

**DRAFT**

**Flying Cloud Airport  
Joint Airport Zoning Board (JAZB)  
Airport Zoning Ordinance**

**Airport Zoning Ordinance Update Technical Report  
Draft – April 5, 2018**





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## **EXECUTIVE SUMMARY**

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## ES EXECUTIVE SUMMARY

### ES.1 INTRODUCTION

The Joint Airport Zoning Board (JAZB) for Flying Cloud Airport (FCM) is tasked with developing an airport zoning ordinance for land uses around FCM as required per [Minnesota Statute 360.061 through 360.074](#) and [Minnesota Rules 8800.1200 and 8800.2400](#).

A JAZB is comprised of an airport operator and representatives from the cities, counties and/or townships that control land use development around an airport. In the case of FCM the cities include Chanhassen, Eden Prairie and Shakopee.

Through a collaborative process, the JAZB seeks to develop an airport zoning ordinance that achieves a balance between a reasonable level of public safety and compatible community development. In determining what minimum airport zoning regulations to adopt, Minnesota State Statutes guide the local airport zoning authority (JAZB) to consider the social and economic costs of restricting land uses versus the benefits derived from a strict application of the standards of the commissioner (the State's Model Zoning Ordinance).

The goal for the Flying Cloud (FCM) Joint Airport Zoning Board (JAZB) is to develop an airport safety zoning ordinance for review and approval by the MnDOT Commissioner of Transportation, then for subsequent adoption by the JAZB, and finally by local communities.

The FCM JAZB was initially seated in 2009 and first met in July of that year. By April of 2010, the group had developed a draft Airport Zoning Ordinance that was ready for public review. A public hearing for the ordinance was held on April 29, 2010. The Draft Airport Zoning Ordinance was then finalized and submitted to the MnDOT Commissioner of Transportation for review and action in December 2010.

However, in early 2011, MAC requested, on behalf of the JAZB, that MnDOT temporarily suspend review of the Draft Ordinance due to legal uncertainties surrounding airport zoning related litigation that was pending in the State at the time. Another factor that affected the timing of the review was a collaborative effort initiated by MnDOT Aeronautics to update the state zoning statutes and rules, which began in earnest in the 2014 timeframe and is still ongoing.

By 2016, completing the zoning effort at FCM re-emerged as a priority due to the pace of development activity occurring in the vicinity of the airport. As such, MAC requested that MnDOT re-initiate its review of the draft Ordinance that had been submitted in December 2010 but was subsequently withdrawn. After consideration, MnDOT determined that they would be unable to review the draft Ordinance until 1] the JAZB was recalled; 2] the JAZB held a public hearing about the proposed zoning regulations; and 3] the JAZB submitted a record of its official action requesting review of the proposed zoning.

The FCM JAZB was re-seated and its first meeting was held on September 21, 2017.

The original JAZB's focus was on identifying land use controls necessary to ensure a reasonable level of safety while considering the social and economic costs associated with implementing the proposed land use controls. The guiding concept employed throughout the process was that of reasonableness. Using the list of reasonableness considerations currently provided in state statute, the original JAZB set out to strike a balance between safety and economic cost considerations.

The first step was to conduct an airport-specific Safety/Risk Study to evaluate the probability of aircraft accidents occurring adjacent to FCM. This assessment used the same target risk standard and overall methodology that had previously been developed for the Minneapolis/St. Paul International Airport (MSP) zoning process – one accident per 10,000,000 flight operations. The study concluded that the accident probability in existing or planned Occupant Areas – land that is or could likely be developed to accommodate congregations of people in designated safety zones – in the vicinity of the FCM was less than the targeted risk standard.

Another key step in the process was to estimate the economic impact to the surrounding community of strictly implementing the State's Model Zoning Ordinance. For this task, Eden Prairie's planning and economic development team identified the impacts related to lost private property development potential, property taxes, and employment. The study concluded that implementation of the State Model Zoning Ordinance would result in an estimated loss of \$150,000,000 in commercial development, \$12,000,000 in residential development, and \$600,000 in annual property taxes.

With all these factors considered, the original JAZB recommended that Safety Zone A be co-located with the FAA RPZ. However, to address the potential for variability in aircraft accident locations beyond the RPZ, the recommendation included a provision for contiguous open space in Zone B that would allow a pilot to set down a disabled aircraft. It also removed site acre and structure limitations in Zone B and identified permitted residential areas that would be treated as conforming land uses.

The purpose for the balance of this report is to document updates being made to the relevant sections of the Draft Zoning Ordinance to reflect current conditions and trends.

## **ES.2 SAFETY/RISK STUDY UPDATE**

Section 2 summarizes the updates that have been made to the Safety/Risk Study completed in 2009 to bring the analysis up-to-date. The updated study will be referred to as the 2017 Safety/Risk Study.

The purpose of the Safety/Risk Study is to evaluate the reasonableness of potential land use restrictions pertaining to areas off the runway ends at Flying Cloud Airport (FCM) based upon the probability of an accident occurring in MnDOT Safety Zone A beyond the FAA-defined Runway Protection Zones (RPZ) and MnDOT Safety Zone B, the character of flying operations expected to be conducted at the airport, and features of the airport vicinity.

The 2009 Safety/Risk Study found that the accident probability exceeded the targeted risk standard beyond the FAA-defined RPZ in several instances at Flying Cloud. With additional analysis, however, the study concluded that the accident probability in existing

or planned occupant areas – land that is or could likely be developed to accommodate congregations of people in designated safety zones – in the vicinity of the Airport was less than the targeted risk standard.

The 2017 Safety/Risk Study confirms that the conclusions of the 2009 Study remain valid in terms of the risk of an aircraft accident in the vicinity of FCM. Specifically, the risk probability of an aircraft accident in an existing or future occupant area is below the targeted risk standard of one accident per 10,000,000 flight operations (see **Table 2-10**). This suggests that a strict application of the land use controls prescribed in the MnDOT Model Zoning Ordinance exceeds what is necessary to provide a reasonable level of safety at FCM.

However, the findings also continue to support the 2009 JAZB recommendation that distinct open spaces (20-acre minimum) in proximity to the extended runway centerline beyond the RPZ and adjacent to occupant areas should be preserved.

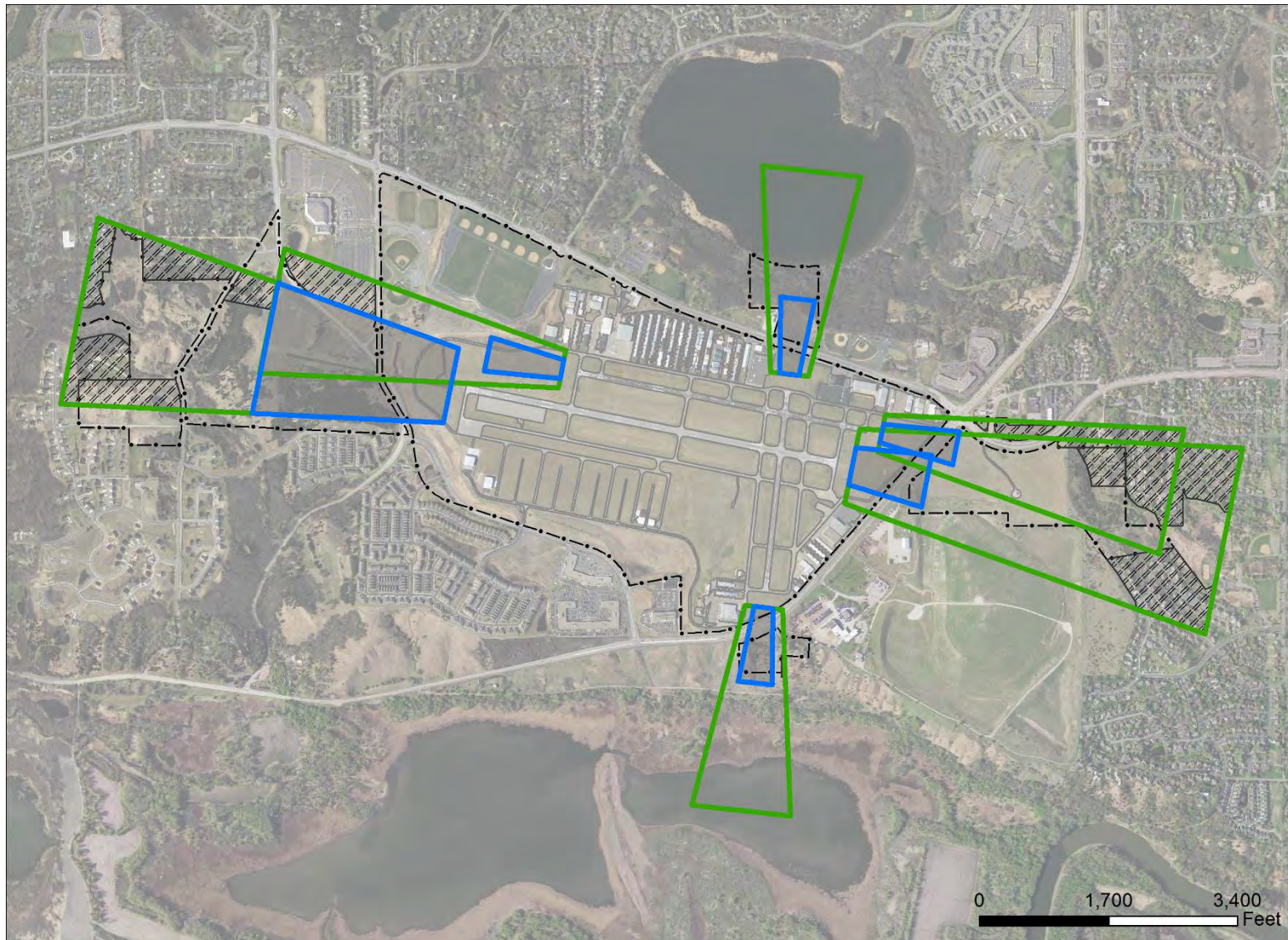
This study confirms that the following elements of the Draft FCM Zoning Ordinance are appropriate from a safety/risk perspective:

