area?

Executive Visits / Meeting Technical / Inventory Visits Business Start-Up

Conferences / Seminars Customer Contact Client / Marketing

Part / Supplies / Shipments Recreation Other: _____

10. What is the projected future business-related use in Windom, MN area?

Increase Same Decline

If increasing or decreasing, why? _____

AIRPORT FACILITIES & SERVICES

11. Overall, are pilot services adequate at the Windom Municipal Airport? Yes No

12. Overall, are passenger services adequate at the MWM? Yes No

If 'No', please specify: _____

13. Does your business use the instrument approach procedures at MWM? Yes No

14. Would lower landing minimums increase your ability to use MWM? Yes No



15. Would a longer Runway 17/35 increase your ability to use MWM? Yes No
16. When you are unable to use MWM, what airport(s) is/are used as an alternate? _____
17. When you are unable to use MWM, what is the most common reason? _____
- Runway length due to aircraft performance Runway length due to surface contamination
- Approach minimums Other: _____

Please specify what improvements would be necessary for your business to increase use of the Windom Municipal Airport: _____

18. Is locating/expanding your business at the Windom Municipal Airport a future option? Yes No
- If so, what airport facilities or services are required for you to locate or expand your business at MWM?
- _____
- _____
- _____

AIRPORT FACILITIES

19. Rate airport facilities & equipment in terms of adequacy to your operations at MWM.
(Circle a number for each item: 1=least adequate to 10 = most adequate)

Airport Facilities	Inadequate			Marginal				Adequate			
Runway 17/35	1	2	3	4	5	6	7	8	9	10	
Runway Lighting	1	2	3	4	5	6	7	8	9	10	
Approach Procedures	1	2	3	4	5	6	7	8	9	10	
Tiedown Availability	1	2	3	4	5	6	7	8	9	10	
Hangar Availability	1	2	3	4	5	6	7	8	9	10	
Arrival/Departure Building (FBO)	1	2	3	4	5	6	7	8	9	10	
Pilot Services/Assistance	1	2	3	4	5	6	7	8	9	10	
Fuel Service/Availability	1	2	3	4	5	6	7	8	9	10	
Ground Transportation	1	2	3	4	5	6	7	8	9	10	
Automobile Parking	1	2	3	4	5	6	7	8	9	10	
Airport Ground Access	1	2	3	4	5	6	7	8	9	10	

Please offer any comments important to you: _____

Thank you for your time!



Windom Municipal Airport

PILOT USER SURVEY

The Windom Municipal Airport (MWM) is studying the degree to which the Airport is serving local aviation needs. As a based aircraft owner, pilot, airport user, or operator, you can provide very meaningful information concerning airport usage, current needs, and long-range improvement priorities. We encourage you to consider anticipated lifestyle, and business evolution over the next 20 years when replying. Please return the survey in the enclosed postage-paid, self-addressed envelope, via fax to 888.908.8166, or scan and email to jgamet@sehinc.com. This information will be used as one source to ascertain the current and future use and needs of MWM. For any additional questions you may also contact the Airport Manager, Brian Underwood at 507.830.0273.

Please Return This Survey By December 30, 2016

The survey may also be found online at: bit.ly/WindomPilot

Thank You,
Short Elliott Hendrickson Inc.
Jacque Gamet, Airport Consultant
651.765.2904

Name: _____

Address: _____

City: _____ Zip: _____ Phone: (____) _____

Email: _____

PILOT & AIRCRAFT ACTIVITY

1. Do you base your aircraft at MWM? Yes No

If yes, how many years have you or your business based a plane at MWM? _____ years

If no, and you own an aircraft, where is your aircraft currently based? _____

If adequate facilities existed, would you base your plane at MWM? Yes No

If yes, would you prefer to own or lease? Own Lease

Would you prefer a box hangar or t-hangar? Box T-Hangar

What additional facilities would you need to base your plane at MWM? _____

Aircraft Make/Model and/or N#: _____ Type (circle): SE ME Jet Heli

Aircraft Make/Model and/or N#: _____ Type (circle): SE ME Jet Heli

Aircraft Make/Model and/or N#: _____ Type (circle): SE ME Jet Heli

Aircraft Make/Model and/or N#: _____ Type (circle): SE ME Jet Heli

2. How many passengers on average are on each flight? _____ passengers



3. Please indicate the total **number** of each type of operations per year to/from MWM (a takeoff and landing is considered two operations):

_____ Pleasure/Recreational _____ Agricultural _____ Military
_____ Business _____ Flight Training _____ Other
_____ Medical _____ Cargo

4. What is your projected MWM Flight Activity? Same Declining Activity Increasing Activity
If increasing or decreasing, why? _____

FACILITY REQUIREMENTS

5. What minimum runway length is required at MWM for your aircraft? _____ Feet
6. When you are unable to use MWM, what airport(s) are used as an alternate? _____
When you are unable to use MWM, what is the most common reason?

Runway Length due to aircraft performance Runway Length due to surface contamination
 Approach Minimums Other: _____

7. What unmet needs do you have at MWM?

Longer Runway 17/35 Based Aircraft Storage Type: _____
 Improved Runway Lighting Transient Aircraft Storage Type: _____
 Lower Approach Minimums Other: _____

Comments: _____

8. Do you purchase fuel at MWM? Yes No

9. Do you use the existing instrument approaches? Yes No

If the approach procedures do not meet your needs, please explain: _____

10. How many additional operations (number in addition to those previously listed) would you complete at MWM if the facilities were improved? _____ Operations

What improvements are needed at MWM for you to conduct the additional operations? _____

11. Do you plan on purchasing/changing aircraft in the future? Yes No

If yes, please indicate aircraft make and model, and runway length required to operate at MWM:

Aircraft make/model or type: _____ Runway length required: _____ Feet

Aircraft make/model or type: _____ Runway length required: _____ Feet



BUSINESS / CORPORATE AIRPORT USE

12. Does your company or clientele use Windom Airport? Yes No N/A
13. Projected business-related use of Windom Airport? Same Decline Increase

AIRPORT FACILITIES

14. Rate airport facilities & equipment in terms of adequacy to your operations at MWM.
(Circle a number for each item: 1=least adequate to 10=most adequate)

Airport Facilities	Inadequate			Marginal				Adequate			N/A
Runway 17/35	1	2	3	4	5	6	7	8	9	10	N/A
Runway Lighting	1	2	3	4	5	6	7	8	9	10	N/A
Approach Procedures	1	2	3	4	5	6	7	8	9	10	N/A
Tiedown Availability	1	2	3	4	5	6	7	8	9	10	N/A
Based Aircraft Hangar Availability	1	2	3	4	5	6	7	8	9	10	N/A
Transient Aircraft Hangar Availability	1	2	3	4	5	6	7	8	9	10	N/A
General Aviation Terminal Building	1	2	3	4	5	6	7	8	9	10	N/A
Pilot Services/Assistance	1	2	3	4	5	6	7	8	9	10	N/A
Fuel Service/Availability	1	2	3	4	5	6	7	8	9	10	N/A
Ground Transportation	1	2	3	4	5	6	7	8	9	10	N/A
Automobile Parking	1	2	3	4	5	6	7	8	9	10	N/A
Airport Ground Access	1	2	3	4	5	6	7	8	9	10	N/A

Please describe airfield improvements you feel are needed: _____

Please describe improvements you feel are needed to buildings, services, and transportation: _____



RECYCLING PRACTICES

15. If your aircraft is based at MWM, do you utilize any recycling programs for your waste generated at the Airport? Yes No Aircraft not based at MWM

If yes, please rate your recycling behavior at the Airport:

Recycling Behavior	Never	Rarely	Sometimes	Usually	Always	N/A
I Recycle Paper	1	2	3	4	5	N/A
I Recycle Steel/Aluminum	1	2	3	4	5	N/A
I Recycle Plastics	1	2	3	4	5	N/A
I Recycle Glass	1	2	3	4	5	N/A

16. If your aircraft is based at MWM, do you actively collect waste from:

Fuel Operations Oil Other (specify) _____

If you collect these waste products, how do you dispose of them? _____

ADDITIONAL COMMENTS

17. Please offer any additional comments or airport recommendations important to you: _____

THANK YOU!





Appendix B

1979 Windom Municipal Airport Zoning Ordinance



Zoning Ordinance

Windom Municipal Airport

No. 172787
Office of County Recorder
State of Minnesota
County of COTTONWOOD
I hereby certify that the within instrument was filed in this office for record on the 6 day of March 1979, at 3 o'clock P.M. and was duly recorded in
Sub 13 - Page 330
Mary Ann Anderson
County Recorder

City of Windom, Minnesota

County of Cottonwood, Minnesota

Joint

Airport Zoning Board

Prepared by: SIOUX ENGINEERING, INCORPORATED
862 FOURTH AVENUE
WINDOM, MINNESOTA 56101

Date 11-30-78

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		2. Zone A
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	C.	Boundary Limitation
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WINDOM MUNICIPAL AIRPORT

ZONING ORDINANCE

CREATED BY THE
CITY OF WINDOM - COUNTY OF COTTONWOOD
JOINT AIRPORT ZONING BOARD

AN ORDINANCE REGULATING AND RESTRICTING THE HEIGHT OF STRUCTURES AND OBJECTS OF NATURAL GROWTH, AND OTHERWISE REGULATING THE USE OF PROPERTY, IN THE VICINITY OF THE WINDOM MUNICIPAL AIRPORT BY CREATING THE APPROPRIATE ZONES AND ESTABLISHING THE BOUNDARIES THEREOF; PROVIDING FOR CHANGES IN THE RESTRICTIONS AND BOUNDARIES OF SUCH ZONES; DEFINING CERTAIN TERMS USED HEREIN; REFERRING TO THE WINDOM MUNICIPAL AIRPORT ZONING MAP WHICH IS INCORPORATED IN AND MADE A PART OF THIS ORDINANCE; PROVIDING FOR ENFORCEMENT; ESTABLISHING A BOARD OF ADJUSTMENT; AND IMPOSING PENALTIES.

IT IS HEREBY ORDAINED BY THE CITY OF WINDOM - COUNTY OF COTTONWOOD JOINT AIRPORT ZONING BOARD PURSUANT TO THE AUTHORITY CONFERRED BY MINNESOTA STATUTES 360.061 - 360.074, AS FOLLOWS:

SECTION I: PURPOSE AND AUTHORITY

CITY OF WINDOM - COUNTY OF COTTONWOOD

Joint Airport Zoning Board, created and established by

joint action of the Common Council of the City of Windom and the

Board of County Commissioners of Cottonwood County pursuant to the

provisions and authority of Minnesota Statutes 360.063, hereby finds and declares that:

- A. An airport hazard endangers the lives and property of users of the Windom Municipal Airport, and property or occupants of land in its vicinity, and also if of the obstructive type, in effect reduces the size of the area available for the landing, takeoff, and maneuvering of aircraft, thus tending to destroy or impair the utility of the Windom Municipal Airport and the public investment therein.
- B. The creation or establishment of an airport hazard is a public nuisance and an injury to the region served by the Windom Municipal Airport.
- C. For the protection of the public health, safety, order, convenience, prosperity and general welfare, and for the promotion of the most appropriate use of land, it is necessary to prevent the creation or establishment of airport hazards.
- D. The prevention of these airport hazards should be accomplished, to the extent legally possible, by the exercise of the police power without compensation.
- E. The prevention of the creation or establishment of airport hazards and the elimination, removal, alteration, mitigation, or marking and lighting of existing airport hazards are public purposes for which political subdivisions may raise and expend public funds.

SECTION II: SHORT TITLE

This ordinance shall be known as "Windom Municipal Airport Zoning Ordinance."

Those sections of land affected by this Ordinance are indicated in "Exhibit A" which is attached to this Ordinance.

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SECTION III: DEFINITIONS

As used in this Ordinance, unless the context otherwise requires:

"AIRPORT" means the Windom Municipal Airport located in Section 12, T 105 N, R 36 W in Cottonwood County, Minnesota

"AIRPORT ELEVATION" means the established elevation of the highest point on the usable landing area which elevation is established to be 1411.0 feet above mean sea level.

"AIRPORT HAZARD" means any structure or tree or use of land which obstructs the airspace required for, or is otherwise hazardous to, the flight of aircraft in landing or taking off at the airport; and any use of land which is hazardous to persons or property because of its proximity to the airport.

"DWELLING" means any building or portion thereof designed or used as a residence or sleeping place of one or more persons.

"HEIGHT" for the purpose of determining the height limits in all zones set forth in this Ordinance and shown on the zoning map, the datum shall be mean sea level elevation unless otherwise specified.

"LANDING AREA" means the area of the airport used for the landing, taking off or taxiing of aircraft.

"NONCONFORMING USE" means any pre-existing structure, tree, natural growth, or use of land which is inconsistent with the provisions of this Ordinance or an amendment hereto.

"NONPRECISION INSTRUMENT RUNWAY" means a runway having an existing or planned straight-in instrument approach procedure utilizing air navigation facilities with only horizontal guidance, and for which no precision approach facilities are planned or indicated on an approved planning document.

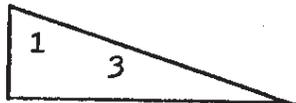
"PERSON" means an individual, firm, partnership, corporation, company, association, joint stock association, or body politic, and includes a trustee, receiver, assignee, administrator, executor, guardian, or other representative.

"PLANNED" as used in this Ordinance refers only to those proposed future airport developments that are so indicated on a planning document having the approval of the Federal Aviation Administration, the Department of Aeronautics, and The City of Windom, Minnesota.

"PRECISIONS INSTRUMENT RUNWAY" means a runway having an existing instrument approach procedure utilizing an Instrument Landing System (ILS), or a Precision Approach Radar (PAR). Also, a runway for which a precision instrument approach system is planned and is so indicated on an approved planning document.

"RUNWAY" means any existing or planned paved surface or turf covered area of the airport which is specifically designated and used or planned to be used for the landing and/or taking off of aircraft.

"SLOPE" means an incline from the horizontal expressed in an airthmetic ratio of horizontal magnitude to vertical magnitude.



slope = 3:1 = 3 ft. horizontal to 1 ft. vertical

"STRUCTURE" means an object constructed or installed by man, including, but without limitations, buildings, towers, smokestacks, and overhead transmission lines.

"TRAVERSE WAYS" for the purpose of determining height limits as set forth in this Ordinance shall be increased in height by 17 feet for interstate highways; 15 feet for all other public roadways; 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for private roads; 23 feet for railroads; and for waterways and all other traverse ways not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it.

"TREE" means any object of natural growth.

"UTILITY RUNWAY" means a runway that is constructed for and intended to be used by propeller-driven aircraft of 12,500 pounds maximum gross weight and less.

"VISUAL RUNWAY" means a runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an approved planning document.

"WATER SURFACES" for the purpose of this Ordinance shall have the same meaning as land for the establishment of protected zones.

SECTION IV: AIRSPACE OBSTRUCTION ZONING

A. AIRSPACE ZONES: In order to carry out the purpose of this Ordinance, as set forth above, the following airspace zones are hereby established: Primary Zone, Horizontal Zone, Conical Zone, Approach Zone, Precision Instrument Approach Zone, and Transitional Zone and whose locations and dimensions are as follows:

1. PRIMARY ZONE: All that land which lies directly under an imaginary primary surface longitudinally centered on a runway and extending 200 feet beyond each end of Runway 17-35 and Runway 10-28.

The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is:

500 feet for Runway 17-35 and Runway 10-28.

2. HORIZONTAL ZONE: All that land which lies directly under an imaginary horizontal surface 150 feet above the established airport elevation, or a height of 1561.0 feet above mean sea level, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:

6,000 feet for Runway 17-35 and Runway 10-28.

When a 6,000 foot arc is encompassed by tangents connecting two adjacent 10,000 foot arcs, the 6,000 foot arc shall be disregarded in the construction of the perimeter of the horizontal surface.

3. CONICAL ZONE: All that land which lies directly under an imaginary conical surface extending upward and outward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet as measured radially outward from the periphery of the horizontal surface.
4. APPROACH ZONE: All that land which lies directly under an imaginary approach surface longitudinally centered on the extended centerline at each end of a

runway. The inner edge of the approach surface is at the same width and elevation as, and coincides with, the end of the primary surface. The approach surface inclines upward and outward at a slope of 40:1 for Runway 17-35 and Runway 10-28.

5.

The approach surface expands uniformly to a width of 3,500 feet for Runway 17-35 and Runway 10-28 at a distance of 10,000 feet, then continues at the same rate of divergence to the periphery of the concial surface.

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5. TRANSITIONAL ZONE: All that land which lies directly under an imaginary surface extending upward and outward at right angles to the runway centerline and centerline extended at a slope of 7 to 1 from the sides of the primary surfaces and from the sides of the approach surfaces until they intersect the horizontal surface or the conical surface.

gence

- B. HEIGHT RESTRICTIONS: Except as otherwise provided in this Ordinance, and except as necessary and incidental to airport operations, no structure or tree shall be constructed, altered, maintained, or allowed to grow in any airspace zone created in Subsection IV A so as to project above any of the imaginary airspace surfaces described in said Subsection IV A hereof. Where an area is covered by more than one height limitation, the more restrictive limitations shall prevail.
- C. BOUNDARY LIMITATIONS: The municipality may regulate the location, size and use of buildings and the density of population in that portion of an airport hazard area under the approach zones for a distance not exceeding two miles from the airport boundary and by height restriction zoning for a distance not to exceed one and one-half miles from the airport boundary.

SECTION V: LAND USE SAFETY ZONING

- A. SAFETY ZONE BOUNDARIES: In order to carry out the purpose of this Ordinance, as set forth above and also, in order to restrict those uses which may be hazardous to the operational safety of aircraft operating to and from the Windom Municipal Airport, and furthermore to limit population and building

density in the runway approach areas, thereby creating sufficient open space so as to protect life and property in case of an accident, there are hereby created and established the following land use safety zones.

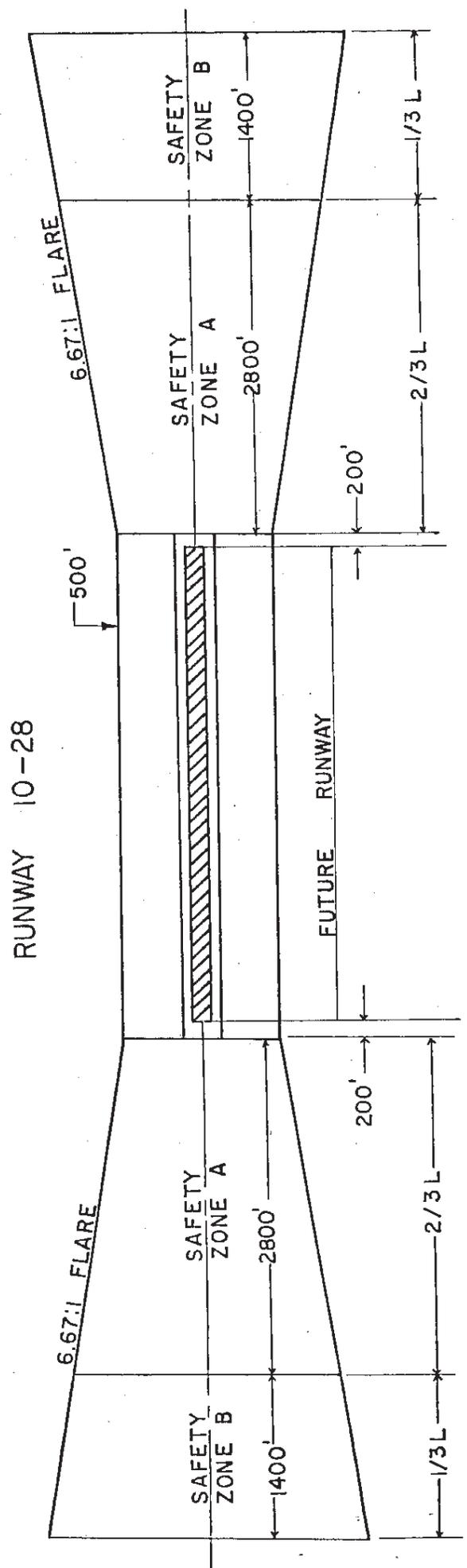
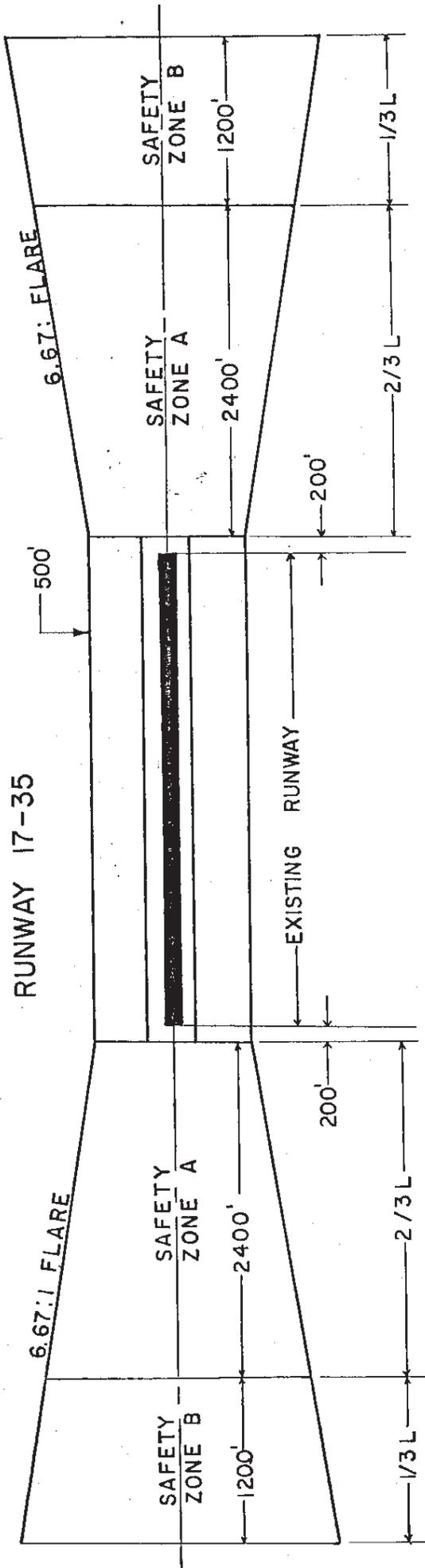
1. SAFETY ZONE A: All land in that portion of the approach zones of a runway, as defined in Subsection IV A hereof, which extends outward from the end of primary surface a distance equal to two-thirds of the planned length of the runway, which distance shall be:
 - a. 2400 Feet for runway 17-35.
 - b. 2800 Feet for runway 10-28, etc.
2. SAFETY ZONE B: All land in that portion of the approach zones of a runway, as defined in Subsection IV A hereof, which extends outward from Safety Zone A a distance equal to one-third of the planned length of the runway, which distance shall be:
 - a. 1200 Feet for runway 17-35.
 - b. 1400 Feet for runway 10-28.
3. SAFETY ZONE C: All that land which is enclosed within the perimeter of the horizontal zone, as defined in Subsection IV A hereof, and which is not included in Zone A or Zone B.

B. USE RESTRICTIONS:

1. GENERAL: Subject at all times to the height restrictions set forth in Subsection IV B, no use shall be made of any land in any of the safety zones defined in Subsection V A which creates or causes interference with the operations of radio or electronic facilities on the airport or with radio or electronic communications between airport and aircraft, makes it difficult for pilots to distinguish between airport lights and other lights, results in glare in the eyes of pilots using the airport, impairs visibility in the vicinity of the airport, or otherwise endangers the landing, taking off, or maneuvering of aircraft.

DIMENSIONS OF LAND USE SAFETY ZONES

NON PRECISION INSTRUMENT RUNWAY
WITH VISIBILITY MINIMUMS GREATER
THAN 3/4 STATUTE MILE



2. ZONE A: Subject at all times to the height restrictions set forth in Subsection IV-B and to the general restrictions contained in Subsection V.B.1. areas designated as Zone A shall contain no buildings, temporary structures, exposed transmission lines, or other similar above-ground land use structural hazards, and shall be restricted to those uses which will not create, attract, or bring together an assembly of persons thereon. Permitted uses may include, but are not limited to, such uses as agriculture (seasonal crops), horticulture, animal husbandry, raising of livestock, wildlife habitat, light outdoor recreation (nonspectator), cemeteries, and auto parking.
3. ZONE B: Subject at all times to the height restrictions set forth in Subsection IV B, and to the general restrictions contained in Subsection V B-1, areas designated as Zone B shall be restricted in use as follows:
- a. Each use shall be on a site whose area shall not be less than three acres.
 - b. Each use shall not create, attract, or bring together a site population that would exceed 15 times that of the site acreage.
 - c. Each site shall have no more than one building plot upon which any number of structures may be erected.
 - d. A building plot shall be a single, uniform and non-contrived area, whose shape is uncomplicated and whose area shall not exceed the following minimum ratios with respect to the total site area:

Site Area at least (Acres)	But Less Than (Acres)	Ratio of Site Area to Bldg. Plot Area	Building Plot Area (sq. ft.)	Max. Site Population (15 persons/A)
3		12:1		
	4	12:1	10,900	45
4		10:1		
	6	10:1	17,400	60
6		8:1		
	10	8:1	32,700	90
10		6:1		
	20	6:1	72,600	150
20	and up	4:1	218,000	300

e. The following uses are specifically prohibited in Zone B: Churches, hospitals, schools, theaters, stadiums, hotels and motels, trailer courts, camp grounds, and other places of frequent public or semipublic assembly.

4. ZONE C: Zone C is subject only to height restrictions set forth in Subsection IV B, and to the general restrictions contained in Subsection V B-1.

3. BOUNDARY LIMITATIONS: The municipality may regulate the location, size, and use of buildings and the density of population in that portion of an airport hazard area under the approach zones for a distance not to exceed two miles from the airport boundary and in other portions of an airport hazard area not to exceed one mile from the airport boundary.

SECTION VI: AIRPORT ZONING MAP

The several zones herein established are shown on the Windom Municipal Airport Zoning Map consisting of 3 sheets, prepared by Sioux Engineering, Incorporated of Windom, Minnesota and dated 11-20, 19 78, attached hereto and made a part hereof, which map, together with such amendments thereto as may from time to time be made, and all notations, references, elevations, data, zone boundaries, and other information thereon, shall be and the same is hereby adopted as part of this Ordinance.

SECTION VII: NONCONFORMING USES

Regulations not retroactive. The regulations prescribed by this Ordinance shall not be construed to require the removal, lowering, or other changes or alteration of any structure or tree not conforming to the regulations as of the effective date of this Ordinance, or otherwise interfere with the continuance of any nonconforming use. Nothing herein contained shall require any change in the construction, alteration, or intended use of any structure, the construction or alteration of which was begun prior to the effective date of this Ordinance, and is diligently prosecuted and completed within two years thereof.

SECTION VIII: PERMITS

A. FUTURE USES: Except as specifically provided in Paragraphs 1 and 2 hereunder, no material change shall be made in the use of land and no structure shall be erected, altered, or otherwise established in any zone hereby created unless a permit there-

fore shall have been applied for and granted by the zoning administrator, hereinafter, provided for. Each application for a permit shall indicate the purpose for which the permit is desired, with sufficient particularity to permit it to conform to the regulations herein prescribed. If such determination is in the affirmative, the permit shall be granted.

1. However, a permit for a tree or structure of less than 75 feet of vertical height above the ground shall not be required in the horizontal and conical zones or in any approach and transitional zones beyond a horizontal distance of 4,200 feet from each end of the runway except when such tree or structure, because of terrain, land contour, or topographic features, would extend the height limit prescribed for the respective zone.
 2. Nothing contained in this foregoing exception shall be construed as permitting or intending to permit any construction, alteration, or growth of any structure or tree in excess of any of the height limitations established by this Ordinance as set forth in Section IV.
- B. **EXISTING USES:** Before any existing use or structure may be replaced, substantially altered or repaired, or rebuilt within any zone established herein, a permit must be secured authorizing such replacement, change, or repair. No permit shall be granted that would allow the establishment or creation of an airport hazard or permit a nonconforming use, structure, or tree to become a greater hazard to air navigation than it was on the effective date of this Ordinance or any amendments thereto, or than it is when the application for a permit is made. Except as indicated, all applications for such a permit shall be granted.
- C. **NONCONFORMING USES ABANDONED OR DESTROYED:** Whenever the Zoning Administrator determines that a nonconforming structure or tree has been abandoned or more than 80% torn down, physically deteriorated, or decayed no permit shall be granted that would allow such structure or tree to exceed the applicable height limit or otherwise deviate from the zoning regulations. Whether

application is made for a permit under this paragraph or not, the Zoning Administrator may order the owner of the abandoned or partially destroyed nonconforming structure, at his own expense, to lower, remove, reconstruct, or equip the same in the manner necessary to conform to the provisions of this ordinance. In the event the owner of the nonconforming structure shall neglect or refuse to comply with such order for ten days after receipt of written notice of such order, the Zoning Administrator may, by appropriate legal action, proceed to have the abandoned or partially destroyed nonconforming structure lowered, removed, reconstructed, or equipped and assess the cost and expense thereof against the land on which the structure is or was located. Unless such an assessment is paid within ninety days from the service of notice thereof on the owner of the land, the sum shall bear interest at the rate of eight per cent per annum from the date the cost and expense is incurred until paid, and shall be collected in the same manner as are general taxes.

SECTION IX: VARIANCES

Any person desiring to erect or increase the height of any structure, or permit the growth of any tree, or use his property, not in accordance with the regulations prescribed in this ordinance, may apply to the Board of Adjustment, hereinafter provided for, for a variance from such regulations. If a person submits an application for a variance by certified mail to the members of the Board and the Board fails to grant or deny the variance within four months after the last member receives the application, the variance shall be deemed to be granted by the Board. When the variance is granted by reason of the failure of the Board to act on the variance, the person receiving the variance shall notify the Board and the Commissioner of Transportation by certified mail that the variance has been granted. The applicant shall include a copy of the original application for the variance with this notice to the Commissioner. The variance shall be effective 60 days after this notice is received by the Commissioner subject to any action taken by the Commissioner pursuant to Section 360.063, Subdivision 6.

Such variances shall be allowed where it is duly found that a literal application or enforcement of the regulations would result in practical difficulty or unnecessary hardship and relief granted would not be contrary to the public interest but do substantial justice and be in accordance with the spirit of this ordinance; provided any variance so allowed may be subject to any reasonable conditions that the Board of Adjustment may deem necessary to effectuate the purpose of this ordinance.

SECTION X: HAZARD MARKING AND LIGHTING

A. NONCONFORMING USES: The owner of any nonconforming structure or tree is hereby required to permit the installation, operation, and maintenance thereon of such markers and lights as shall be deemed necessary by the Zoning Administrator to indicate to the operators of aircraft in the vicinity of the airport the presence of such airport hazards. Such markers and lights shall be installed, operated, and maintained at the expense of the City of Windom, Minnesota.

B. PERMITS AND VARIANCES: Any permit or variance granted by the Zoning Administrator or Board of Adjustment as the case may be, may, if such action is deemed adviseable to effectuate the purpose of this ordinance and be reasonable in the circumstances, so condition such permit or variance as to require the owner of the structure or tree in question at his own expense, to install, operate, and maintain thereon such markers and lights as may be necessary to indicate to pilots the presence of an airport hazard.

SECTION XI: AIRPORT ZONING ADMINISTRATOR

It shall be the duty of the CITY ZONING ADMINISTRATOR to administer and (an appropriate local zoning official) enforce the regulations prescribed herein. Applications for permits and variances shall be made to the CITY ZONING ADMINISTRATOR upon a form furnished by him. Permit applications shall be promptly considered and granted or denied by him. Variance applications shall be forthwith transmitted by the CITY ZONING ADMINISTRATOR for action by the Board of Adjustment hereinafter provided for.

SECTION XII: BOARD OF ADJUSTMENT

- A. ESTABLISHMENT: The COTTONWOOD COUNTY BOARD OF ADJUSTMENT shall serve as the Board of Adjustment for the Windom Municipal Airport Zoning Ordinance.
- B. POWERS: The Board of Adjustment shall have and exercise the following powers:
1. To hear and decide appeals from any order, requirement, decision, or determination made by the Zoning Administrator in the enforcement of this Ordinance.
 2. To hear and decide special exceptions to the terms of this Ordinance upon which such Board of Adjustment under such regulations may be required to pass.
 3. To hear and decide specific variances.
- c. PROCEDURES:
1. The Board of Adjustment shall adopt rules for its governance and procedure in harmony with the provisions of this Ordinance. Meetings of the Board of Adjustment shall be held at the call of the Chairman and at such other

times as the Board of Adjustment may determine. The Chairman, or in his absence the acting chairman, may administer oaths and compel the attendance of witnesses. All hearings of the Board of Adjustment shall be public. The Board of Adjustment shall keep minutes of its proceedings showing the vote of each member upon each question or, if absent or failing to vote, indicating such fact, and shall keep records of its examinations and other official actions, all of which shall immediately be filed in the office of the Zoning Administrator and shall be a public record.