- JAZB Safety Zone A is co-terminus with the FAA Runway Protection Zone (RPZ); and
- JAZB Safety Zone B is comprised of the portion of Model State Safety Zone A beyond the RPZ plus Model State Safety Zone B. Safety Zone B does not include site acre/structure limitations, site area to building plot area ratios, or population criteria for designated occupant areas. Occupant Areas guided for residential use will allow for the improvement, expansion, and development of new residential uses that will be treated as conforming uses in the zoning ordinance.

To provide for an extra margin of safety, JAZB Zone B will contain a provision that a minimum of 20 percent of the total Zone B acreage or 20 acres, whichever is greater, will be preserved as contiguous open space.

The proposed JAZB Safety Zones A and B are shown in **Figure ES-1**.

Figure ES-1: Proposed JAZB Safety Zones



FCM Property Line    Runway Protection Zones (RPZ)    JAZB Zone A    JAZB Zone B    Occupant Area

### ES.3 ECONOMIC IMPACT ANALYSIS UPDATE

In determining what minimum airport zoning regulations to adopt, Minnesota State Statutes guide the local airport zoning authority (JAZB) to consider the social and economic costs of restricting land uses versus the benefits derived from a strict application of the standards of the commissioner (the State's Model Zoning Ordinance).

In 2010, the City of Eden Prairie's planning and economic development team identified the impacts related to lost private property development potential, property taxes, and employment that would be associated with a strict application of the State Model Zoning Ordinance. The study concluded that strict implementation of the State Model Zoning Ordinance would result in an estimated loss of \$150,000,000 in commercial development, \$12,000,000 in residential development, and \$600,000 in annual property taxes.

Section 3 summarizes updates that have been made to the City's Economic Impact Analysis completed in 2010 to bring the analysis up-to-date. The updated study will be referred to as the 2017 Economic Impact Analysis.

The 2017 Economic Impact Analysis concludes that strict implementation of the State Model Zoning Ordinance would result in an estimated loss of approximately \$38,000,000 to \$58,000,000 in commercial development, approximately \$6,000,000 to \$15,000,000 in residential development, and approximately \$139,000 to \$257,000 in annual property taxes. While these values are somewhat more conservative than those reported in the 2010 study, they still indicate that a strict implementation of the State Model Zoning Ordinance would have a significant adverse long-term economic impact on the surrounding community in the magnitude of \$56,000,000 to \$69,000,000 over a 20-year period, not including the loss of employment generating potential.

### ES.4 2017 FCM AIRPORT ZONING ORDINANCE

This section describes updates that have been made to the Draft FCM Airport Zoning Ordinance document.

Changes from the 2010 Draft Ordinance language are shown as tracked-changes in **Appendix 7**. Most of the language changes reflect updated elements that have been described in this report. Other changes include the following items:

- Section I, Purpose and Authority: Removed the City of Bloomington from the list of JAZB participants as the proposed zoning surfaces do not extend into the municipal boundaries of Bloomington (page 1)
- Section IV, Airspace Obstruction Zoning, Subsection B, Height Restrictions: Added clarifying language to items 1 and 2 about use of an FAA 7460 Obstruction Evaluation and determination by FAA (pages 9 and 10)
- Section XIV, Judicial Review: Clarified language to better align with state statute (page 22)

The updated Draft FCM Zoning Ordinance will continue to allow for the improvement, expansion and development of new residential uses in existing and planned Occupant

Areas guided for residential use. These residential uses, as designated Permitted Residential Areas, are recognized and treated as conforming land uses in the ordinance.

The exhibits and grid maps supporting and attached to the Zoning Ordinance have also been updated to reflect updated elements described in this report. The updated items include:

- Zoning Ordinance Exhibits (see **Appendix 7**)
  - Exhibit A, Airport Boundary
  - Exhibit B, Residential Permitted Parcels on JAZB Zone B
  - Exhibit C, Permitted Residential Areas
  - Exhibit D, Airport Boundary and Airspace Zoning Limits
  - Exhibit E, Airport Boundary and Airspace Contours
  - Exhibit F, Airport Boundary and Safety Zoning Limits
- FCM Airspace Zones Within Zoning Limits Grid Maps (see **Appendix 8**)
- FCM Safety Zones Within Zoning Limits Grid Maps (see **Appendix 9**)
- FCM Maximum Construction Heights Without Permit Grid Maps (see **Appendix 10**)



**SECTION 1:**

**INTRODUCTION AND BACKGROUND**

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# 1. INTRODUCTION AND BACKGROUND

## 1.1 OVERVIEW

The Joint Airport Zoning Board (JAZB) for Flying Cloud Airport (FCM) is tasked with developing an airport zoning ordinance for land uses around FCM as required per [Minnesota Statute 360.061 through 360.074](#) and [Minnesota Rules 8800.1200 and 8800.2400](#).

A JAZB is comprised of an airport operator and representatives from the cities, counties and/or townships that control land use development around an airport. In the case of FCM the cities include Chanhassen, Eden Prairie and Shakopee.

Through a collaborative process, the JAZB seeks to develop an airport zoning ordinance that achieves a balance between a reasonable level of public safety and compatible community development. In determining what minimum airport zoning regulations to adopt, Minnesota State Statutes guide the local airport zoning authority (JAZB) to consider the social and economic costs of restricting land uses versus the benefits derived from a strict application of the standards of the commissioner (the State's Model Zoning Ordinance).

The goal for the Flying Cloud (FCM) Joint Airport Zoning Board (JAZB) is to develop an airport safety zoning ordinance for review and approval by the MnDOT Commissioner of Transportation, then for subsequent adoption by the JAZB, and finally by local communities.

The implementation of airport safety zoning remains important for FCM for the following reasons:

- Airport safety zoning accomplishes the state law direction to prevent airport hazards, and MnDOT's expectation is that the JAZB will successfully zone FCM in order to avoid potential airport grant funding implications;
- The pace of development around FCM is only increasing and the lack of an adopted airport safety zoning ordinance is creating uncertainty and confusion about possible land use controls and/or restrictions;
- MAC would like to continue to pursue non-aeronautical uses of some FCM parcels located within designated safety zones. Uncertainty regarding zoning is holding up land release approvals.

## 1.2 REVIEW OF FCM JAZB HISTORICAL TIMELINE AND ACTIVITIES

The FCM JAZB was initially seated in 2009 and first met in July of that year. By April of 2010, the group had developed a draft Airport Zoning Ordinance that was ready for public review. A public hearing for the ordinance was held on April 29, 2010. The Draft Airport Zoning Ordinance was then finalized and submitted to the MnDOT Commissioner of Transportation for review and action in December 2010.

A copy of the Draft FCM Airport Zoning Ordinance that was submitted to MnDOT is available on the MAC website and can be viewed through the following link:

[https://metroairports.org/General-Aviation/Airports/Flying-Cloud/Joint-Airport-Zoning-Board-Flying-Cloud/Draft-FCM-Zoning-Ordinance-12-21-10\\_reduced\\_size.aspx](https://metroairports.org/General-Aviation/Airports/Flying-Cloud/Joint-Airport-Zoning-Board-Flying-Cloud/Draft-FCM-Zoning-Ordinance-12-21-10_reduced_size.aspx)

However, in early 2011, MAC requested, on behalf of the JAZB, that MnDOT temporarily suspend review of the Draft Ordinance due to legal uncertainties surrounding airport zoning related litigation that was pending in the State at the time. Another factor that affected the timing of the review was a collaborative effort initiated by MnDOT Aeronautics to update the state zoning statutes and rules, which began in earnest in the 2014 timeframe and is still ongoing.

By 2016, completing the zoning effort at FCM re-emerged as a priority due to the pace of development activity occurring in the vicinity of the airport. As such, MAC requested that MnDOT re-initiate its review of the draft Ordinance that had been submitted in December 2010 but was subsequently withdrawn. After consideration, MnDOT determined that they would be unable to review the draft Ordinance until 1] the JAZB was recalled; 2] the JAZB held a public hearing about the proposed zoning regulations; and 3] the JAZB submitted a record of its official action requesting review of the proposed zoning.

The FCM JAZB was re-seated and its first meeting was held on September 21, 2017. A record of all JAZB meeting materials is available on the MAC website through the following link:

<https://metroairports.org/General-Aviation/Airports/Flying-Cloud/Joint-Airport-Zoning-Board-Flying-Cloud.aspx>

### **1.3 SUMMARY OF DRAFT FCM ZONING ORDINANCE**

The original JAZB's focus was on identifying land use controls necessary to ensure a reasonable level of safety while considering the social and economic costs associated with implementing the proposed land use controls. The guiding concept employed throughout the process was that of reasonableness. Using the list of reasonableness considerations currently provided in state statute, the original JAZB set out to strike a balance between safety and economic cost considerations.

The first step was to conduct an airport-specific Safety/Risk Study to evaluate the probability of aircraft accidents occurring adjacent to FCM, including in the Federal Aviation Administration (FAA)-defined Runway Protection Zone (RPZ), in model State Safety Zone A beyond the RPZ, and in model State Safety Zone B. This assessment used the same target risk standard and overall methodology that had previously been developed for the Minneapolis/St. Paul International Airport (MSP) zoning process – that is, one accident per 10,000,000 flight operations. For context:

- The Runway Protection Zone (RPZ) is the trapezoid surface beyond the end of the runway that the Federal Aviation Administration (FAA) stipulates should be kept clear of incompatible land uses;
- MnDOT's State Model Zone A restricts all buildings and uses which bring together an assembly of persons and extends for a distance that is 2/3 of the

- runway length. At FCM, State Model Zone A extends beyond the FAA RPZ off each runway end;
- MnDOT's State Model Zone B is less restrictive, but still limits density and site population to 15 times that of the site acreage. Zone B extends beyond Zone A for a distance that is 1/3 of the runway length; and
  - MnDOT's State Zone C is defined by a set radius from the runway ends, has general land use restrictions against interfering with airport operations, and is established at an elevation of 150 feet above the airport.

The Safety/Risk Study found that the accident probability exceeded the targeted risk standard beyond the FAA RPZ in several instances at FCM.

With additional analysis, however, the study concluded that the accident probability in existing or planned Occupant Areas – land that is or could likely be developed to accommodate congregations of people in designated safety zones – in the vicinity of the FCM was less than the targeted risk standard.

Another key step in the process was to estimate the economic impact to the surrounding community of strictly implementing the State's Model Zoning Ordinance. For this task, Eden Prairie's planning and economic development team identified the impacts related to lost private property development potential, property taxes, and employment. The study concluded that implementation of the State Model Zoning Ordinance would result in an estimated loss of \$150,000,000 in commercial development, \$12,000,000 in residential development, and \$600,000 in annual property taxes.

With all these factors considered, the original JAZB recommended that Safety Zone A be co-located with the FAA RPZ. However, to address the potential for variability in aircraft accident locations beyond the RPZ, the recommendation included a provision for contiguous open space in Zone B that would allow a pilot to set down a disabled aircraft. It also removed site acre and structure limitations in Zone B and identified permitted residential areas that would be treated as conforming land uses.

In addition to the safety zones, the Draft Zoning Ordinance establishes airspace, or height, limitations in the vicinity of the airport. Per the draft ordinance, an airport zoning permit will not be required for development up to a "maximum construction height without a permit" elevation established on a parcel-by-parcel basis.

If a proposed development exceeds the maximum construction height without a permit elevation, a zoning permit from the municipal Zoning Administrator will be required to ensure that the airspace zoning limit above the parcel is not exceeded. If the proposed development penetrates the airspace zoning surface, a variance will be required from a Board of Adjustment. The draft ordinance makes an exception to the requirement for a variance is if the proposed development has received a "determination of no hazard" based on a formal FAA airspace review.

Summary images from the Draft Zoning Ordinance showing the extents of the safety zones, airspace height zoning limits, and maximum construction heights without a permit are shown in **Figures 1-1 through 1-3**.

The purpose for the balance of this report is to document updates being made to the relevant sections of the Draft Zoning Ordinance to reflect current conditions and trends.