2. The Board of Adjustment shall make written findings of fact and conclusions of law giving the facts upon which it acted and its legal conclusions from such facts in reversing, affirming, or modifying any order, requirement, decision or determination which comes before it under the provisions of this Ordinance.
3. The concurring vote of a majority of the members of the Board of Adjustment shall be sufficient to reverse any order, requirement, decision or determination of the Zoning Administrator or to decide in favor of the applicant on any matter upon which it is required to pass under this Ordinance, or to effect any variation in this Ordinance.

SECTION XIII: APPEALS

- A. Any person aggrieved, or any taxpayer affected by any decision of the Zoning Administrator made in his administration of this Ordinance may appeal to the Board of Adjustment. Such appeals may also be made by any governing body of a municipality, county, or airport zoning board, which is of the opinion that a decision of the zoning administrator is an improper application of this ordinance as it concerns such governing body or board.
- B. All appeals hereunder must be commenced within 30 days of the Zoning Administrator's decision, by filing with the Zoning Administrator a notice of appeal specifying the grounds thereof. The Zoning Administrator shall forthwith transmit to the Board of Adjustment all the papers constituting the record upon

which the action appealed from was taken. In addition, any person aggrieved, or any taxpayer affected by any decisions of the Zoning Administrator made in his administration of this ordinance who desires to appeal such decision shall submit a notice of appeal by certified mail to the members of the Board of Adjustment in the matter set forth in Minnesota Statute 360.067, Subdivision 2.

- C. An appeal shall stay all proceedings in furtherance of the action appealed from, unless the Zoning Administrator certifies to the Board of Adjustment, after the notice of appeal has been filed with it, that by reason of the facts stated in the certificate a stay would, in his opinion, cause imminent peril to life or property. In such case, proceedings shall not be stayed except by order of the Board of Adjustment on notice to the Zoning Administrator and on due cause shown.
- D. The Board of Adjustment shall fix a reasonable time for hearing appeals, give public notice and due notice to the parties in interest, and decide the same within a reasonable time. Upon the hearing any party may appear in person or by agent or by attorney.
- E. The Board of Adjustment may, in conformity with the provisions of this ordinance, reverse or affirm, in whole or in part, or modify the order, requirement, decision or determination appealed from and may make such order, requirement, decision or determination, as may be appropriate under the circumstances, and to that end shall have all the powers of the Zoning Administrator.

SECTION XIV: JUDICIAL REVIEW

Any person aggrieved, or any taxpayer affected by any decision of the Board of Adjustment, or any governing body of a municipality, county, or airport zoning board, which is of the opinion that a decision of the board of adjustment is illegal may present to the District Court of Cottonwood County a verified petition setting forth that the decision or action is illegal, in whole or in part, and specifying the grounds of the illegality. Such petition shall be presented to the court within 30 days after the decision is filed in the office of the Board of Adjustment. The petitioner must exhaust the remedies provided in this Ordinance before availing himself of the right to petition a court as provided by this section.

SECTION XV: PENALTIES

Every person who shall construct, establish, substantially change, alter or repair any existing structure or use, or permit the growth of any tree without having complied with the provision of this ordinance or who, having been granted a permit or variance under the provisions of this Ordinance, shall construct, establish, substantially change or substantially alter or repair any existing growth or structure or permit the growth of any tree, except as permitted by such permit or variance, shall be guilty of a misdemeanor and shall be punished by a fine of not more than \$500 or imprisonment for not more than 90 days or by both. Each day a violation continues to exist shall constitute a separate offense. The Airport Zoning Administrator may enforce all provisions of this ordinance through such proceedings for injunctive relief and other relief as may be proper under the laws of Minn. Stat. 360.073 and other applicable law.

SECTION XVI: CONFLICTS

Where there exists a conflict between any of the regulations or limitations prescribed in this Ordinance and any other regulations applicable to the same area, whether the conflict be with respect to the height of structures or trees, the use of land, or any other matter, the more stringent limitation or regulation shall govern and prevail.

SECTION XVII: SEVERABILITY

A. In any case in which the provision of this Ordinance, although generally reasonable, are held by a court to interfere with the use or enjoyment of a particular structure or parcel of land to such an extent, or to be so onerous in their application to such a structure or parcel of land, as to constitute a taking or deprivation of that property in violation of the constitution of this state or the constitution of the United States, such holding shall not affect the application of this Ordinance as to other structures and parcels of land, and to this end the provisions of this

Ordinance are declared to be severable.

B. Should any section or provision of this ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the ordinance as a whole or any part thereof other than the parts so declared to be unconstitutional or invalid.

SECTION XVIII: EFFECTIVE DATE

This Ordinance shall be published on ~~NOT PUBLISHED~~ in the Cottonwood County Citizen, an official newspaper in Windom, Minnesota, and shall take effect on the 9TH day of JANUARY, 1979. Copies thereof shall be filed with the Commissioner of Aeronautics, State of Minnesota, and the County Recorder, Cottonwood County, Minnesota.

Passed and adopted after public hearing by the City of Windom-County of Cottonwood Joint Airport Zoning Board this 9th day of Jan, 1979.

John L. Geller
Chairman

Diane Annen
Member

Marilyn Burtch
Member

Member

Member

ATTEST: T.N. Weeks
T.N. WEEKS
CITY CLERK

CITY
SEAL

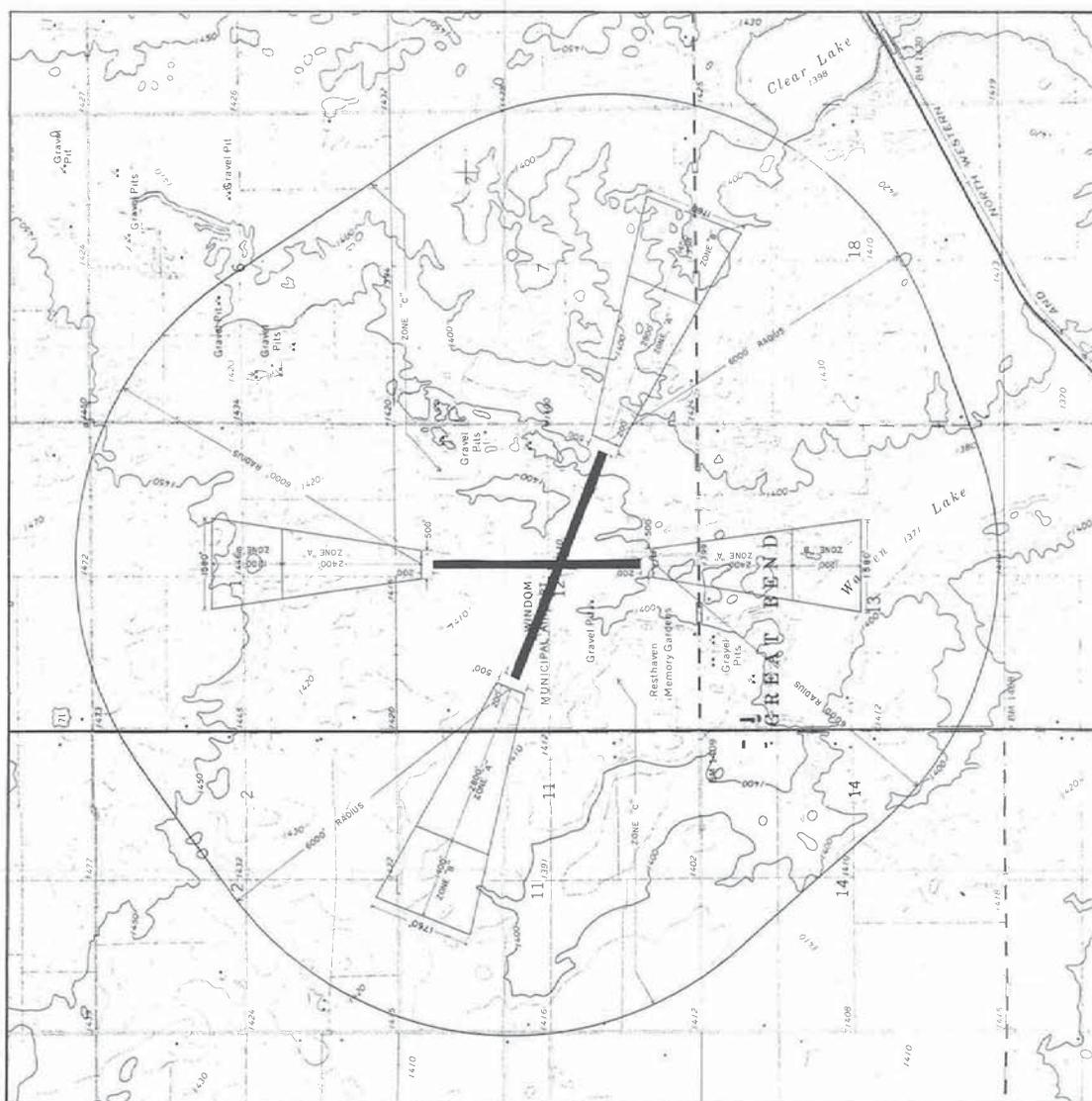
EXHIBIT A

WINDOM MUNICIPAL AIRPORT

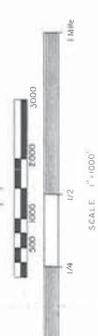
ZONING ORDINANCE

This Ordinance affects all or a portion of the following sections of land:

NAME AND NUMBER OF TOWNSHIP	AIRSPACE OBSTRUCTION ZONING Section IV of Ordinance Pages <u>1 and 3</u> of Zoning Map.	LAND USE SAFETY ZONING Section V of Ordinance Page <u>3</u> of Zoning Map.
<u>LAKESIDE</u> Township T 105 N R 35 W	Sections: 5, 6, 7, 8, 17, 18, 19, 20	Sections: 6, 7, 8, 18
<u>GREAT BEND</u> Township T 105 N R 36 W	Sections: 1, 2, 3, 10, 11, 12, 13, 14, 15, 23, 24	Sections: 1, 2, 10, 11, 12, 13, 14,
<u>CARSON</u> Township T 106 N R 35 W	Sections: 31, 32	Sections: NONE
<u>DALE</u> Township T 106 N R 36 W	Sections: 34, 35, 36	Sections: 36
Township T R		



TRUE NORTH
MAGNETIC DECLINATION
07°00' EAST



NOTES

1. TOPOGRAPHIC CONTOUR INTERVALS ARE 10 FEET DATUM IS MEAN SEA LEVEL ELEVATION
2. EXISTING TOPOGRAPHIC SWAMPS ARE THOSE USED BY THE U.S. GEOLOGICAL SURVEY.

LEGEND

- ULTIMATE RUNWAY
- ZONE BOUNDARY
- TOPOGRAPHIC CONTOURS
- SECTION LINES

R. DIXON SPEARS ASSOCIATES
MINNEAPOLIS, MINNESOTA

SIOUX ENGINEERING - INCORPORATED
WINDOM, MINNESOTA

MICROFILMED

WINDOM MUNICIPAL AIRPORT ZONING PLAN
LAND USE ZONING PLAN

MAGNETIC DECLINATION
 NORTH
 BY MINNESOTA
 AERONAUTICAL CHART



- NOTES**
1. TOPOGRAPHIC CONTOUR INTERVALS ARE 10 FEET. DATUM IS MEAN SEA LEVEL ELEVATION.
 2. THE AERIAL CONTOURS ILLUSTRATE THE HEIGHT LIMITATIONS WITHIN EACH ZONE.
 3. CONTOUR INTERVALS EXCEPT THE INTERVALS OF 40 FEET TO THE VERTICAL DISTANCE OF 1 FOOT.
 4. EXISTING TOPOGRAPHIC SYMBOLS ARE THOSE USED BY THE U.S. GEOLOGICAL SURVEY.
 5. IN THOSE AREAS WHERE EXISTING TERRAIN OR TREES PENETRATE ONE OR MORE OF THE IMAGINARY SURFACES DESCRIBED IN THIS PLAN, THE HEIGHT OF THE TREE CANOPY WHICH PROVIDES A NATURAL SHIELD TO THE STRUCTURE.

- LEGEND**
- ULTIMATE RUNWAY
 - ZONE BOUNDARY
 - TOPOGRAPHIC CONTOURS
 - AERIAL CONTOURS
 - SECTION LINES



T 106 N
 TOWER
 T 105 N

TV 500
 1785.0MSL

⊗ TOWERS
 ⊗ 1756.0 MSL

⊗ RADIO TOWER
 1579.0 MSL

MICROFILM

**WINDOM MUNICIPAL AIRPORT
 ZONING PLAN
 WINDOM, MINNESOTA**

APPROVAL	DATE
APPROVAL	DATE
APPROVAL	DATE

REVISIONS	DATE	DESCRIPTION

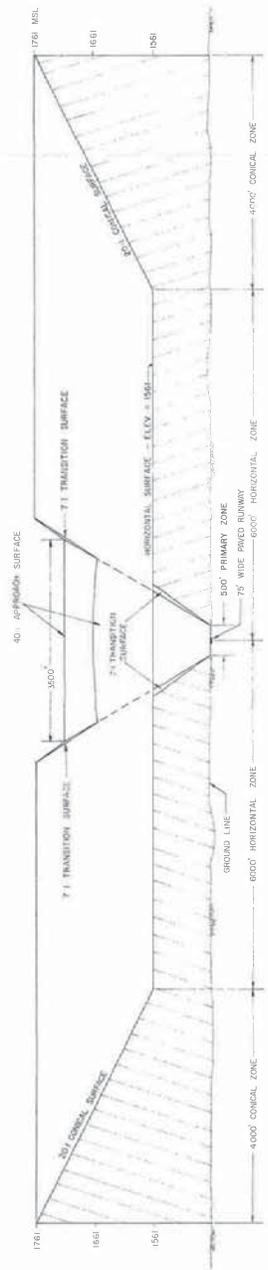
I HEREBY CERTIFY THAT THIS PLAN, PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND IN ACCORDANCE WITH THE PROVISIONS AND RULES OF THE AERONAUTICAL CHART ACT, IS IN ACCORDANCE WITH THE LAWS OF THE STATE OF MINNESOTA.

NAME: *C. J. [Signature]*
 DATE: 11-22-78
 NO. 8709

R DIVON, SBCAS ASSOCIATES
 MINNEAPOLIS, MINNESOTA

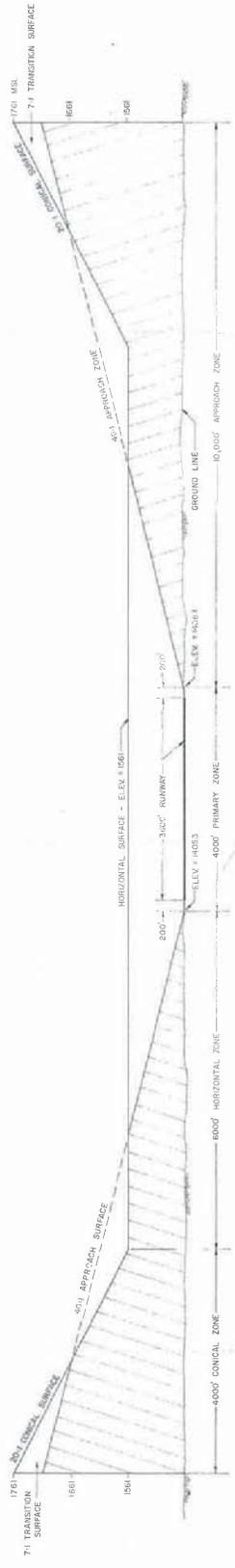
SIOUX ENGINEERING, INCORPORATED
 WINDOM, MINNESOTA

AIRSPACE ZONING PLAN

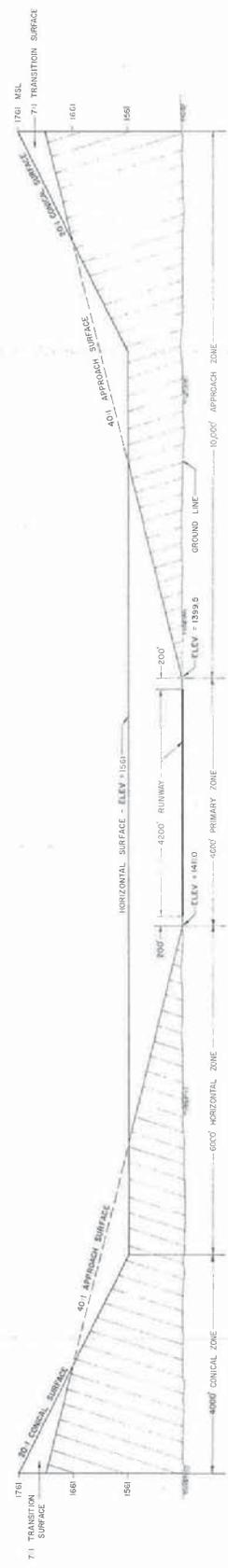


SECTION C-C

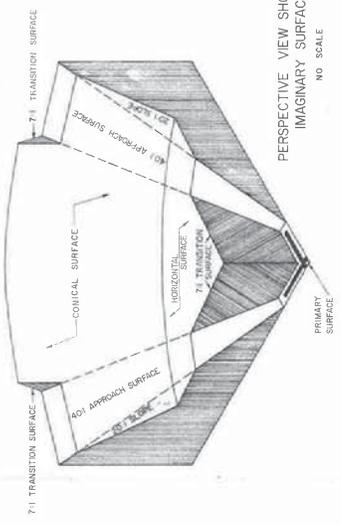
SCALE: VERT. 1" = 100'
HORIZ. 1" = 1000'