Figure 1-1: FCM Draft Zoning Ordinance Airspace Zones

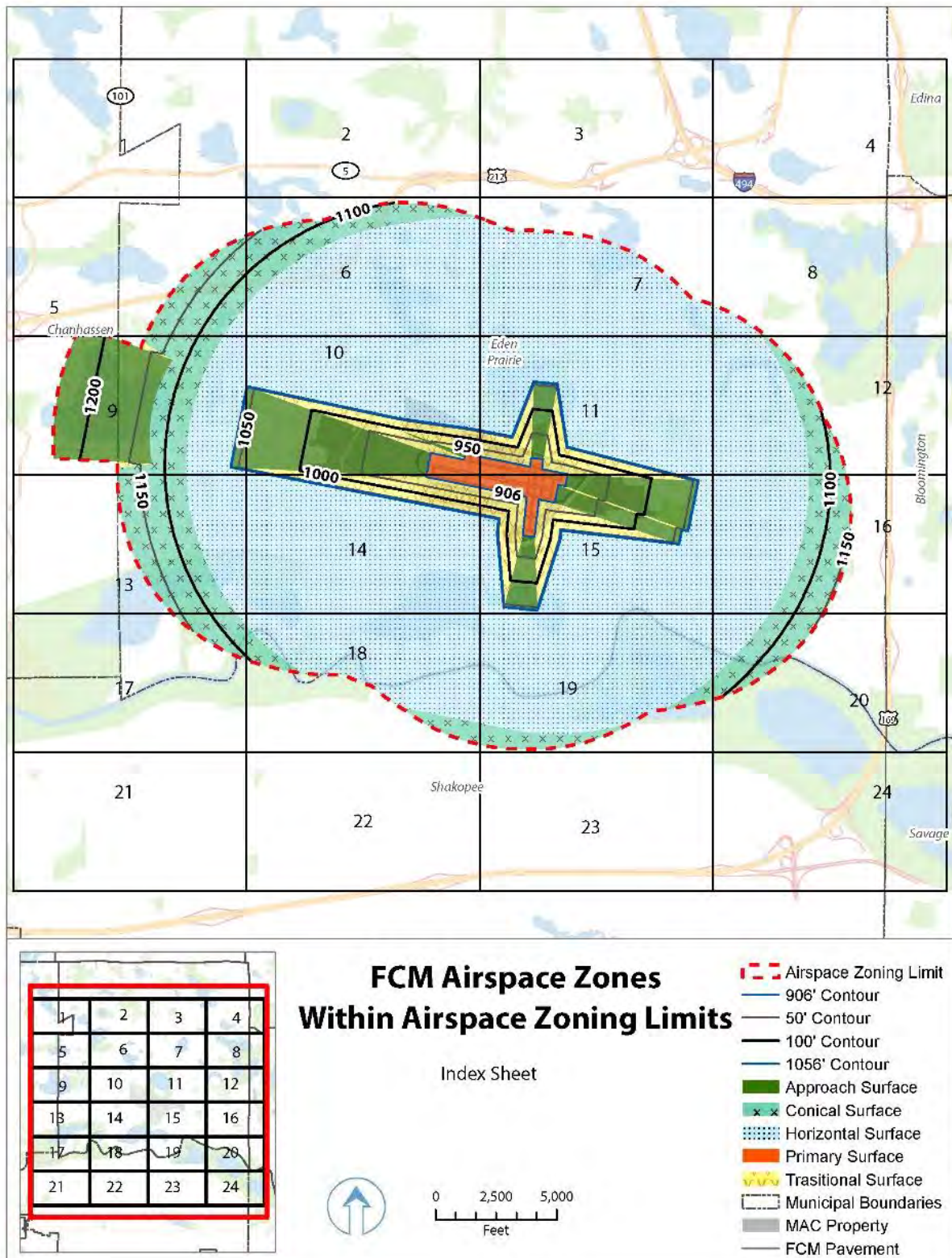
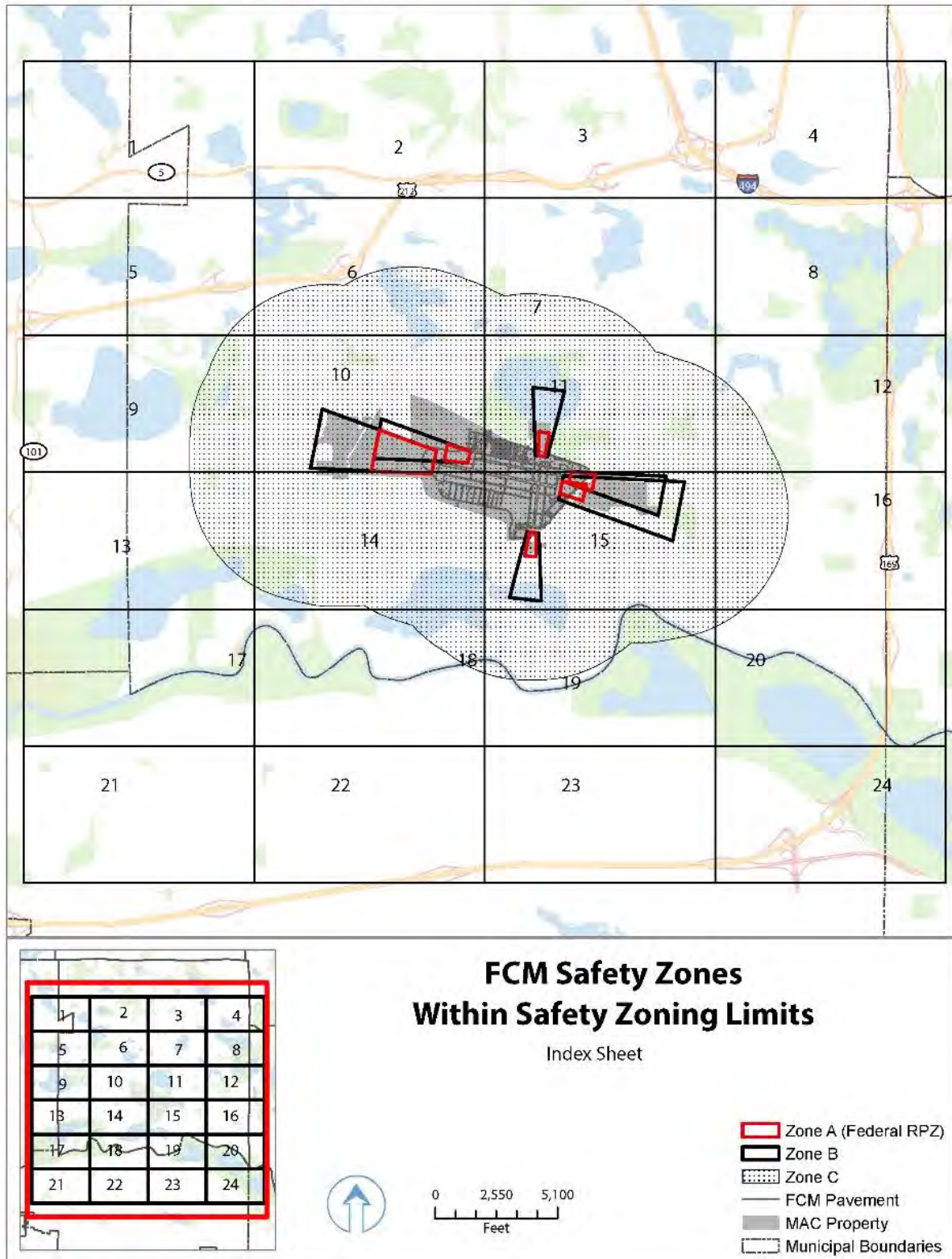
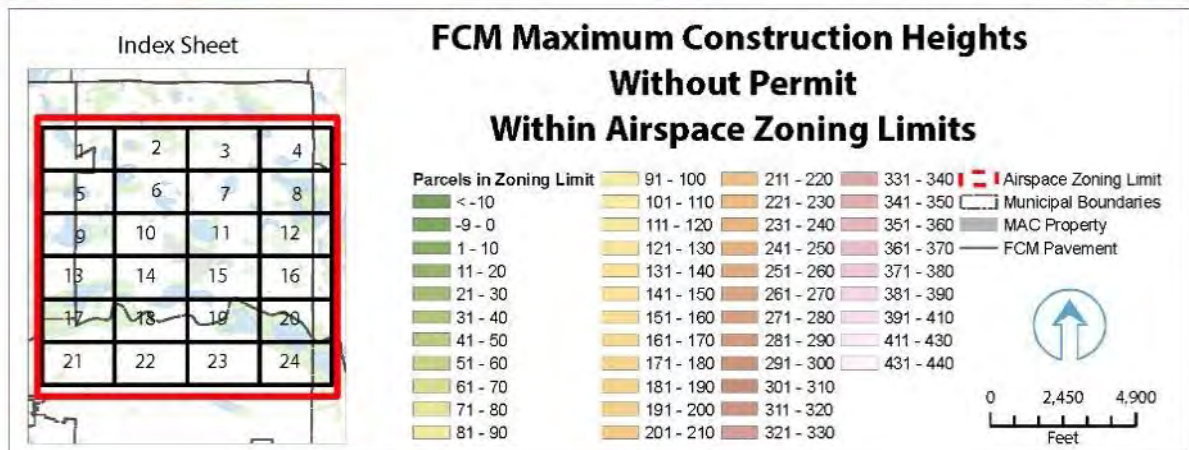
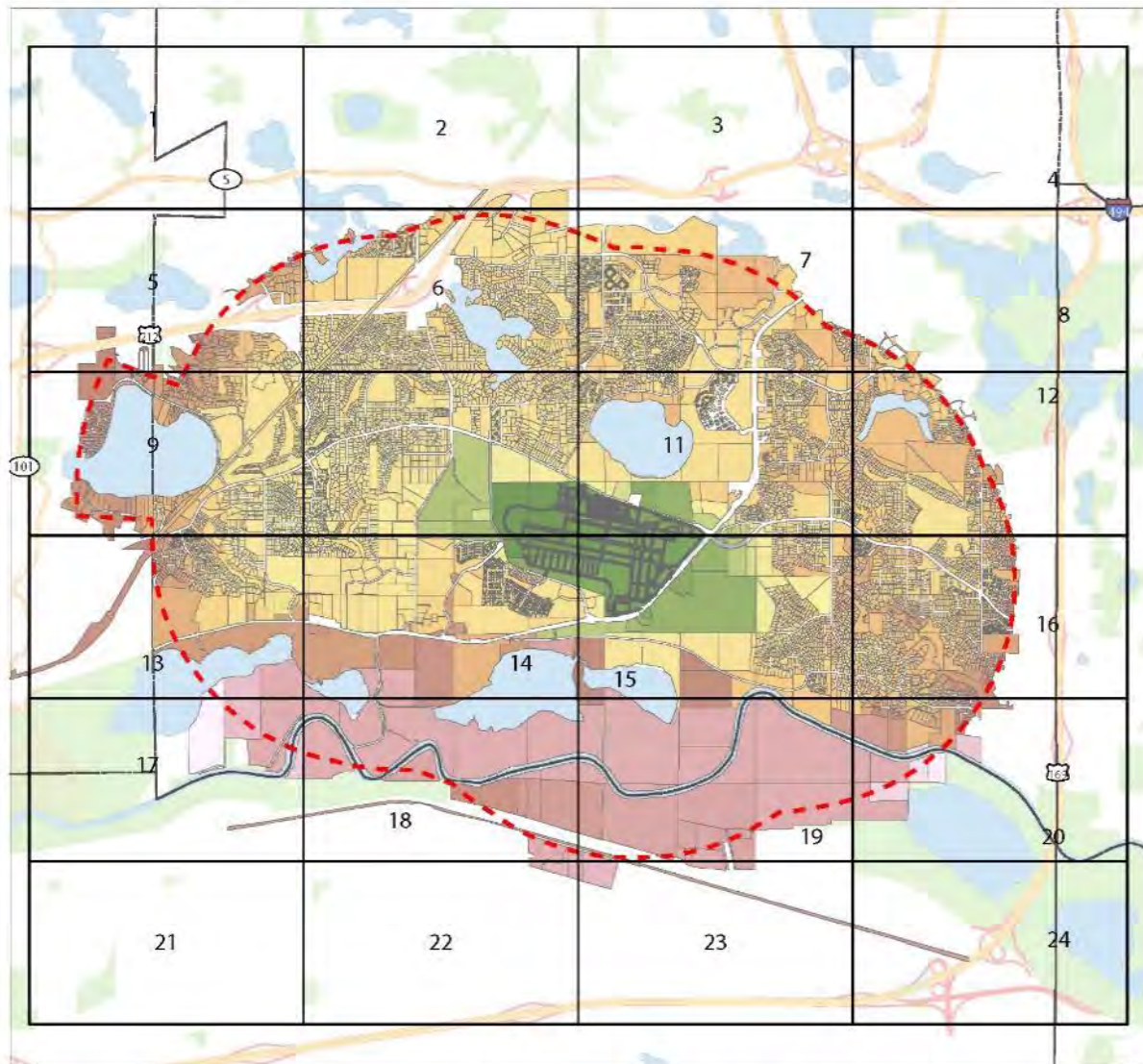


Figure 1-2: FCM Draft Zoning Ordinance Safety Zones





**Figure 1-3: FCM Draft Zoning Ordinance Maximum Construction Heights Without a Zoning Permit**



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**SECTION 2:  
SAFETY/RISK STUDY UPDATE**

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## 2. SAFETY/RISK STUDY UPDATE

### 2.1 INTRODUCTION

This chapter summarizes updates that have been made to the Safety/Risk Study completed in 2009 to bring the analysis up-to-date. The updated study will be referred to as the 2017 Safety/Risk Study.

The purpose of the Safety/Risk Study is to evaluate the reasonableness of potential land use restrictions pertaining to areas off the runway ends at Flying Cloud Airport (FCM) based upon the probability of an accident occurring in MnDOT Safety Zone A beyond the FAA-defined Runway Protection Zones (RPZ) and MnDOT Safety Zone B, the character of flying operations expected to be conducted at the airport, and features of the airport vicinity.

The 2009 Safety/Risk Study found that the accident probability exceeded the targeted risk standard beyond the FAA-defined RPZ in several instances at Flying Cloud. With additional analysis, however, the study concluded that the accident probability in existing or planned occupant areas – land that is or could likely be developed to accommodate congregations of people in designated safety zones – in the vicinity of the Airport was less than the targeted risk standard.