SECTION A-A



SECTION B-B



PERSPECTIVE VIEW SHOWING
IMAGINARY SURFACES
NO SCALE

R. DIXON SPEAS ASSOCIATES
MINNEAPOLIS, MINNESOTA
SIOUX ENGINEERING, INCORPORATED
WINDOM, MINNESOTA

MICROFILMED

Appendix C

Exhibit 'A' Property Research (CD)

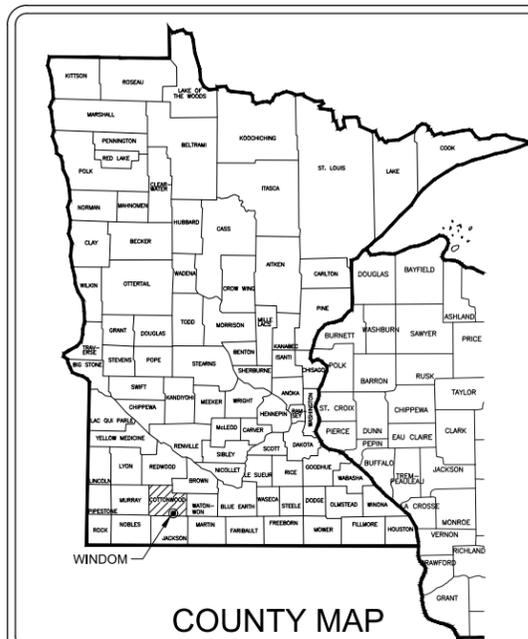
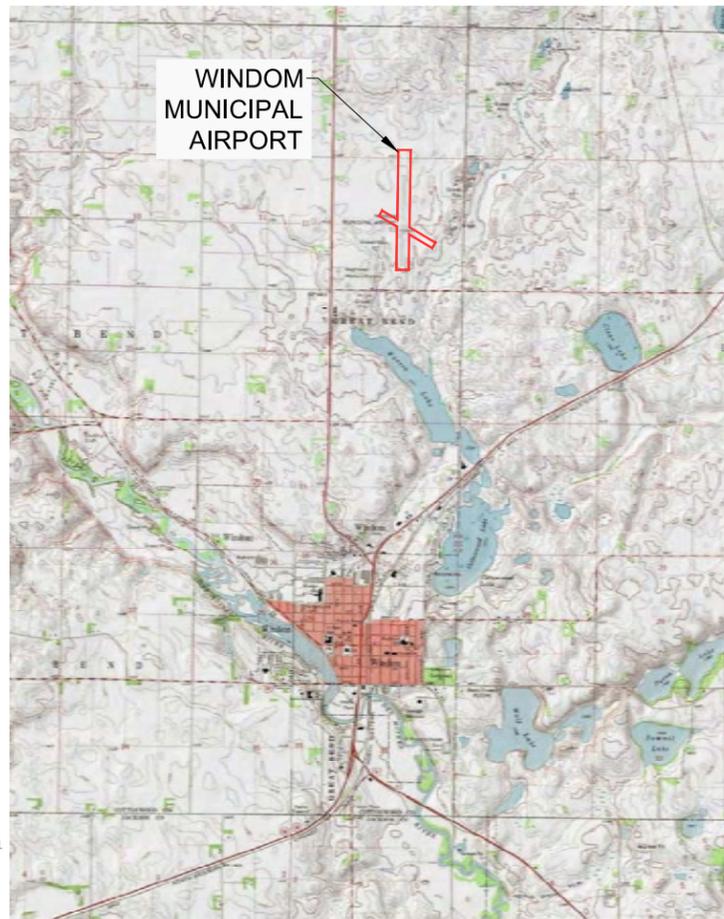
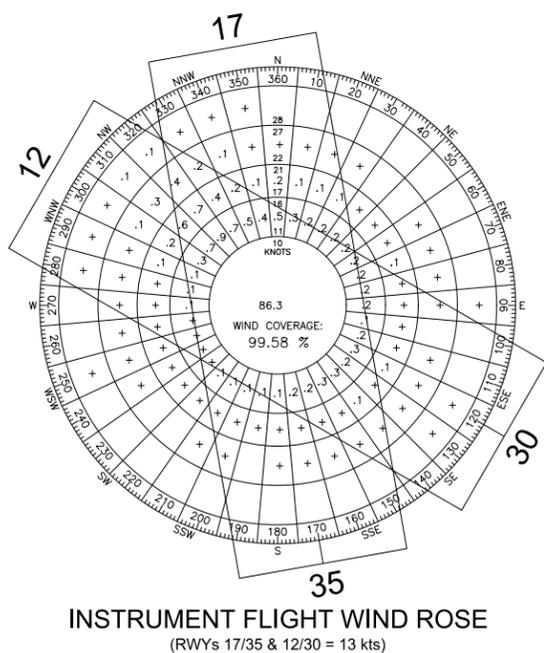
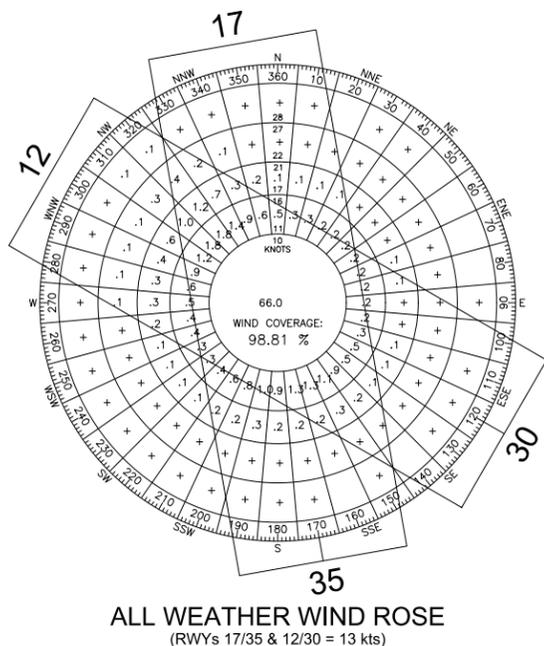
Appendix D
Airport Layout Plan

WINDOM AIRPORT LAYOUT PLAN

WINDOM MUNICIPAL AIRPORT

WINDOM, MINNESOTA

June 30, 2019



INDEX OF SHEETS

- TITLE SHEET
- AIRPORT LAYOUT PLAN
- AIRPORT DATA SHEET
- PART 77 AIRSPACE
- EXIST. & ULT. RW 17 INNER APPROACH & DEPARTURE SURFACES
- EXIST. & FUT. RW 35 APPROACH & DEPARTURE SURFACES
- FUT. RW 12 INNER APPROACH SURFACE
- FUT. RW 30 INNER APPROACH SURFACE
- TERMINAL AREA
- LAND USE & ZONING
- EXHIBIT 'A' AIRPORT PROPERTY MAP (SHEET 1 OF 2)
- EXHIBIT 'A' PROPERTY MAP DETAIL SHEET (SHEET 2 OF 2)

MAGNETIC DECLINATION = 1°45' E (0°4' W/YR)
SOURCE: NATIONAL GEOPHYSICAL DATA CENTER
WEB SITE = 06/20/2019
<https://www.ngdc.noaa.gov/geomag-web/#declination>

AIRPORT DATA				
	EXISTING	FUTURE	ULTIMATE	
AIRPORT ELEVATION	1,409.2' MSL	SAME	1,409.0' MSL	
AIRPORT REFERENCE POINT (LATITUDE)	43° 54' 48.29" N	43° 54' 46.75" N	43° 54' 49.45" N	
(LONGITUDE)	95° 06' 33.84" W	95° 06' 33.02" W	95° 06' 33.10" W	
MEAN MAX. TEMP. OF HOTTEST MONTH	85.3° F (JULY)	N/A	N/A	
TAXIWAY LIGHTING	NONE	MITLs	SAME	
NAVIGATIONAL AIDS	BEACON	SAME	SAME	
MISCELLANEOUS FACILITIES	LIGHTED WINDCONE, MIRLS, REILS, AWOS	LIGHTED WINDCONE, MIRLS, REILS, AWOS PAPIs	SAME	
NPIAS ROLE	LOCAL GA	SAME	SAME	
MN SASP CLASSIFICATION	INTERMEDIATE	SAME	SAME	
AIRPORT REFERENCE CODE (ARC)	B-II SMALL	SAME	SAME	
APPROACH MINIMUMS RUNWAY 17(18)	NPI = 1 MILE	NPI = 7/8 MILE	SAME	
APPROACH MINIMUMS RUNWAY 35(36)	NPI = 1 MILE	NPI = 7/8 MILE	SAME	
APPROACH MINIMUMS RUNWAYS 12/30	N/A	VISUAL	SAME	
CRITICAL AIRCRAFT	PILATUS PC-12	SAME	SAME	

WIND COVERAGE					
		10.5 KNOTS	13 KNOTS	16 KNOTS	
RUNWAY 17/35	ALL	88.21%	93.32%	97.21%	
	VFR	90.44%	94.54%	97.69%	
	IFR	95.30%	97.46%	99.00%	
RUNWAY 12/30	ALL	88.82%	94.06%	97.98%	
	VFR	90.85%	95.18%	98.39%	
	IFR	95.56%	97.56%	99.13%	
COMBINED	ALL	96.99%	98.81%	99.63%	
	VFR	97.55%	99.02%	99.68%	
	IFR	98.82%	99.58%	99.91%	

SOURCE: Windom Municipal Airport AWOS, 2009 to 2018. Obtained from NOAA Integrate Surface Database.

MNDOT APPROVAL

Approved _____

Title _____

Date _____

FAA APPROVAL

PLAN APPROVAL

AIRPORT SPONSOR

Approved _____

Title _____

Date _____

ALP REVIEW STATEMENT

On behalf of Short, Elliott, Hendrickson, Inc., this Airport Layout Plan (ALP) was prepared for the Windom Municipal Airport according to the applicable Advisory Circulars, the current version of the ARP SOP No. 2,00 ALP Checklist, and accurately depicts the proposed use of airspace at the time of submittal. The ALP conforms with FAA design standards, except as noted.

Signed: *Jacqueline Zirbes* Date: 6/30/19

JACQUELEINE ZIRBES

3535 VADAMAS CENTER DR
ST PAUL, MN 55110
TEL: 651.480.2100
FAX: 651.480.2100
WATTS: 651.325.2055
www.sehinc.com

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DRAFT

Lindsay Riebel, P.E.

DATE: 6/30/2019 LICENSE NO. _____

Windom Municipal Airport
Airport Layout Plan
Windom, MN

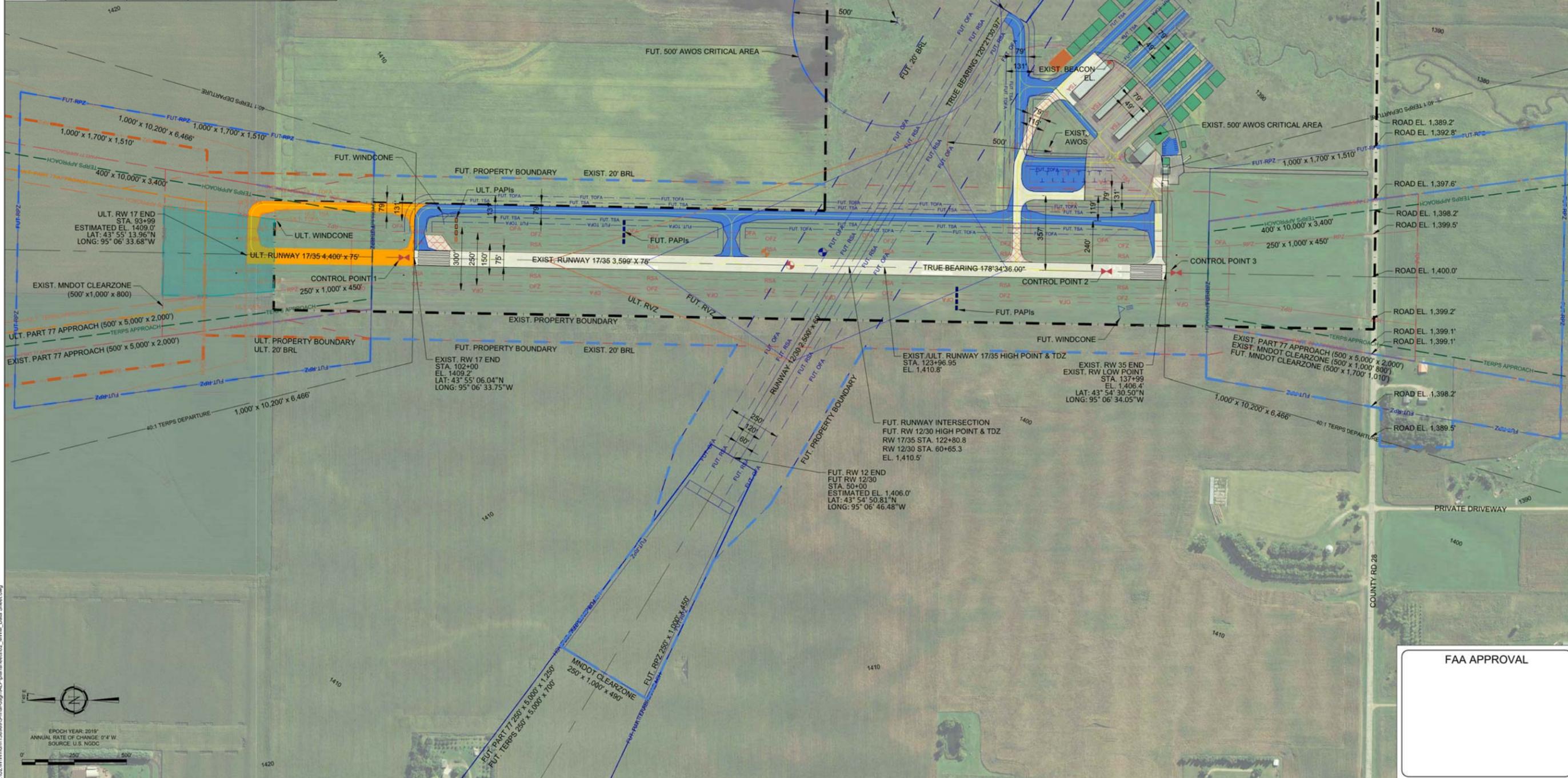
WINDM 138969
ISSUE DATE 6/30/2019
DESIGNED BY JMW
DRAWN BY BLM

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SHEET TITLE
TITLE SHEET

SHEET
1

LEGEND			
EXISTING	FUTURE	ULTIMATE	
---	---	---	FEE PROPERTY
---	---	---	PAVEMENT
---	---	---	TURF RUNWAY
---	---	---	HANGARS/BUILDINGS
---	---	---	AIRPORT REFERENCE POINT (ARP)
---	---	---	ROTATING BEACON
---	---	---	WIND CONE
---	---	---	AWOS
---	---	---	PAPI
---	---	---	FAA RUNWAY PROTECTION ZONE (RPZ)
---	---	---	RUNWAY OBJECT FREE AREA (OFA)
---	---	---	RUNWAY OBJECT FREE ZONE (OFZ)
---	---	---	RUNWAY SAFETY AREA (RSA)
---	---	---	TAXIWAY OBJECT FREE AREA (TOFA)
---	---	---	TAXIWAY SAFETY AREA (TSA)
---	---	---	BUILDING RESTRICTION LINE (BRL)
---	---	---	40:1 DEPARTURE SURFACE
---	---	---	14 CFR PART 77 APPROACH SURFACE
---	---	---	TERPS APPROACH
---	---	---	EASEMENT
---	---	---	THRESHOLD LIGHTS
---	---	---	REILS
---	---	---	GROUND CONTOURS
---	---	---	MNDOT CLEAR ZONE
---	---	---	TIEDOWNS
---	---	---	FUT. PAVEMENT REMOVAL
---	---	---	AIRPORT CONTROL POINTS