A copy of the 2009 Safety/Risk Study is included as **Appendix 1**.

### 2.2 STUDY METHODOLOGY

This 2017 Safety/Risk Study uses the same eight-step methodology that was established for the 2009 study, as follows:

- Determine the appropriate data to be used in the analysis;
- Identify applicable probability standards;
- Define the areas to be studied;
- Compile appropriate data to determine accident rates and locations;
- Distribute accident data to the areas being analyzed;
- Determine the number of future operations for the runway end being studied;
- Calculate the accident probabilities in the study areas; and
- Compare the accident probabilities to the applicable probability standards.

The 2017 Safety/Risk Study will use an analysis year of 2040.

### 2.3 UPDATED DATA TO BE USED IN THE ANALYSIS

The following airfield configuration changes are included in the 2017 Safety/Risk Study, which evaluates conditions expected to be present at FCM in the analysis year of 2040:

- Crosswind Runway 18-36 length and position; and

- North parallel Runway 10R-28L designation.

**Figure 2-1** illustrates the airfield configuration that served as the basis for the 2017 Safety/Risk Study.

### 2.3.1 Crosswind Runway 18-36 Length and Position

At the time when the 2009 Safety/Risk Study was prepared, the future airfield plan for FCM included a project to both shift and extend the crosswind Runway 18-36 by about 100 feet, for a total length of 2,800 feet. In the intervening years, however, the future airfield plan has been refined and the proposed changes to the length and positioning of the existing crosswind runway ends have been removed. Therefore, the 2017 Safety/Risk Study will reflect the existing crosswind runway length, 2,691 feet, and the existing runway ends. This change affects both the starting point for the RPZs and Safety Zones that are tied to the runway end. It also affects the length of the State Model Safety Zones as they are tied to the length of the runway. The analysis will, however, take into account the establishment of a future non-precision instrument approach to the Runway 18 end.

### 2.3.2 North Parallel Runway 10R-28L Designation

While no changes are proposed to the physical length or width of the north parallel Runway 10R-28L, its designation is proposed to change from “other than utility” to “utility”. The distinction between the designations has to do with the types of aircraft that use the runway on a regular basis – those that weigh over 12,500 pounds or under 12,500 pounds. Since the north parallel runway does not routinely accommodate aircraft that weigh over 12,500 pounds, the utility designation is appropriate. The re-designation is being proposed as a solution to reduce the number of runway incursions – in this case instances where aircraft enter the runway environment without permission from the Tower – as it will allow the runway hold short lines to move in closer to the runway centerline. This will allow pilots to get lined up on the crossing taxiway before they reach the hold short line.

From a zoning and land use perspective, this change will result in a smaller RPZ at each end of north parallel Runway 10R-28L. In the draft JAZB zoning ordinance, Safety Zone A was proposed to be co-located with the FAA RPZ, so this would result in a smaller JAZB Zone A in the updated ordinance. From an airspace and height limitation perspective, it also results in a steeper, or less restrictive, approach surface slope and a slightly smaller Safety Zone C radius to the north of the airport. The changes associated with the north parallel Runway 10R-28L re-designation are planned to be implemented in mid-2018.

## 2.4 APPLICABLE PROBABILITY STANDARD

The 2017 Safety/Risk Study will continue to use the targeted risk standard identified in the previous study. The threshold probability of **one accident per 10 million aircraft operations ( $10^{-7}$ )** will continue to be used as the standard for measuring the accident probabilities in the analysis areas<sup>1</sup>. An accident will be considered as a collision with the

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<sup>1</sup> An event with an occurrence probability of less than or equal to one in  $10^{-7}$  is generally considered to be in a likelihood category of “extremely remote” per FAA Safety Management System (SMS) criteria. The “extremely remote” category also generally correlates to events expected to occur every 10-100 years. Events occurring less than every 100 years correlate to the “extremely improbable” likelihood category.

ground or with an object above the ground that results in substantial damage to the aircraft or serious injury to persons in the aircraft or on the ground.

## 2.5 DEFINITION OF ANALYSIS AREAS

The 2017 Safety/Risk Study will continue to use the four analysis areas identified in the previous study. These areas have been updated to reflect the existing and planned year 2040 airfield configuration and are shown in **Figure 2-2**.

- The area inclusive of the airfield, airport property, and the FAA-defined RPZ;
- MnDOT Model State Safety Zone A beyond the RPZ;
- MnDOT Model State Safety Zone B; and
- Other off-airport areas beyond State Model Safety Zones A and B.

In addition, existing and planned Occupant Areas have been updated to reflect current land use guidance provided by the City of Eden Prairie for off-airport parcels (not owned by MAC) and MAC non-aeronautical property development strategies for on-airport parcels (owned by MAC). Occupant Areas are defined as land that is or could likely be developed to accommodate congregations of people in the designated Safety Zones. Examples of Occupant Areas include existing and planned residential, office/commercial, industrial, and church uses. The Occupant Areas identified for the 2017 Safety/Risk Study analysis are shown in **Figure 2-3**.

## 2.6 ACCIDENT FREQUENCY DATA

The 2009 Safety/Risk Study analyzed aircraft accidents that occurred at FCM during the 20-year period between 1989 and 2008. Based on the 1989-2008 data set, the accident rate at FCM was calculated to be 0.7545 accidents per 100,000 aircraft operations.

The 2017 Safety/Risk Study updates the data set to consider accidents that occurred during the 20-year period between 1997 and 2016. Based on the 1997-2016 data set, the accident rate at FCM is calculated to be 0.8403 accidents per 100,000 aircraft operations.

The FCM accident rate per 100,000 aircraft operations is a key input into the subsequent accident probability calculations.

As shown in **Table 2-1**, there have been fewer aircraft accidents at FCM in the 1997 – 2016 timeframe than there were in 1989 – 2009. However, the number of aircraft operations has declined as well, resulting in an increase in the accident rate per 100,000 aircraft operations.

**Table 2-1: FCM Historical Accident Rate Calculations**

	1989 - 2008	1997 - 2016	% Change
Total Aircraft Operations	3,711,199	2,737,022	-26%
Total Aircraft Accidents	28	23	-18%
Accident Rate Per 100,000 Aircraft Operations	0.75	0.84	11%

Source: FAA Air Traffic Activity Data System (ATADS) database; NTSB accident database

**Figure 2-4** shows the approximate locations of the FCM accidents that occurred in the vicinity of the airport between 1997 and 2016 and were considered in this analysis. **Table 2-2** provides a summary of the general location of the accidents included in both the 2009 and 2017 Safety/Risk Studies, based upon available accident records from the National Transportation Safety Board (NTSB).

**Table 2-2: FCM Historical Aircraft Accident Locations**

FCM Accident Location Area	1989 - 2008		1997 - 2016	
	Accidents	% of Total	Accidents	% of Total
Airfield/On-Airport	16	57%	14	61%
Runway Protection Zone (RPZ)	2	7%	3	13%
State Safety Zone A Beyond RPZ	1	4%	1	4%
State Safety Zone B	1	4%	1	4%
Off Airport Beyond Safety Zones A/B	8	29%	4	17%
Total	28	100%	23	100%

Source: MAC analysis of NTSB accident records using methodology from 2009 Safety/Risk Study prepared by HNTB

Additional details about aircraft accidents at FCM are provided in **Appendix 2**.

## 2.7 LOCATION AND DISTRIBUTION OF AIRCRAFT ACCIDENT DATA

The 2017 Safety/Risk Study continues to use the general aviation aircraft accident location distribution research conducted by the University of California at Berkeley for the *California Airport Land Use Planning Handbook*, which was published in 2002 and updated in 2011 ("California Study"). A link to the updated California Study report is provided below:

<http://dot.ca.gov/hq/planning/aeronaut/documents/alucp/AirportLandUsePlanningHandbook.pdf>

The California Study compiled 873 general aviation aircraft accidents that occurred between 1983 and 1992 and had land-use compatibility implications. It found that the



number and location of reported accidents varied by runway length and therefore grouped the accident locations by the following categories:

- Runway length less than 4,000 feet;
- Runway length between 4,000 feet and 5,999 feet; and
- Runway length 6,000 feet and greater.

**Table 2-3** shows the California Study data sets that were applied to each runway at FCM.

**Table 2-3: Accident Location Data Set Application**

Accident Data Set Based on Runway Length	RWY 18-36 (2,691 feet)	RWY 10L-28R (3,900 feet)	RWY 10R-28L (5,000 feet)
Less than 4,000 feet	X	X	
Between 4,000 feet and 5,999 feet			X
6,000 feet or greater			

Source: MAC analysis

These are the same accident location data sets that were applied in the 2009 Safety/Risk Study. However, the digital accident location files from the California Study are now available and were used for the 2017 study analysis. The 2009 study relied on accident locations that were digitized from hard copy prints of the California Study report as the digital files were not available at the time it was produced. The accident locations contained in the digital files (reproduced in **Appendix 3**) were superimposed on the appropriate FCM runway ends to provide a representative sample of where general aviation accidents are likely to occur in relation to a runway.

For each runway end, the number of accident locations associated with arrivals to that end, along with departures from the opposite end, were combined. For example, the Runway 18 end accident location count includes accidents locations associated with arrivals to Runway 18 and departures from Runway 36. Also, due to their close proximity, arrival and departure accident locations for parallel Runways 10L-28R and 10R-28L at FCM often overlap each other. To account for this, the accident count data were reported both individually and combined (10L with 10R, 28L with 28R) for each of the parallel runway ends.

**Figures 2-5 through 2-8** show the superimposed accident locations for each runway end at FCM. However, it is important to reiterate that these figures illustrate a compilation of national aircraft accident data over a long period of time that is superimposed on each runway end at FCM to determine a likely aircraft accident distribution profile. They do not illustrate actual accident locations at FCM.

Another factor to consider is adjusting the accident data set to reflect the likely total of accident locations for a given runway end. As noted earlier, the California Study only included accident locations that were considered to have land use compatibility

implications; it did not provide a total number of accidents. The California Study does provide, however, the following generalized distribution profile of general aviation accident locations:

- 68% of general aviation accidents take place on an airport;
- 3% of general aviation accidents are enroute accidents, occurring more than approximately five miles from an airport; and,
- The remaining 29% of general aviation accidents occur in the vicinity of an airport (within approximately five miles from an airport).

This accident location profile was used to adjust the number of accident locations in the California Study to determine a total number of accidents to use in the subsequent probability calculations. The calculations of total accident locations by runway end are shown in **Table 2-4**. The resulting percentage distribution of accident locations by analysis area are shown in **Table 2-5**.

Table 2-4: Calculation of Total Accidents by Runway End for Analysis

Accident Locations	FCM Runway End						18	36	All Ends
	10R	28L	10L	28R	10L+10R	28L+28R			
<b>Airport Vicinity Accidents</b>	<b>185</b>	<b>191</b>	<b>166</b>	<b>202</b>	<b>369</b>	<b>468</b>	<b>198</b>	<b>219</b>	<b>1,266</b>
RPZ	65	35	70	70	158	117	69	70	422
SSZ A Beyond RPZ	8	37	44	44	47	152	36	35	278
SSZ B	12	11	4	4	19	17	8	9	59
Other Off Airport	100	108	48	84	145	182	85	105	507
<b>Total Accidents (Vicinity Accidents / 29%)</b>	<b>638</b>	<b>659</b>	<b>572</b>	<b>697</b>	<b>1,272</b>	<b>1,614</b>	<b>683</b>	<b>755</b>	<b>4,366</b>
Enroute Accidents (3% of Total Accidents)	19	20	17	21	38	48	20	23	131
<b>On-Airport Accidents (68% of Total Accidents)</b>	<b>434</b>	<b>448</b>	<b>389</b>	<b>474</b>	<b>865</b>	<b>1,097</b>	<b>464</b>	<b>514</b>	<b>2,969</b>
RPZ Accidents	65	35	70	70	158	117	69	70	422
On-Airport + RPZ	499	483	459	544	1,023	1,214	533	584	3,391
SSZ A Beyond RPZ	8	37	44	44	47	152	36	35	278
SSZ B	12	11	4	4	19	17	8	9	59
Other Off Airport	100	108	48	84	145	182	85	105	507
<b>Total Accidents for Analysis</b>	<b>619</b>	<b>639</b>	<b>555</b>	<b>676</b>	<b>1,234</b>	<b>1,565</b>	<b>662</b>	<b>733</b>	<b>4,235</b>

## Notes:

1. RPZ, SSZ A Beyond RPZ, SSZ B, and Other Off Airport accident locations are counted from the California Study data superimposed on each FCM runway end. The remaining accident location counts are calculated values.

Source: California Land Use Compatibility Handbook; MAC analysis using methodology from 2009 Safety/Risk Study prepared by HNTB

**Table 2-5: Accident Location Distribution by Runway End**

Accident Location Analysis Areas	FCM Runway End Accident Location Distribution								All Ends
	10R	28L	10L	28R	10L+10R	28L+28R	18	36	
On-Airport + RPZ	81%	76%	83%	80%	83%	78%	81%	80%	80%
SSZ A Beyond RPZ	1%	6%	8%	7%	4%	10%	5%	5%	7%
SSZ B	2%	2%	1%	1%	2%	1%	1%	1%	1%
Other Off Airport	16%	17%	9%	12%	12%	12%	13%	14%	12%
<b>Total Accidents for Analysis</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Notes:

1. RPZ, SSZ A Beyond RPZ, SSZ B, and Other Off Airport accident locations are counted from the California Study data superimposed on each FCM runway end. The remaining accident location counts are calculated values.

Source: California Land Use Compatibility Handbook; MAC analysis using methodology from 2009 Safety/Risk Study prepared by HNTB

## 2.8 OPERATIONS FORECAST

The accident probability calculations require an operations forecast for the number of aircraft takeoffs and landings in the analysis year, which in this case is 2040.

The latest aviation activity forecast prepared for FCM was completed in 2015 and used 2035 as its planning horizon year. This forecast projected an activity level of 93,255 aircraft operations at FCM in 2035. A summary of this forecast is provided in **Appendix 4**.

To extend the 2035 forecast to 2040, the average annual growth rate for aircraft operations from the 2030 to 2035 period was applied to the 2035 to 2040 period. As illustrated in **Table 2-6**, this extrapolation results in a 2040 operations forecast of 101,042.

**Table 2-6: FCM 2040 Aircraft Operations Forecast**

Year	Forecast Aircraft Operations
2015	83,889
2020	81,516
2025	83,623
2030	86,068
2035	93,255
2040	101,042
2030 - 2035 Annual Growth Rate	1.62%
2035 - 2040 Annual Growth Rate	1.62%

Source: HNTB Minneapolis-St. Paul Reliever Airports Activity Forecasts Technical Report, October 2015; MAC extrapolation

The next step is to distribute the total number of aircraft operations to each individual runway end. **Table 2-7** illustrates actual runway use percentages at FCM in 2016, which will be carried forward into the 2040 analysis year.

**Table 2-7: FCM 2016 Runway Use Distribution**

FCM Runway	2016 Arrival %	2016 Departure %
10R	20%	15%
28L	23%	19%
10L	17%	15%
28R	26%	32%
18	10%	14%
36	4%	5%

Source: MACNOMS data analysis

The forecasted number of aircraft operations for the analysis year 2040 is presented in Table 2-8.

**Table 2-8: FCM 2040 Aircraft Operations by Runway End**

FCM Runway	2040 Arrivals	% Total Arrivals	2040 Departures	% Total Departures	Total Operations at Runway End
10R	10,024	20%	7,457	15%	19,731
28L	11,919	23%	9,707	19%	19,376
10L	8,643	17%	7,509	15%	24,438
28R	13,309	26%	15,795	32%	20,818
18	5,134	10%	7,068	14%	7,517
36	2,094	4%	2,384	5%	9,162
Total	51,122	100%	49,920	100%	101,042
10L+10R	18,666	37%	14,966	30%	44,169
28L+28R	25,228	49%	25,502	51%	40,194

Notes:

Operations at a runway end are the sum of arrivals at that end plus departures from the opposite end

Source: MAC analysis using methodology from 2009 Safety/Risk Study prepared by HNTB

## 2.9 CALCULATION OF ACCIDENT PROBABILITIES

The probability of an aircraft accident occurring in an accident analysis area in 2040 is calculated in the following manner:

- Multiply the FCM historical accident rate per 100,000 aircraft operations (0.84 per **Table 2-1**) by the number of forecasted aircraft operations by runway end for 2040 (per **Table 2-7**);
- Multiply the result by the percent of accidents location in the nationwide data set distributed to the applicable analysis areas (per **Table 2-5**). This represents the probability of an aircraft accident within the analysis area based on forecasted 2040 operational levels;
- Calculate the number of years between aircraft accidents based on the probability factor (1/probability); and
- Convert accident probabilities to a “per 10,000,000” factor to compare against the targeted risk standard of one per 10,000,000. This is accomplished by multiplying the accident probability by 10,000,000 and then dividing by the number of forecasted aircraft operations for the applicable runway end.
- A summary of the calculations is shown in **Table 2-9**. More detailed calculation tables are included in **Appendix 5**.

The results indicate that – consistent with the 2009 Safety/Risk Study – the risk probability exceeds the targeted standard in several analysis areas. However, it is important to recognize that the analysis so far assumes that the entire analysis area is covered by above-ground objects or structures that promote congregations of people. Of course, this is not the case as large parcel of airport-owned property off each runway end are vacant and will remain so. A primary purpose for implementing safety and land use zoning is to protect the lives and property of users of the airport and of occupants of land in its vicinity. This leads to the last step of the probability calculation process, which is calculating the probability of aircraft accidents in occupant areas where existing and/or future congregations of people are likely to occur in the vicinity of FCM.

Based on the existing and future occupant areas shown in **Figure 2-3**, the risk probabilities were re-calculated using the number of aircraft accident locations within each of the occupant areas per analysis area, instead of the analysis area as a whole. A summary of the calculations are shown in **Table 2-10**. More detailed calculation tables are included in **Appendix 5**.

These results are also consistent with the 2009 Safety/Risk Study in that the risk probability does not exceed the targeted risk standard of one accident per 10,000,000 operations in the occupant areas.