FAA APPROVAL



I HEREBY CERTIFY THAT THE PLAN, SPECIFICATION OR SURVEY WORK AND DATA ARE A TRUE AND CORRECT REPRESENTATION OF THE WORK DONE BY ME OR UNDER MY SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DRAFT
Lindsay Reilly, PE
DATE: _____ LICENSE NO: _____

Windom Municipal Airport
Airport Layout Plan
Windom, MN

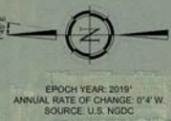
MARK	DATE	DESCRIPTION

SEH FILE NO. WINDOM 138969
 ISSUE DATE 6/30/2019
 DESIGNED BY JMZ
 DRAWN BY BLM
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SHEET TITLE
AIRPORT LAYOUT PLAN

SHEET
2

S:\L2\Windom\138969-5-Final-Design\ALP\plan\sheet102_MMM_Data_Sheet.dwg



EPOCH YEAR: 2019
ANNUAL RATE OF CHANGE: 0.4" W
SOURCE: U.S. NSDC

RUNWAY DATA TABLE			
	EXIST. RW 17/35	ULT. RW 17/35	FUT. 12/30
RUNWAY LENGTH & WIDTH	3,599' x 75'	4,400' x 75'	2,500' x 60'
RUNWAY DESIGN CODE (RDC)	B-II (S)	SAME	A/B-(S)
RUNWAY TYPE	UTILITY	UTILITY	UTILITY
APPROACH REFERENCE CODE	B/III/5000	B/III/5000	A/B-(S)/VIS
DEPARTURE REFERENCE CODE	B-II (S)	SAME	A/B-(S)
VISIBILITY MINIMUMS	1 MILE	7/8 MILE	VISUAL
PAVEMENT STRENGTH	15,000 LBS SWG 20,000 LBS DWG	15,000 LBS SWG 20,000 LBS DWG	N/A
PUBLISHED PAVEMENT STRENGTH	12,500 LBS SWG	SAME	N/A
PAVEMENT MATERIAL	CONCRETE - GROOVED	SAME	TURF
RUNWAY EFFECTIVE GRADIENT	0.08%	0.06%	0.17%
WIND COVERAGE	10.5 KNOTS	10.5 KNOTS	10.5 KNOTS
ALL WEATHER	85.2%	SAME	97.5%
VFR	86.0%	SAME	94.1%
IFR	79.6%	SAME	96.4%
RUNWAY END ELEVATION	RW 17: 1,409.2' RW 35: 1,406.4'	RW 17 EST: 1409.9'	RW 12: 1,406.0' RW 30: 1,404.0'
RUNWAY END STATION	RW 17: 102+00 RW 35: 137+99	RW 17: 93+99 RW 35: 137+99	RW 12: 50+00 RW 30: 75+00
RUNWAY LIGHTING	MIRLS	SAME	YELLOW CONES
RUNWAY MARKING	NON-PRECISION	SAME	NONE
14 CFR PART 77 APPROACH CAT. / RUNWAY APPROACH SLOPE	20:1	SAME	20:1
RUNWAY APPROACH TYPE	NON-PRECISION	SAME	VISUAL
RUNWAY VISUAL INSTRUMENT AIDS (NAVAIDS)	REILs	REILs, PAPIs	EDGE MARKERS
AERONAUTICAL SURVEY REQUIRED	VERTICALLY GUIDED	SAME	N/A
RUNWAY DEPARTURE SURFACE	YES	SAME	NO*
CRITICAL AIRCRAFT	PILATUS PC-12	SAME	CESSNA 172
RDC	B-II	SAME	A-I
APPROACH SPEED	87 KNOTS	SAME	60 KNOTS
WINGSPAN	53' 4"	SAME	35' 9"
MAX. TAKEOFF WEIGHT	10,500 LBS	SAME	1,100 LBS

*The Airport Sponsor requests no departure procedures for Future Runway 12/30

AIRPORT COORDINATES			
RUNWAY END	EXISTING	FUTURE	ULTIMATE
AIRPORT REFERENCE POINT (ARP)	LAT: 43° 54' 48.27"N LONG: 95° 06' 33.90"W	LAT: 43° 54' 46.75"N LONG: 95° 06' 33.02"W	LAT: 43° 54' 49.45"N LONG: 95° 06' 33.10"W
RUNWAY 17	LAT: 43° 55' 06.04"N LONG: 95° 06' 33.75"W	SAME	LAT: 43° 55' 13.96"N LONG: 95° 06' 33.68"W
RUNWAY 35	LAT: 43° 54' 30.50"N LONG: 95° 06' 34.05"W	SAME	SAME
RUNWAY 12	N/A	LAT: 43° 54' 50.81"N LONG: 95° 06' 46.48"W	SAME
RUNWAY 30	N/A	LAT: 43° 54' 38.33"N LONG: 95° 06' 17.01"W	SAME

TAXIWAY/TAXILANE STANDARDS		
TAXIWAY PROTECTION	ADG I	ADG II
TSA	49'	79'
TAXIWAY OFA	89'	131'
TAXILANE OFA	79'	115'
TAXIWAY SEPARATION		
TAXIWAY C/L TO PARALLEL TAXIWAY /TAXILANE C/L	70'	105'
TAXIWAY C/L TO FIXED OR MOVABLE OBJECTS	44.5'	65.5'
TAXILANE TO PARALLEL TAXILANE CENTERLINE	64'	97'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	39.5'	57.5'
WINGTIP CLEARANCE		
TAXIWAY WINGTIP CLEARANCE	20'	26'
TAXILANE WINGTIP CLEARANCE	15'	18'

TAXIWAY DATA TABLE			
	EXIST. RW 17/35	FUT. RW 17/35	ULT. RW 17/35
TAXIWAY LENGTH & WIDTH	40' WIDE	3,599' X 35'	4,400' X 35'
TAXIWAY SAFETY AREA WIDTH	79'	79'	79'
TAXIWAY OFA WIDTH	131'	131'	131'
TAXIWAY LIGHTING	REFLECTORS	MITLs	MITLs
RUNWAY CL TO TAXIWAY CL	240'	240'	240'

AIRPORT CONTROL POINTS	
RUNWAY END	COORDINATES
AIRPORT CONTROL POINT 1	LAT: 43° 55' 06.55"N LONG: 95° 06' 33.714"W
AIRPORT CONTROL POINT 2	LAT: 43° 54' 33.99"N LONG: 95° 06' 33.99"W
AIRPORT CONTROL POINT 3	LAT: 43° 54' 30.07"N LONG: 95° 06' 34.02"W

NAVAID OWNERSHIP	
NAVAID	OWNING ENTITY
RW 17/35 MIRLS	CITY OF WINDOM
RW 17 AND 35 REILs	CITY OF WINDOM
ROTATING BEACON	CITY OF WINDOM
AWOS	MNDOT

MODIFICATION TO FAA DESIGN STANDARDS		
APPROVAL DATE	CASE NUMBER	MODIFICATION
NONE REQUIRED		

OBSTACLE FREE ZONE (OFZ) OBJECT PENETRATIONS			
KEY	DESCRIPTION	PENETRATION	ELEVATION
N/A			

THRESHOLD SITING SURFACE OBJECT PENETRATION			
KEY	DESCRIPTION	PENETRATION	ELEVATION
N/A			

RUNWAY END PROTECTION AREAS					
		BASE	LENGTH	OUTER WIDTH	SLOPE
EXIST. RUNWAY 17/35	FAA APPROACH RUNWAY PROTECTION ZONE (RPZ)	250'	1,000'	450'	N/A
	FAA DEPARTURE RUNWAY PROTECTION ZONE (RPZ)	250'	1,000'	450'	N/A
	FAA APPROACH SURFACE	500'	5,000'	2,000'	20:1
	MNDOT CLEAR ZONE	500'	1,000'	800'	N/A
	TERPS (EB 99 TABLE 3-2, ROW 4)	400'	10,000'	3,400'	20:1
	TERPS DEPARTURE SURFACE	1,000'	10,200'	6,466'	40:1
ULT. RUNWAY 17/35	FAA APPROACH RUNWAY PROTECTION ZONE (RPZ)	1,000'	1,700'	1,510'	N/A
	FAA DEPARTURE RUNWAY PROTECTION ZONE (RPZ)	1,000'	1,700'	1,510'	N/A
	FAA APPROACH SURFACE	500'	5,000'	2,000'	20:1
	MNDOT CLEAR ZONE	500'	1,700'	1,010'	N/A
	TERPS (EB 99 TABLE 3-2, ROW 4)	400'	10,000'	3,400'	20:1
	TERPS DEPARTURE SURFACE	1,000'	10,200'	6,466'	40:1
FUT. RUNWAY 12/30	FAA APPROACH RUNWAY PROTECTION ZONE (RPZ)	250'	1,000'	450'	N/A
	FAA APPROACH SURFACE	250'	5,000'	1,250'	20:1
	MNDOT CLEAR ZONE	250'	1,200'	490'	N/A
	TERPS (EB 99 TABLE 3-2, ROW 2)	250'	5,000'	700'	20:1

RUNWAY SAFETY/PROTECTION AREAS				
		WIDTH	LENGTH BEYOND RUNWAY ENDS	LENGTH PRIOR TO THRESHOLD
EXIST. & ULT. RW 17/35	RUNWAY SAFETY AREA (RSA)	150'	300'	300'
	RUNWAY OBSTACLE FREE ZONE (OFZ)	250'	200'	200'
	RUNWAY OBJECT FREE AREA (OFA)	500'	300'	300'
FUT. RW 12/30	RUNWAY SAFETY AREA (RSA)	120'	240'	240'
	RUNWAY OBSTACLE FREE ZONE (OFZ)	250'	200'	200'
	RUNWAY OBJECT FREE AREA (OFA)	250'	240'	240'

DECLARED DISTANCES			
	EXIST. RUNWAY 17/35	ULT. RUNWAY 17/35	FUT. RUNWAY 12/30
TORA	3,599'	4,400'	2,500'
TODA	3,599'	4,400'	2,500'
ASDA	3,599'	4,400'	2,500'
LDA	3,599'	4,400'	2,500'

TOUCHDOWN ZONE (TDZ) LIMITS			
RUNWAY	TDZ LIMITS	STA.	ELEV.
EXIST. RW 17/35	102+00 TO 132+00	124+00	1,410.8'
ULT. RW 17	116+00 TO 146+00	123+49	1,410.8'
FUT. RW 12/30	52+00 TO 87+00	60+65.3	1,410.5'

NOTE: Horizontal Datum used is NAD 83
Vertical Datum used is NAVD 88

3635 VADNAIS CENTER DR
ST PAUL, MN 55110
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WATTS: 651.325.2055
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DRAFT
Lindsay Rebit, PE
DATE: 5/28/2019 LICENSE NO. 111111

Windom Municipal Airport
Windom Airport Layout Plan
Windom, MN

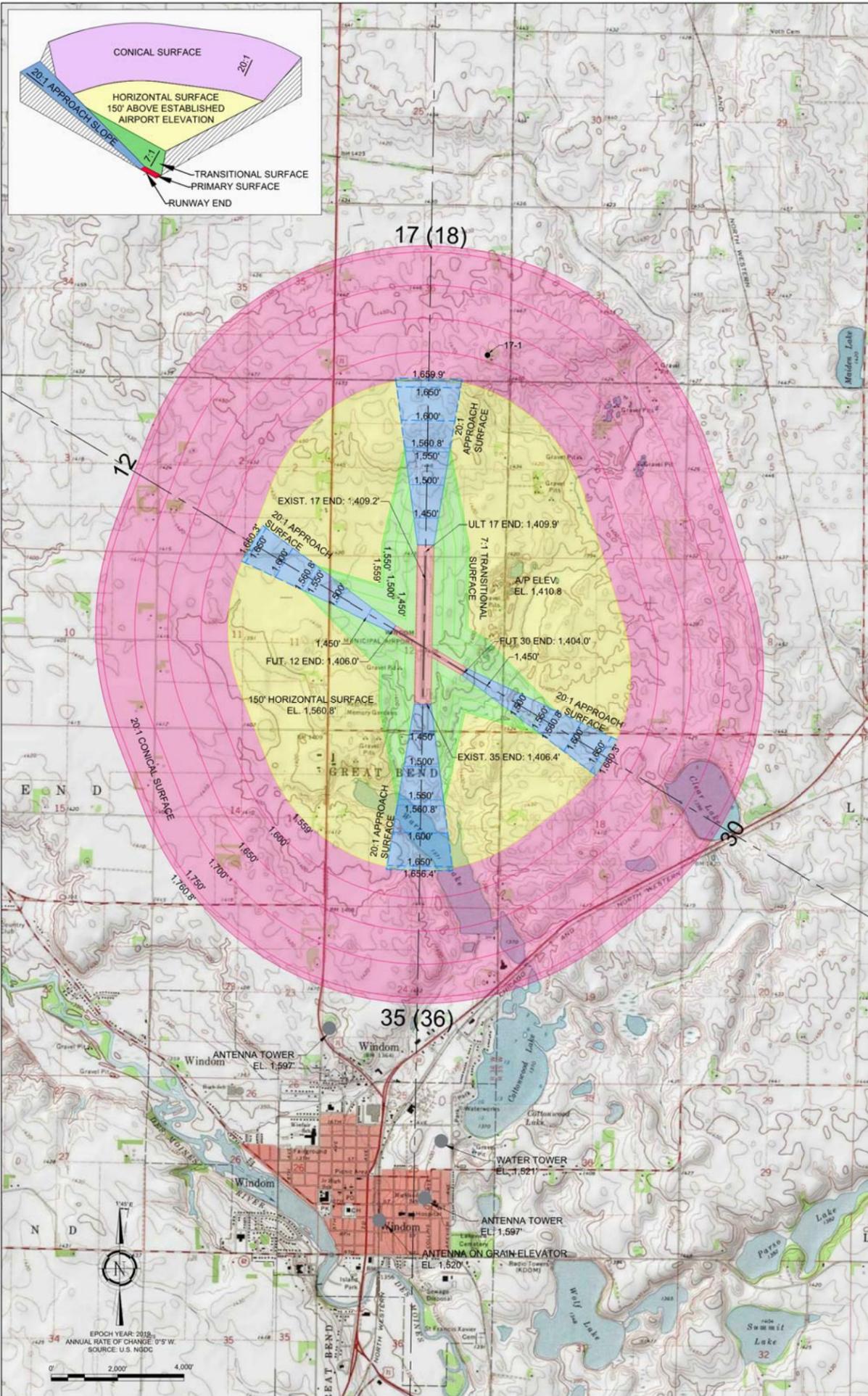
MARK DATE DESCRIPTION REVISIONS

SEH FILE NO. WINDM 138969
ISSUE DATE 5/28/2019
DESIGNED BY JNZ
DRAWN BY BLM
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SHEET TITLE
DATA SHEET

SHEET

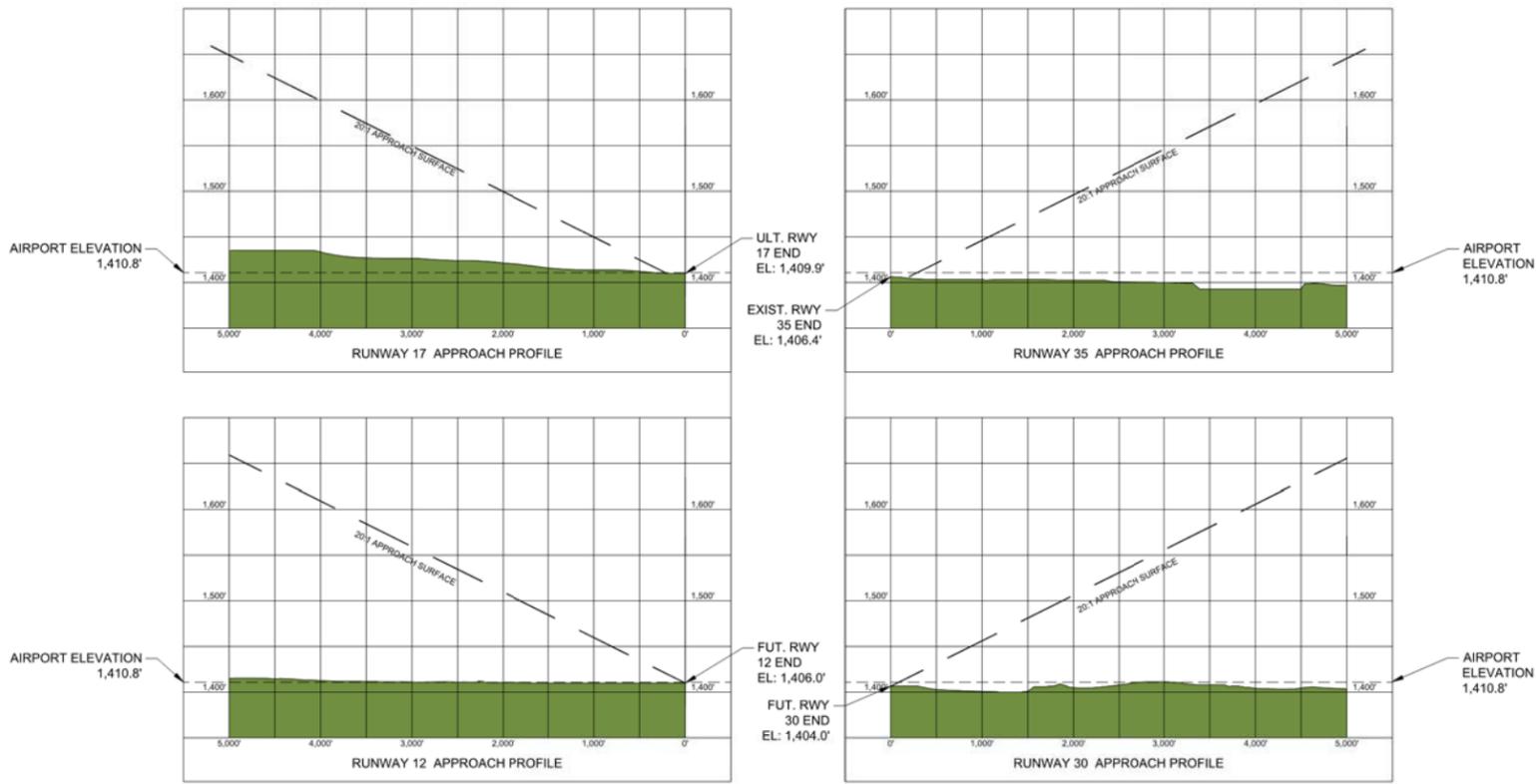
3



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EPOCH YEAR: 2018
ANNUAL RATE OF CHANGE: 0.5" W
SOURCE: U.S. NEDC

0' 2,000' 4,000'



KEY	DESCRIPTION	GROUND ELEVATION	OBJECT ELEVATION	DEPARTURE SURFACE 40:1	PENETRATION IN FEET				DISPOSITION	OE/AAA NO.	
					HORIZONTAL SURFACE	CONICAL SURFACE	PART 77 APPROACH	7:1 TRANSITION			PRIMARY SURFACE
17-1	TREE	1,484.0'	1,569.9'	16.4'	-	24.6' CLEAR	-	-	-	TO REMAIN	N/A

SOURCE: Airports GIS Aeronautical Survey, MWM 185612, Quantum Spatial, Inc.; Verified 9/13/2018
FAA OE/AAA, <https://oeaaa.faa.gov/oeaaa/external/searchAction.jsp>

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ST PAUL, MN 55110
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FAX: 651.490.2001
WWW.SEH.COM

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DRAFT
Lindsay Reed, PE

Windom Municipal Airport
Airport Layout Plan
Windom, MN

MARK	DATE	DESCRIPTION	REVISIONS

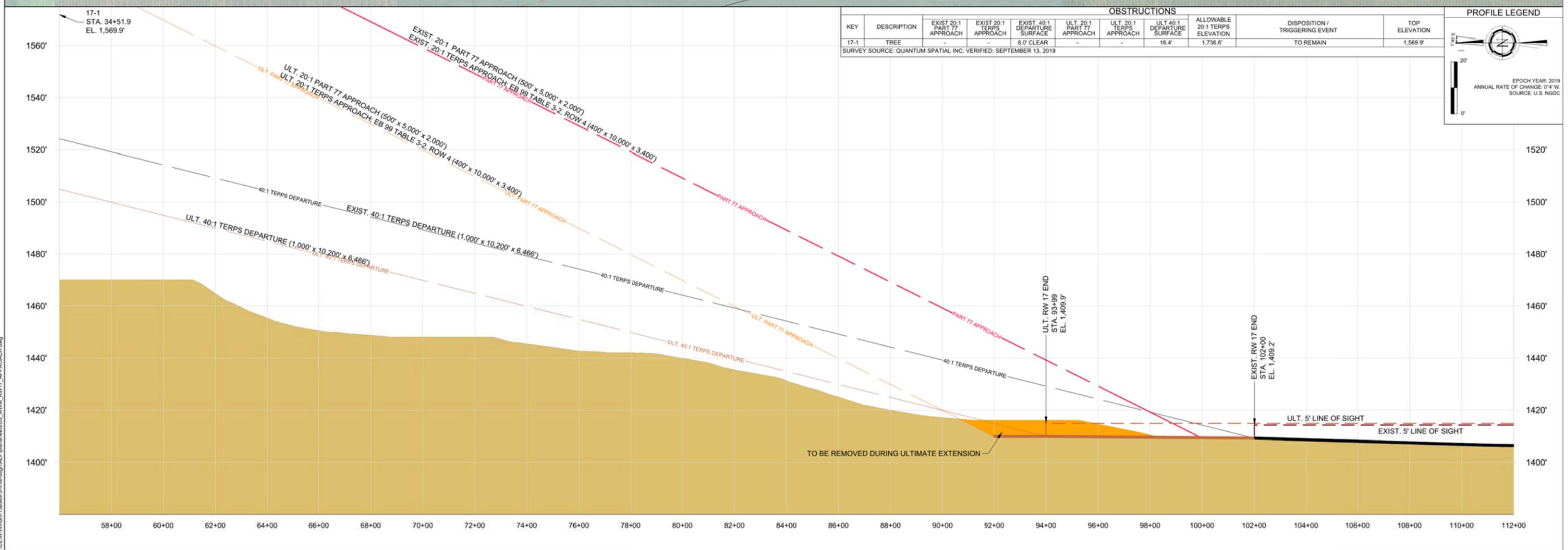
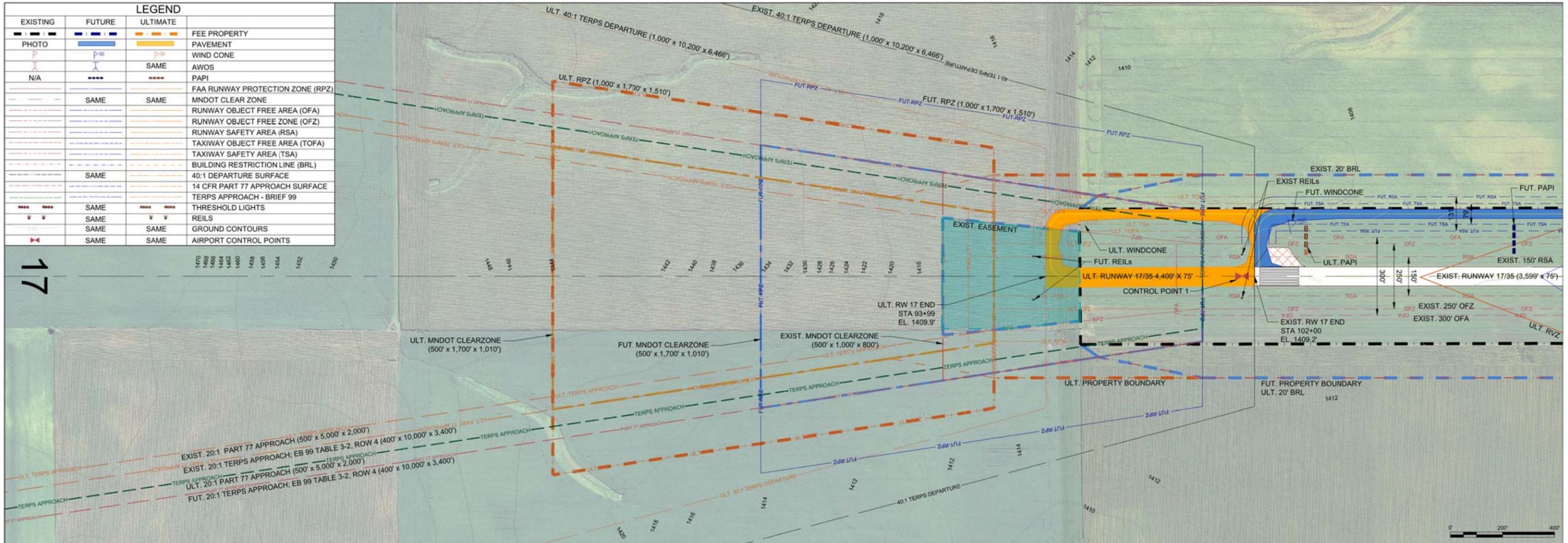
SEH FILE NO. WINDM 138969
ISSUE DATE 6/30/2019
DESIGNED BY JMJ
DRAWN BY BLM

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SHEET TITLE
PART 77 AIRSPACE

SHEET
4

LEGEND			
EXISTING	FUTURE	ULTIMATE	
PHOTO			FEE PROPERTY
			PAVEMENT
			WIND CONE
N/A			SAME
			AWOS
			PAPI
			FAA RUNWAY PROTECTION ZONE (RPZ)
			MNDOT CLEAR ZONE
			RUNWAY OBJECT FREE AREA (OFA)
			RUNWAY SAFETY AREA (RSA)
			TAXIWAY OBJECT FREE AREA (TOFA)
			TAXIWAY SAFETY AREA (TSA)
			BUILDING RESTRICTION LINE (BRL)
			40:1 DEPARTURE SURFACE
			14 CFR PART 77 APPROACH SURFACE
			TERPS APPROACH - BRIEF 99
			THRESHOLD LIGHTS
			REILS
			GROUND CONTOURS
			AIRPORT CONTROL POINTS



OBSTRUCTIONS		PROFILE LEGEND	
KEY	DESCRIPTION	EXIST 20:1 PART 77 APPROACH	EXIST 20:1 TERPS APPROACH
17-1	TREE		

DISPOSITION / TRIGGERING EVENT	TOP ELEVATION
TO REMAIN	1,569.9'

SURVEY SOURCE: QUANTUM SPATIAL INC, VERIFIED: SEPTEMBER 13, 2018



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Lindsay Reil, PE

DATE: _____ LICENSE NO: _____

Windom Municipal Airport
Windom Airport Layout Plan
Windom, MN

MARK	DATE	DESCRIPTION	REVISIONS

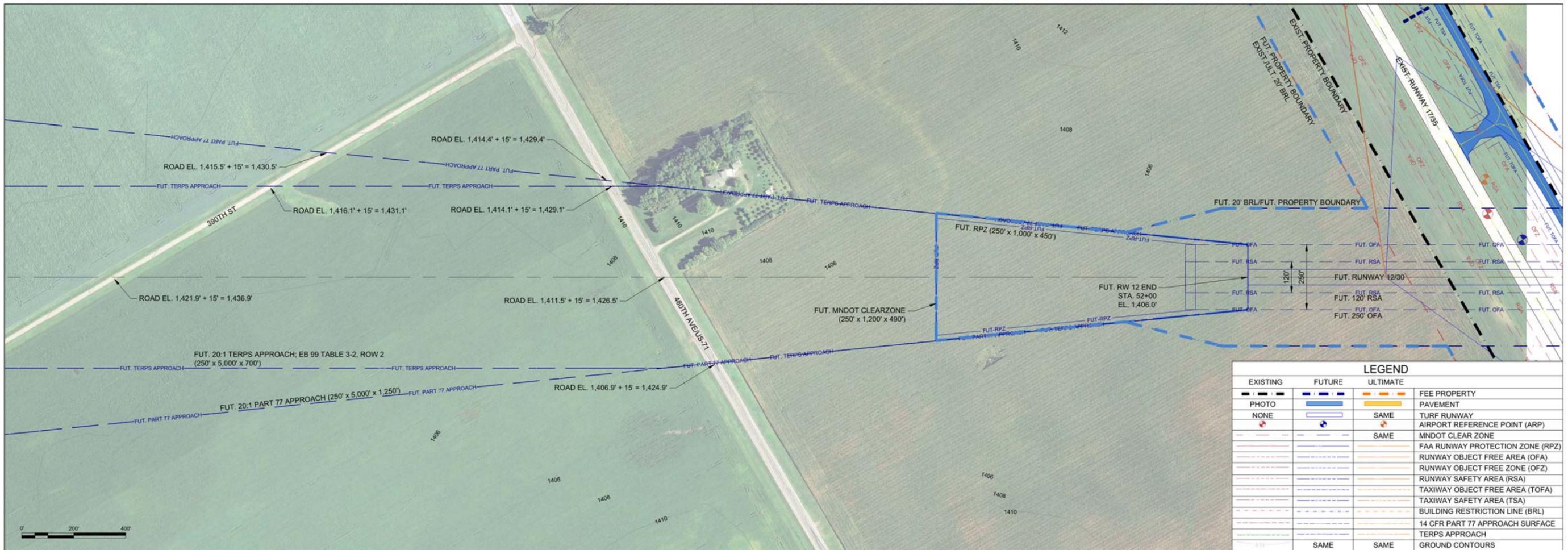
SEH FILE NO. WINDOM 138969
ISSUE DATE 5/28/2019
DESIGNED BY JMZ
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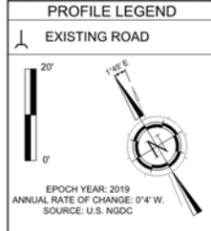
SHEET TITLE
EXIST. & FUT. RUNWAY
17 APPROACH &
DEPARTURE

SHEET
5

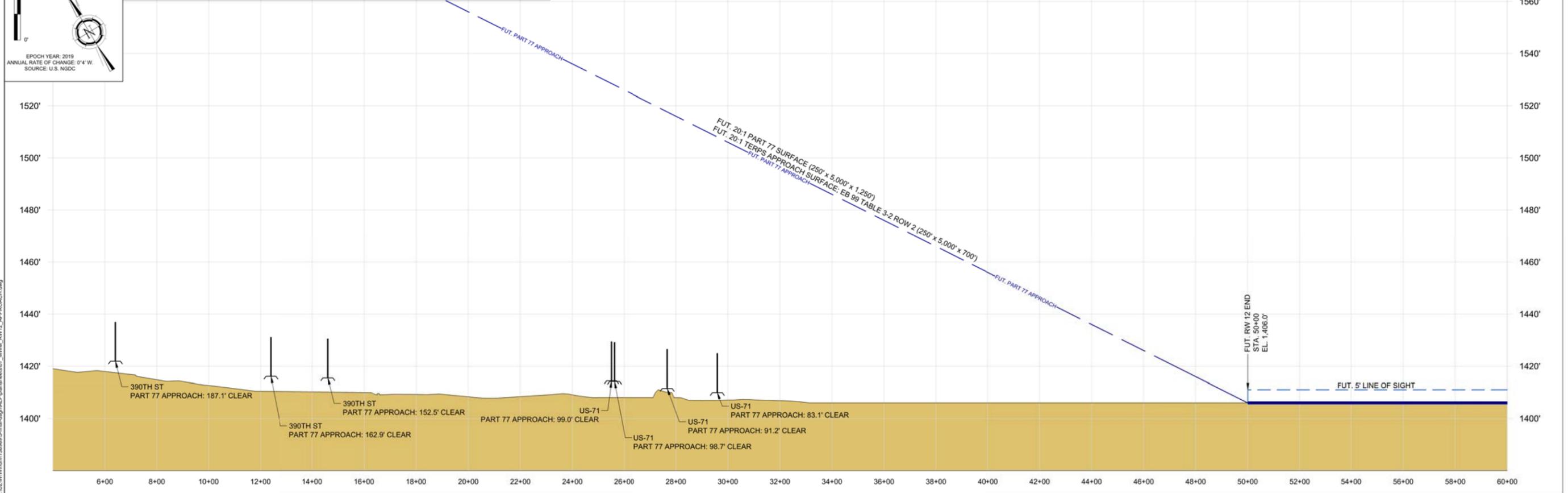
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EXISTING		FUTURE		ULTIMATE		
---	---	---	---	---	---	FEE PROPERTY
---	---	---	---	---	---	PAVEMENT
---	---	---	---	---	---	TURF RUNWAY
---	---	---	---	---	---	AIRPORT REFERENCE POINT (ARP)
---	---	---	---	---	---	MNDOT CLEAR ZONE
---	---	---	---	---	---	FAA RUNWAY PROTECTION ZONE (RPZ)
---	---	---	---	---	---	RUNWAY OBJECT FREE AREA (OFA)
---	---	---	---	---	---	RUNWAY OBJECT FREE ZONE (OFZ)
---	---	---	---	---	---	RUNWAY SAFETY AREA (RSA)
---	---	---	---	---	---	TAXIWAY OBJECT FREE AREA (TOFA)
---	---	---	---	---	---	TAXIWAY SAFETY AREA (TSA)
---	---	---	---	---	---	BUILDING RESTRICTION LINE (BRL)
---	---	---	---	---	---	14 CFR PART 77 APPROACH SURFACE
---	---	---	---	---	---	TERPS APPROACH
---	---	---	---	---	---	GROUND CONTOURS