**Table 2-9: FCM Accident Probability per Analysis Area Summary**

FCM Runway	On-Airfield + RPZ		State Safety Zone A Beyond RPZ		State Safety Zone B		Off Airport Beyond Safety Zones		Total	
	Years Between	Per 10m	Years Between	Per 10m	Years Between	Per 10m	Years Between	Per 10m	Years Between	Per 10m
10R	7	67.7	467	1.1	311	1.6	37	13.6	6	84.0
28L	8	63.5	106	4.9	357	1.4	36	14.2	6	84.0
10L	6	69.5	61	6.7	676	0.6	56	7.3	5	84.0
28R	7	67.6	88	5.5	966	0.5	46	10.4	6	84.0
18	20	67.7	291	4.6	1,311	1.0	123	10.8	16	84.0
36	16	66.9	272	4.0	1,057	1.0	91	12.0	13	84.0
All	1	67.3	18	5.5	85	1.2	10	10.1	1	84.0
10L+10R	3	69.7	71	3.2	175	1.3	23	9.9	3	84.0
28L+28R	4	65.2	30	8.2	273	0.9	25	9.8	3	84.0

Notes:

Targeted risk standard is 1 accident per 10,000,000 aircraft operations.

Values in red text exceed the targeted risk standard.

Values in green text are at or below the targeted risk standard

Source: MAC analysis using methodology from 2009 Safety/Risk Study prepared by HNTB



**Table 2-10: FCM Accident Probability per Occupant Area Summary**

FCM Runway	Occupant Areas								
	State Safety Zone A Beyond RPZ			State Safety Zone B			Combined		
	Accident Locations	Years Between	Per 10m	Accident Locations	Years Between	Per 10m	Accident Locations	Years Between	Per 10m
10R	2	1,866	0.3	4	933	0.5	6	622	0.8
28L	2	1,962	0.3	5	785	0.7	7	561	0.9
10L	0	---	0.0	1	2,704	0.2	1	2,704	0.2
28R	1	3,862	0.1	2	1,931	0.2	3	1,287	0.4
18	0	---	0.0	0	---	0.0	0	---	0.0
36	0	---	0.0	0	---	0.0	0	---	0.0
All	7	712	0.1	20	249	0.4	27	185	0.5
10L+10R	2	1,663	0.1	8	416	0.5	10	333	0.7
28L+28R	5	927	0.3	9	515	0.5	14	331	0.8

Notes:

Targeted risk standard is 1 accident per 10,000,000 aircraft operations.

Values in red text exceed the targeted risk standard.

Values in green text are at or below the targeted risk standard

Source: MAC analysis using methodology from 2009 Safety/Risk Study prepared by HNTB

## 2.10 FINDINGS

The 2017 Safety/Risk Study confirms that the conclusions of the 2009 Study remain valid in terms of the risk of an aircraft accident in the vicinity of FCM. Specifically, the risk probability of an aircraft accident in an existing or future occupant area is below the targeted risk standard of one accident per 10,000,000 flight operations. This suggests that a strict application of the land use controls prescribed in the MnDOT Model Zoning Ordinance exceeds what is necessary to provide a reasonable level of safety at FCM.

However, the findings also continue to support the 2009 JAZB recommendation that distinct open spaces (20-acre minimum) in proximity to the extended runway centerline beyond the RPZ and adjacent to occupant areas should be preserved. This open space gives the pilot of a disabled aircraft an area to clearly locate and contain the extent of a crash site. Assuming a crash site area of approximately 5,000 square feet<sup>2</sup>, it would impact approximately 0.6% of a 20-acre open space (871,200 square feet).

This study confirms that the following elements of the Draft FCM Zoning Ordinance are appropriate from a safety/risk perspective:

- JAZB Safety Zone A is co-terminus with the FAA Runway Protection Zone (RPZ); and
- JAZB Safety Zone B is comprised of the portion of Model State Safety Zone A beyond the RPZ plus Model State Safety Zone B. Safety Zone B does not include site acre/structure limitations, site area to building plot area ratios, or population criteria for designated occupant areas. Occupant Areas guided for residential use will allow for the improvement, expansion, and development of new residential uses that will be treated as conforming uses in the zoning ordinance (Permitted Residential Areas, see **Section 4.5**).
- To provide for an extra margin of safety, JAZB Zone B will contain a provision that a minimum of 20 percent of the total Zone B acreage or 20 acres, whichever is greater, will be preserved as contiguous open space. This open space requirement applies to the totality of the proposed JAZB Safety Zone B area, and not to each parcel within the zone. The JAZB Safety Zone B open space requirement is easily met by existing airport-owned land, along with off-airport property guided to remain as open space or otherwise not expected to be regularly occupied. The amount of contiguous open space within JAZB Zone B as proposed in the updated Draft FCM Zoning Ordinance is shown in **Table 2-11**.

The proposed JAZB Safety Zones A and B are shown in **Figure 2-9**.

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<sup>2</sup> Assumes a 100-foot long by 50-foot wide accident swath (distance between where an accident aircraft first touched the ground or an object on the ground and where it subsequently came to a rest).

**Table 2-11: Contiguous Open Space Acreages in JAZB Safety Zone B**

FCM Runway	Acres		
	JAZB Zone B Total	20% Minimum or 20 ac.	Proposed Contiguous Open Space
10L+10R	163.0	32.6	76.1
28L+28R	197.7	39.5	126.8
18	47.8	20.0	47.8
36	47.8	20.0	47.5
<b>Total</b>	<b>456.3</b>	<b>91.3</b>	<b>298.2</b>

Source: MAC analysis

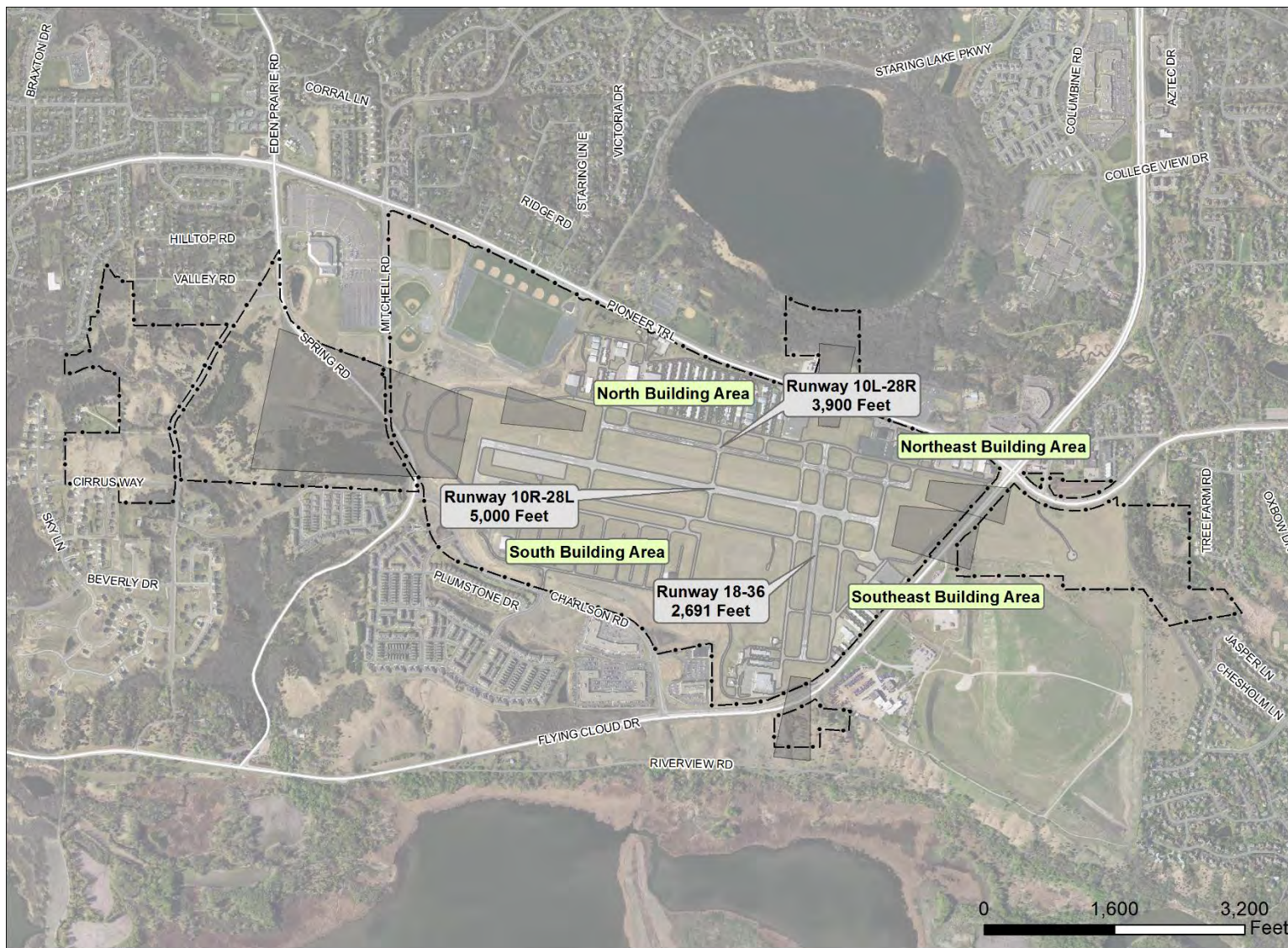
The dimensions of the proposed JAZB Safety Zones are shown in **Table 2-12**.