OBSTRUCTIONS						
KEY	DESCRIPTION	FUT. 20:1 PART 77 APPROACH	FUT. 20:1 TERPS APPROACH	ALLOWABLE 20:1 TERPS ELEVATION	DISPOSITION / TRIGGERING EVENT	TOP ELEVATION
NO OBSTRUCTIONS						
SURVEY SOURCE: AIRPORTS GIS AERONAUTICAL SURVEY, MWM 185612, QUANTUM SPATIAL INC, VERIFIED: SEPTEMBER 13, 2018						

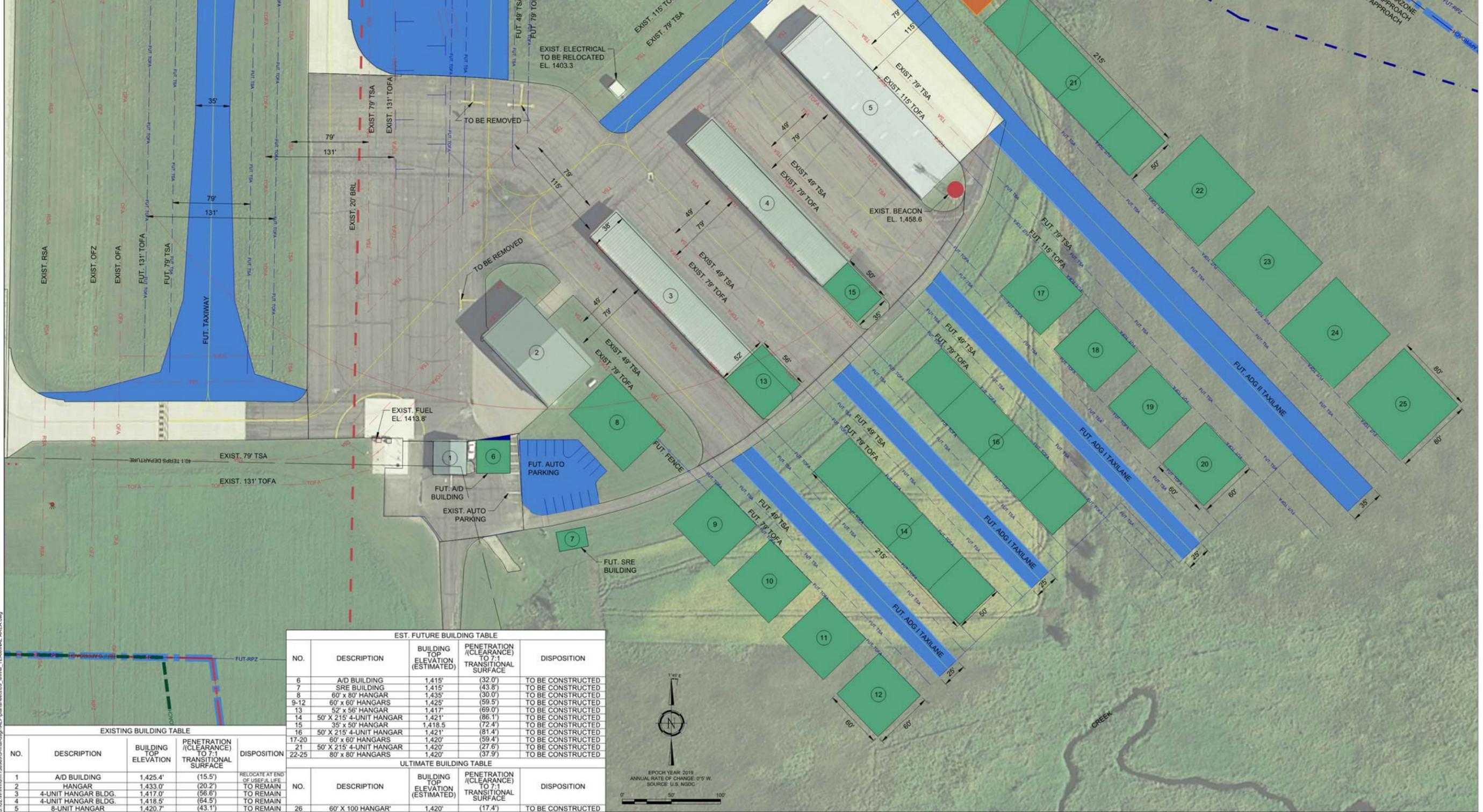


MARK	DATE	DESCRIPTION	REVISIONS

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ISSUE DATE	6/30/2019
DESIGNED BY	JMZ
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SHEET TITLE
FUT. RUNWAY 12 INNER APPROACH SURFACE

LEGEND			
EXISTING	FUTURE	ULTIMATE	
PHOTO	PHOTO	PHOTO	FEE PROPERTY
NONE	NONE	NONE	PAVEMENT
PHOTO	PHOTO	PHOTO	TURF RUNWAY
			HANGARS/BUILDINGS
			ROTATING BEACON
			WIND CONE
			AWOS
			FAA RUNWAY PROTECTION ZONE (RPZ)
			RUNWAY OBJECT FREE AREA (OFA)
			RUNWAY OBJECT FREE ZONE (OFZ)
			RUNWAY SAFETY AREA (RSA)
			TAXIWAY OBJECT FREE AREA (TOFA)
			TAXIWAY SAFETY AREA (TSA)
			BUILDING RESTRICTION LINE (BRL)
			THRESHOLD LIGHTS
			REILS
			TIEDOWNS
			FUT. PAVEMENT REMOVAL
			AIRPORT CONTROL POINTS



NO.	DESCRIPTION	BUILDING TOP ELEVATION (ESTIMATED)	PENETRATION (CLEARANCE) TO 7:1 TRANSITIONAL SURFACE	DISPOSITION
6	A/D BUILDING	1,415'	(32.0')	TO BE CONSTRUCTED
7	SRE BUILDING	1,415'	(43.8')	TO BE CONSTRUCTED
8	60' x 80' HANGAR	1,435'	(30.0')	TO BE CONSTRUCTED
9-12	60' x 60' HANGARS	1,425'	(59.5')	TO BE CONSTRUCTED
13	52' x 56' HANGAR	1,417'	(69.0')	TO BE CONSTRUCTED
14	50' x 215' 4-UNIT HANGAR	1,421'	(86.1')	TO BE CONSTRUCTED
15	35' x 50' HANGAR	1,418.5'	(72.4')	TO BE CONSTRUCTED
16	50' x 215' 4-UNIT HANGAR	1,421'	(81.4')	TO BE CONSTRUCTED
17-20	60' x 60' HANGARS	1,420'	(59.4')	TO BE CONSTRUCTED
21	50' x 215' 4-UNIT HANGAR	1,420'	(27.6')	TO BE CONSTRUCTED
22-25	80' x 80' HANGARS	1,420'	(37.9')	TO BE CONSTRUCTED
26	60' x 100' HANGAR	1,420'	(17.4')	TO BE CONSTRUCTED

NO.	DESCRIPTION	BUILDING TOP ELEVATION	PENETRATION (CLEARANCE) TO 7:1 TRANSITIONAL SURFACE	DISPOSITION
1	A/D BUILDING	1,425.4'	(15.5')	RELOCATE AT END OF USEFUL LIFE
2	HANGAR	1,433.0'	(20.2')	TO REMAIN
3	4-UNIT HANGAR BLDG.	1,417.0'	(56.6')	TO REMAIN
4	4-UNIT HANGAR BLDG.	1,418.5'	(64.5')	TO REMAIN
5	8-UNIT HANGAR	1,420.7'	(43.1')	TO REMAIN

NO.	DESCRIPTION	BUILDING TOP ELEVATION (ESTIMATED)	PENETRATION (CLEARANCE) TO 7:1 TRANSITIONAL SURFACE	DISPOSITION
1	A/D BUILDING	1,425.4'	(15.5')	RELOCATE AT END OF USEFUL LIFE
2	HANGAR	1,433.0'	(20.2')	TO REMAIN
3	4-UNIT HANGAR BLDG.	1,417.0'	(56.6')	TO REMAIN
4	4-UNIT HANGAR BLDG.	1,418.5'	(64.5')	TO REMAIN
5	8-UNIT HANGAR	1,420.7'	(43.1')	TO REMAIN
6	A/D BUILDING	1,415'	(32.0')	TO BE CONSTRUCTED
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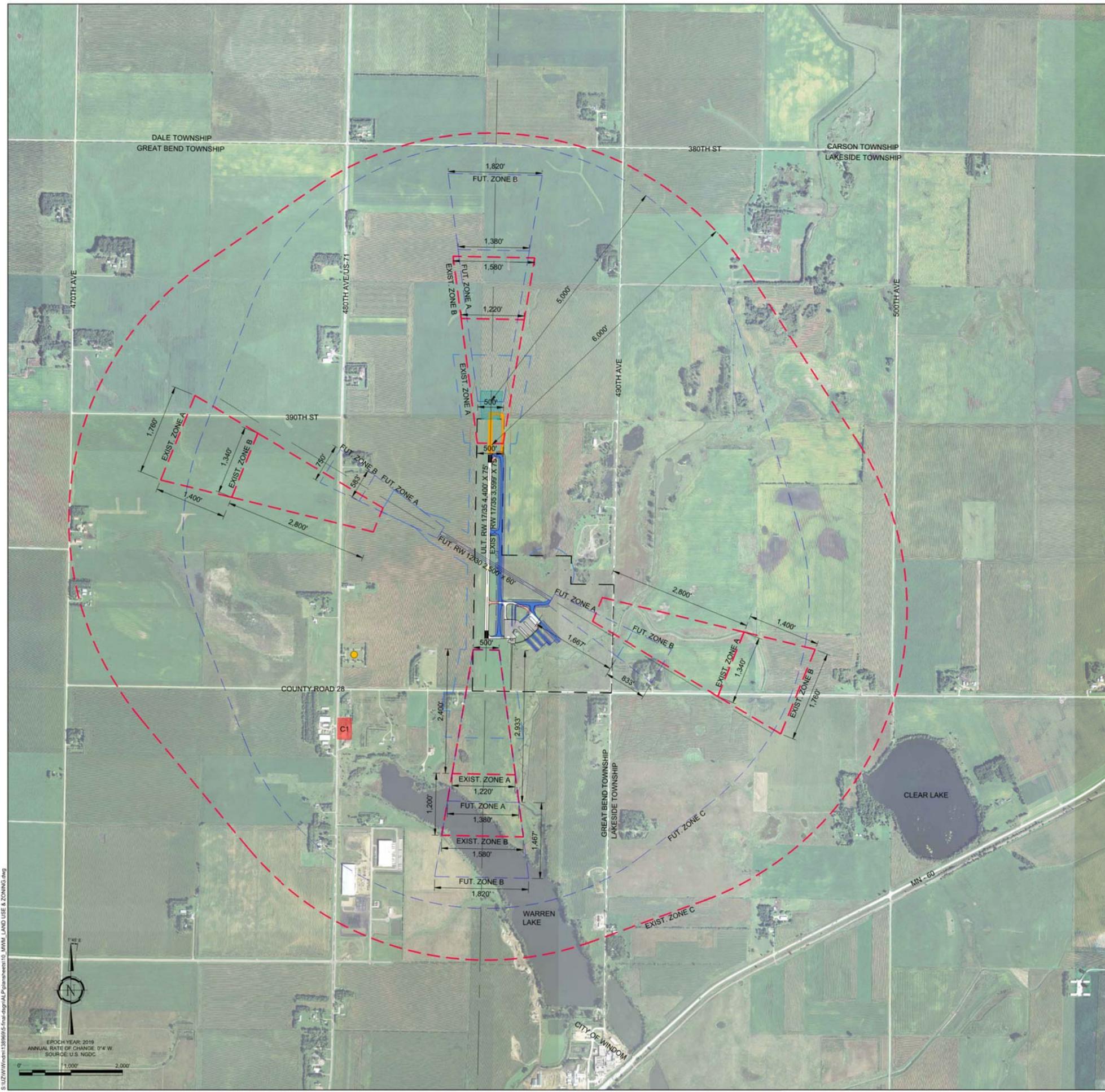
Windom Municipal Airport

Windom, MN

Airport Layout Plan

MARK	DATE	DESCRIPTION	REVISIONS

SHEET TITLE
BUILDING AREA PLAN
 SHEET
9



WINDOM, MINNESOTA AIRPORT ZONING ORDINANCE 1982

USE RESTRICTIONS:
GENERAL: Subject at all times to the height restrictions set forth in Subsection IV B, no use shall be made of any land in any of the safety zones defined in Subsection V A which creates or causes interference with the operations of radio or electronic facilities on the airport or with radio or electronic communications between airport and aircraft, makes it difficult for pilots to distinguish between airport lights and other lights, results in glare in the eyes of pilots using the airport, impairs visibility in the vicinity of the airport, or otherwise endangers the landing, taking off, or maneuvering of aircraft.

ZONE A: Subject at all times to the height restrictions set forth in Sub-sections IV B and to the general restrictions contained in Subsections V B-1, area designated as Zone A shall contain no buildings, temporary structures, exposed transmission lines, or other similar above ground land use structural hazards, and shall be restricted to those use which will not create, attract, or bring together an assembly of persons thereon. Permitted uses may include agriculture (seasonal crops) horticulture, animal husbandry, raising of livestock, wildlife habitat, light outdoor recreation (non-spectator), cemeteries and auto parking.

ZONE B: Subject to all times to the height restrictions set forth in Subsection IV-B, and to the general restrictions contained in Subsection V B-1, areas designated as Zone B shall be restricted in use as follows:
 a. Each use shall be on site whose area shall not be less than 3 acres.
 b. Each use shall not create, attract, or bring together a site population that would exceed 15 times that of the site acreage.
 c. Each site shall have no more than one building plot upon which any number of structures may be erected.
 d. A building plot shall be a single, uniform and non-contrived area, whose shape is uncomplicated and whose are shall not exceed the following minimum ratios with respect to the total site area:

Site Area at Least (Acres)	But Less Than (Acres)	Ratio of Site Area to Bldg. Area	Building Area (sq. ft.)	Max. Site Population (15 Persons/Acres)
3	4	12:1	10,900	45
4	6	10:1	17,400	60
6	10	8:1	32,700	90
10	20	6:1	72,600	150
20	and up	4:1	218,000	300

e. The following uses are specifically prohibited in Zone B: Churches, schools, hospitals, theaters, stadiums, hotels and motels, trailer courts, campgrounds, and other places of public or semi-public assembly.

ZONE C: Zone C is a subject only to height restrictions set forth in Subsection IV B and to the general restrictions contained in Subsection V B-1

	RUNWAY	AIRPORT ZONING DIMENSIONS						
		PLANNED RUNWAY LENGTH	ZONE A			ZONE B		
		LENGTH	INNER WIDTH	OUTER WIDTH	LENGTH	INNER WIDTH	OUTER WIDTH	
EXIST. ZONING	RW 10/28	4,200'	2,800'	500'	1,340'	1,400'	1,340'	1,760'
	RW 17/35	3,600'	2,400'	500'	1,220'	1,200'	1,220'	1,580'
EXISTING ZONE C HEIGHT RESTRICTION: 6,000' RADIUS - NO OBJECT SHALL EXCEED 1,559.0' MSL.								
FUT. ZONING	RW 12/30	2,500'	1,667'	250'	583.3'	833'	583.3'	750'
	RW 17/35	4,400'	2,933'	500'	1,380'	1,467'	1,380'	1,820'
FUTURE ZONE C HEIGHT RESTRICTION: 5,000' RADIUS - NO OBJECT SHALL EXCEED 1,559.0' MSL.								

SOURCE: WINDOM, MINNESOTA AIRPORT ZONING ORDINANCE 1979

PROPOSED WINDOM MUNICIPAL AIRPORT ZONING

The proposed zoning for Windom Municipal Airport is to remove the zoning for Runway 10/28 and replace it with zoning for future Runway 12/30. Runway 17(18)/35(36) Zones A & B will be updated to reflect future approach minimums and the planned extension.

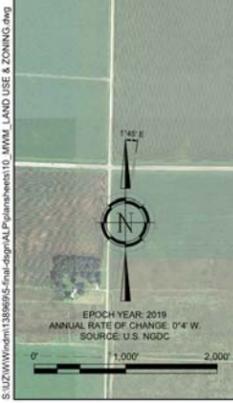
SAFETY ZONE LEGEND:

EXISTING	FUTURE	ULTIMATE	
—	—	—	FEE PROPERTY
—	—	—	FEE PROPERTY
---	---	---	MUNICIPAL BOUNDARIES
PHOTO	—	—	PAVEMENT
NONE	—	—	TURF RUNWAY
---	---	---	MNDOT CLEAR ZONE
---	---	---	MNDOT SAFETY ZONES (A,B & C)

COTTONWOOD COUNTY ZONING

- C1: COMMERCIAL ZONING
- CEMETERY

SOURCE: Cottonwood County Land Use Plan, 1968



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DRAFT
 Lindsay Reiter, PE
 LICENSE NO. _____
 DATE _____

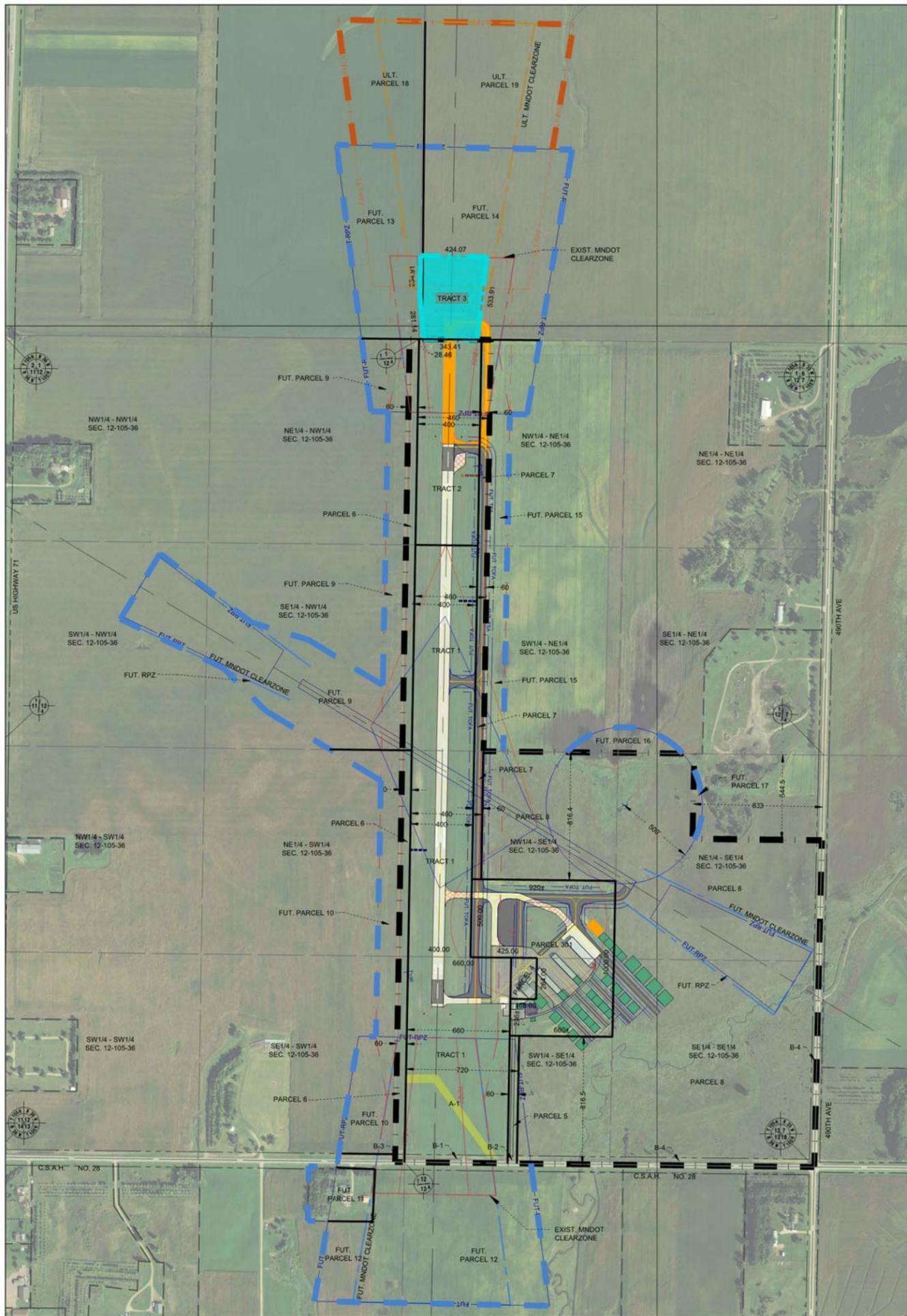
Windom Municipal Airport
 Airport Layout Plan
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MARK	DATE	DESCRIPTION	REVISIONS

SEH FILE NO. WINDOM 138969
 ISSUE DATE 6/30/2019
 DESIGNED BY JMZ
 DRAWN BY BLM
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SHEET TITLE
LAND USE & ZONING

SHEET
 10

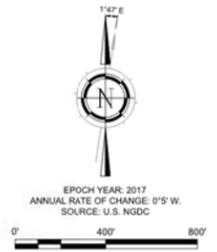


EXISTING AIRPORT PROPERTY											
ID	ACRES (APPX.)	TYPE OF INTEREST	TYPE OF CONVEYANCE	GRANTOR	OWNER	P.I.D. #	RECORDING	DOC. NO.	DATE	PARTICIPANT	GRANT ID
1	20.0	FEE	CERTIFICATE	CHARLES & MYRTLE STROUD ET AL	CITY OF WINDOM	08.012.0600	BK 89 PG 145	132829	10/9/1959	FAAP 9-21-093-01 S.P. 1701-03	TRACT 1
	24.2	FEE	CERTIFICATE	CHARLES & MYRTLE STROUD ET AL	CITY OF WINDOM	08.012.0600	BK 89 PG 145	132829	10/9/1959	FAAP 9-21-093-01 S.P. 1701-03	TRACT 1
2	12.1	FEE	WARRANTY DEED	HOWARD AND HAZEL KETZENBURG	CITY OF WINDOM	08.012.0600	BK 97 PG 180	143029	4/5/1965	FAAP 9-21-093-01 S.P. 1701-03	TRACT 2
301	17.1	FEE	WARRANTY DEED	MYRTLE LUCILLE STROUD	CITY OF WINDOM	08.012.0600	FILE 164 CARD 1176	174604	10/29/1979	-	N/A
4	1.0	FEE	WARRANTY DEED	CHARLES & MYRTLE STROUD	CITY OF WINDOM	08.012.0600	FILE 151 CARD 152	149648	7/5/1968	-	N/A
5	0.04	FEE	WARRANTY DEED	MYRTLE LUCILLE STROUD	CITY OF WINDOM	08.012.0600	-	245468	11/19/2004	-	N/A
6	7.3	FEE	WARRANTY DEED	LOUIS & SOPHIE KLASSEN	CITY OF WINDOM	08.012.0600	-	245993	1/24/2005	-	N/A
7	1.1	FEE	WARRANTY DEED	MYRTLE LUCILLE STROUD	CITY OF WINDOM	08.012.0600	-	245468	11/19/2004	-	N/A
	3.6	FEE	WARRANTY DEED	TIM & CINDY KETZENBERG	CITY OF WINDOM	08.012.0600	-	245469	11/19/2004	-	N/A
8	96.7	FEE	PERSONAL REPRESENTATIVE'S DEED	MYRTLE LUCILLE STROUD	CITY OF WINDOM	08.012.0500	-	263575	12/23/2010	-	N/A

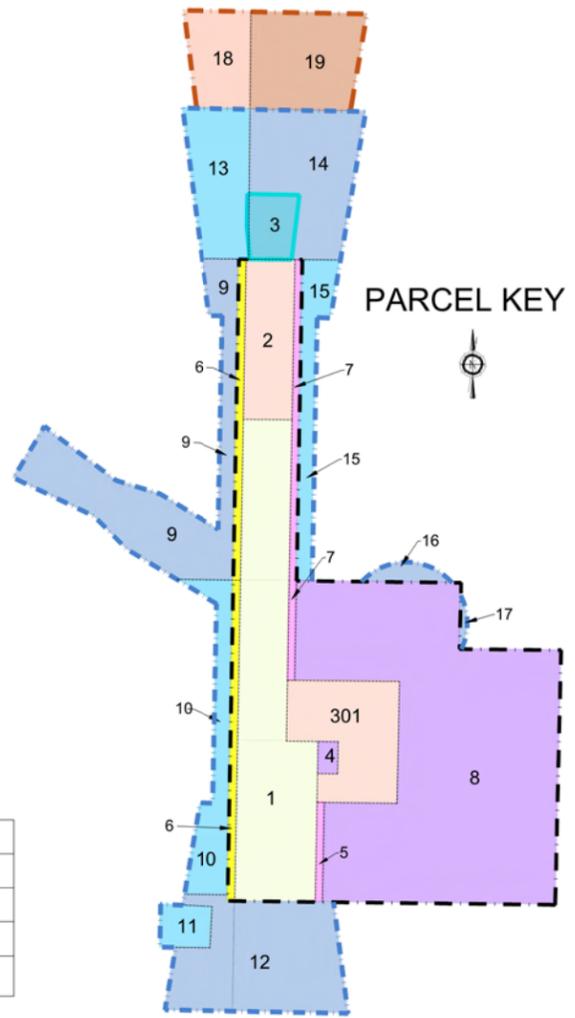
EXISTING AIRPORT EASEMENTS								
TRACT	WITHIN TRACT	ACREAGE	EASEMENT TYPE	OWNER	DOC. NO.	DATE	PARTICIPATION	GRANT ID
3	N/A	4.79	AIRSPACE	CITY OF WINDOM	143678	8/3/1965	FAAP 9-21-093-01 S.P. 1701-03	TRACT 3

FUTURE & ULTIMATE AIRPORT PROPERTY					
PARCEL ID	ACRES (APPX.)	TYPE OF INTEREST	OWNER	P.I.D. #	PURPOSE OF ACQUISITION
9	28.8	FEE	MELROY L. KLASSEN	08.012.0300	FUT. CROSSWIND RUNWAY
10	11.7	FEE	STANLEY L. KLASSEN	08.012.0400	BUILDING RESTRICTION LINE
11	3.3	FEE	JESSE & LOIS FERGUSON	08.013.0400	FUT. RUNWAY PROTECTION ZONE
12	26.8	FEE	MYRON & LYNN PETERS	08.013.0404	FUT. RUNWAY PROTECTION ZONE
13	13.4	FEE	STEVEN & BRENDA MULLER; THOMAS & COLLEEN MULLER	08.001.0600	FUT. RUNWAY PROTECTION ZONE
14	23.9	FEE	NEDERGALL INVESTMENTS	08.001.0100	FUT. RUNWAY PROTECTION ZONE
15	9.4	FEE	TIM KETZENBERG	08.012.0100	BUILDING RESTRICTION LINE
16	1.9	FEE	TIM KETZENBERG	08.012.0100	FUT. AWOS CRITICAL AREA
17	0.4	FEE	STATE OF MINNESOTA	08.001.0600	FUT. AWOS CRITICAL AREA
18	9.6	FEE	STEVEN & BRENDA MULLER; THOMAS & COLLEEN MULLER	08.001.0600	ULT. RUNWAY PROTECTION ZONE
19	16.3	FEE	NEDERGALL INVESTMENTS	08.001.0100	ULT. RUNWAY PROTECTION ZONE

- SURVEYORS NOTES**
- REFER TO ATTACHED AIRPORT PROPERTY SUMMARIES FOR DETAILED PROPERTY INFORMATION & DOCUMENTS
 - ALL PARCEL LINES WERE PROVIDED TO SEH AND ARE BASED OFF OF COTTONWOOD COUNTY'S G.I.S.
 - NO BOUNDARY SURVEY WAS COMPLETED.
 - FOR THE PURPOSE OF THE EXHIBIT A PROPERTY MAP, AIRPORT PARCEL & BOUNDARIES, AIRPORT EASEMENTS, AND AIRPORT ENCUMBRANCES ARE COMPUTED AND SHOWN BASED ON THE BEST INFORMATION AVAILABLE INCLUDING THE FOLLOWING, BUT NOT LIMITED TO: RECORD DOCUMENTS, RECORD PLATS, RECORD SURVEYS, RECORD RIGHT OF WAY MAPS AND/OR PLATS, PUBLISHED SECTION CORNER INFORMATION, G.I.S. DATA OBTAINED FROM THE LOCAL GOVERNMENT UNIT.
 - BEARINGS AND DISTANCES SHOWN ARE FROM DEEDS OF RECORD, AND ARE PROVIDED FOR REFERENCE ONLY.



LEGEND	
	EXISTING AIRPORT BOUNDARY
	FUTURE AIRPORT BOUNDARY
	ULTIMATE AIRPORT BOUNDARY
	INTERIOR AIRPORT BOUNDARIES
	HIGHWAY RIGHT-OF-WAY LINE
	SECTION LINE
	SECTION (QUARTER) LINE
	ADJACENT PROPERTY LINE
	AIRSPACE EASEMENT
	ELECTRIC EASEMENT
	UNRECORDED USE



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DRAFT
Lindsay Reil, PE

DATE: _____ LICENSE NO: _____

Windom Municipal Airport
Airport Layout Plan
Windom, MN

MARK	DATE	DESCRIPTION

SEH FILE NO. WINDM 138969
ISSUE DATE 6/30/2019
DESIGNED BY JNZ
DRAWN BY LCK
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SHEET TITLE
EXHIBIT 'A' AIRPORT
PROPERTY MAP (SHEET
1 OF 2)

SHEET
11

EXISTING RECORDED INTERESTS ON AIRPORT PROPERTY							
I.D.	WITHIN TRACT	ACREAGE	INTEREST TYPE	OWNER	RECORDING	DOC. NO.	DATE
A-1	1	0.90	EASEMENT	SOUTH CENTRAL ELECTRIC ASSOCIATION		178326	5/1/1981

UNRECORDED USES ON AIRPORT PROPERTY		
I.D.	ON PARCEL	DESCRIPTION
B-1	1	ROADWAY EASEMENT FOR APPROXIMATELY 660 FEET OF CSAH 28 ALONG THE SOUTHERN PORTION OF PARCEL 1
B-2	5	ROADWAY EASEMENT FOR APPROXIMATELY 60 FEET OF CSAH 28 ALONG THE SOUTHERN PORTION OF PARCEL 5
B-3	6	ROADWAY EASEMENT FOR APPROXIMATELY 60 FEET OF CSAH 28 ALONG THE SOUTHERN PORTION OF PARCEL 6
B-4	8	ROADWAY EASEMENT FOR APPROXIMATELY 1,900 FEET OF CSAH 28 ALONG THE SOUTHERN PORTION OF PARCEL 8
	8	ROADWAY EASEMENT FOR APPROXIMATELY 2,090 FEET OF 490TH AVE ALONG THE EASTERN PORTION OF PARCEL 8

ENCUMBRANCE DETAIL:

Easement A-1 – Permanent Easement for electric utility purposes to South Central Electric Association dated May 1, 1981 (Doc. No. 178326). The easement covers a 50.00 foot wide strip that falls within the southern half of Tract 1. The total acreage of this easement that falls on Airport Property is approximately 0.90 acres.

ENTITLEMENT DETAIL:

Tract 3 – The Easement grants the easement holder the perpetual right to unobstructed passage of aircraft over and across described easement.

SURVEYORS NOTES

1. REFER TO ATTACHED AIRPORT PROPERTY SUMMARIES FOR DETAILED PROPERTY INFORMATION & DOCUMENTS
2. ALL PARCEL LINES WERE PROVIDED TO SEH AND ARE BASED OFF OF COTTONWOOD COUNTY'S G.I.S.
3. NO BOUNDARY SURVEY WAS COMPLETED.
4. FOR THE PURPOSE OF THE EXHIBIT A PROPERTY MAP, AIRPORT PARCEL & BOUNDARIES, AIRPORT EASEMENTS, AND AIRPORT ENCUMBRANCES ARE COMPUTED AND SHOWN BASED ON THE BEST INFORMATION AVAILABLE INCLUDING THE FOLLOWING, BUT NOT LIMITED TO: RECORD DOCUMENTS, RECORD PLATS, RECORD SURVEYS, RECORD RIGHT OF WAY MAPS AND/OR PLATS, PUBLISHED SECTION CORNER INFORMATION, G.I.S. DATA OBTAINED FROM THE LOCAL GOVERNMENT UNIT.
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SHEET TITLE
EXHIBIT 'A' PROPERTY MAP
DETAIL SHEET (SHEET 2 OF 2)

SHEET
12



Building a Better World for All of Us®

Building a Better World for All of Us®

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