**Table 2-12: JAZB Safety Zone Dimensions**

JAZB Zone	JAZB Safety Zone Dimensions by Runway End (feet)					
	10R	28L	10L	28R	18	36
Zone A Inner Width	1,000	500	250	250	250	250
Zone A Outer Width	1,750	700	450	450	450	450
Zone A Length	2,500	1,000	1,000	1,000	1,000	1,000
Zone B Inner Width	1,750	1,000	450	450	450	450
Zone B Outer Width	2,500	2,500	1,670	1,670	1,307	1,307
Zone B Length	2,500	4,000	2,900	2,900	1,691	1,691

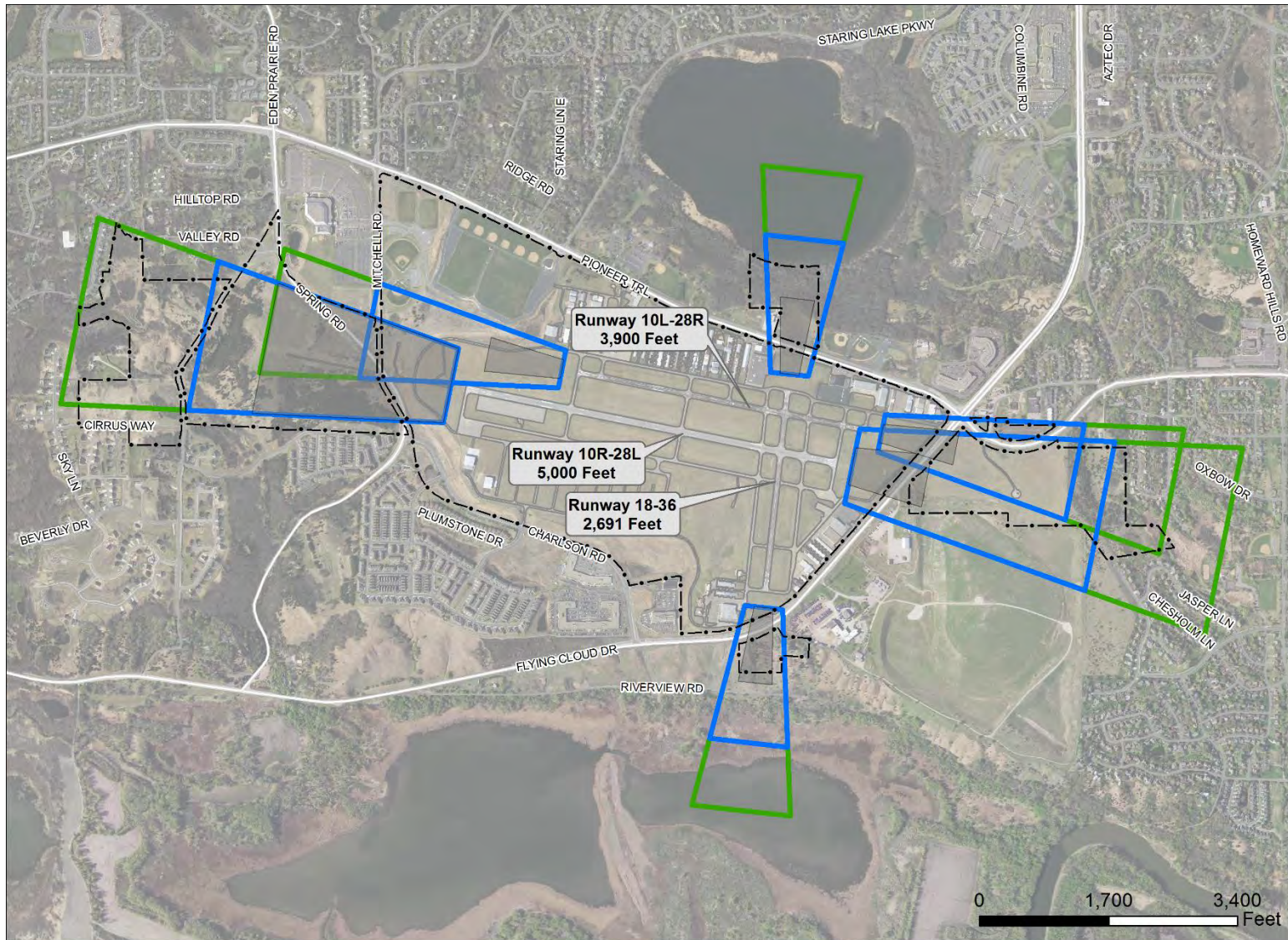
Source: MAC analysis

Figure 2-1: FCM Airfield Configuration



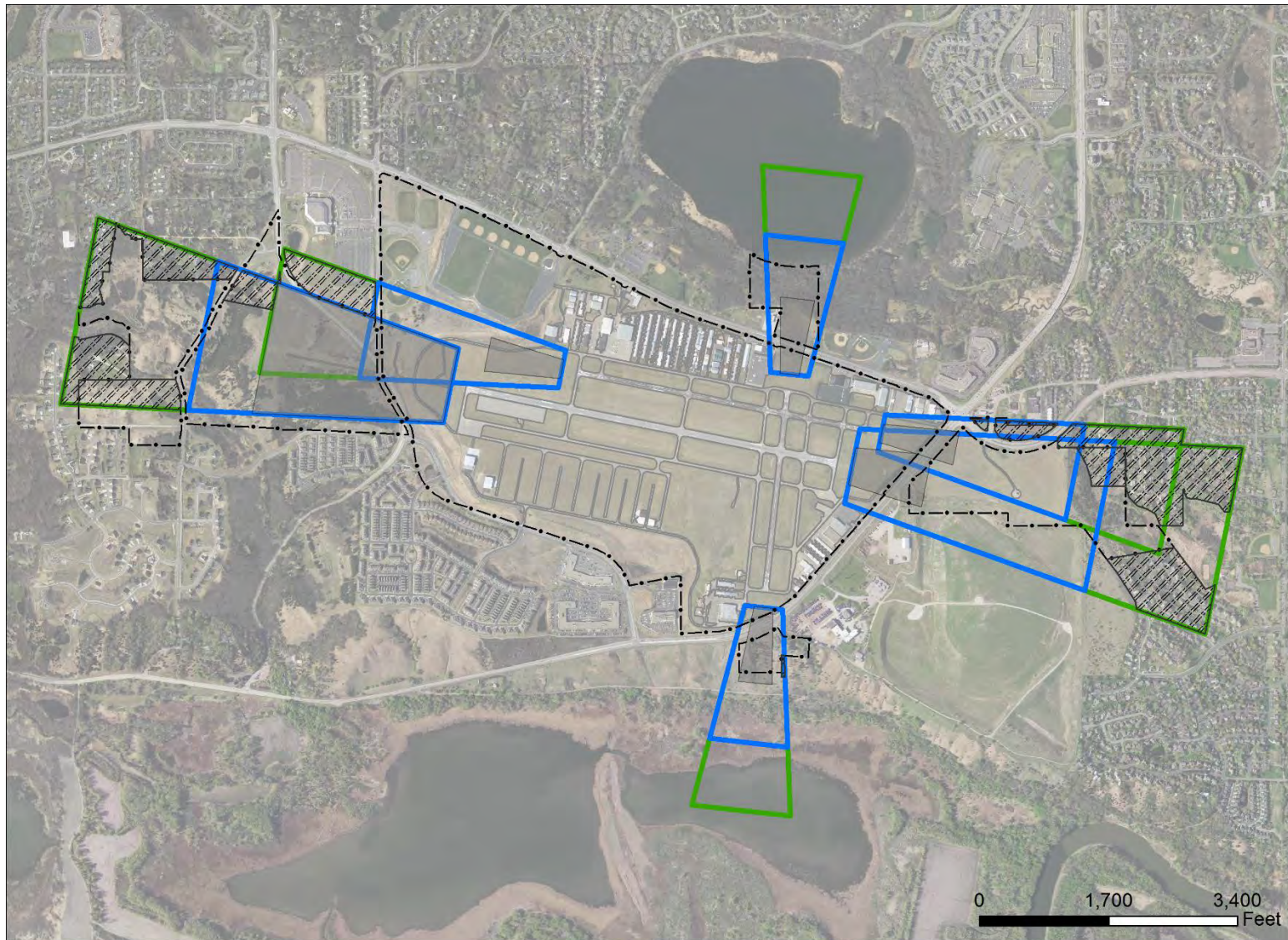
--- FCM Property Line    Runway Protection Zones (RPZ)

Figure 2-2: FCM 2017 Safety/Risk Study Analysis Areas



FCM Property Line    Runway Protection Zones (RPZ)    Model Zone A    Model Zone B

Figure 2-3: FCM 2017 Safety/Risk Study Occupant Areas



FCM Property Line    Runway Protection Zones (RPZ)    Model Zone A    Model Zone B    Occupant Area

Figure 2-4: FCM Historical Aircraft Accident Locations (1997 – 2016)



Figure 2-5: Historic Nationwide GA Accident Locations Superimposed on FCM Runway 10L and 10R Ends

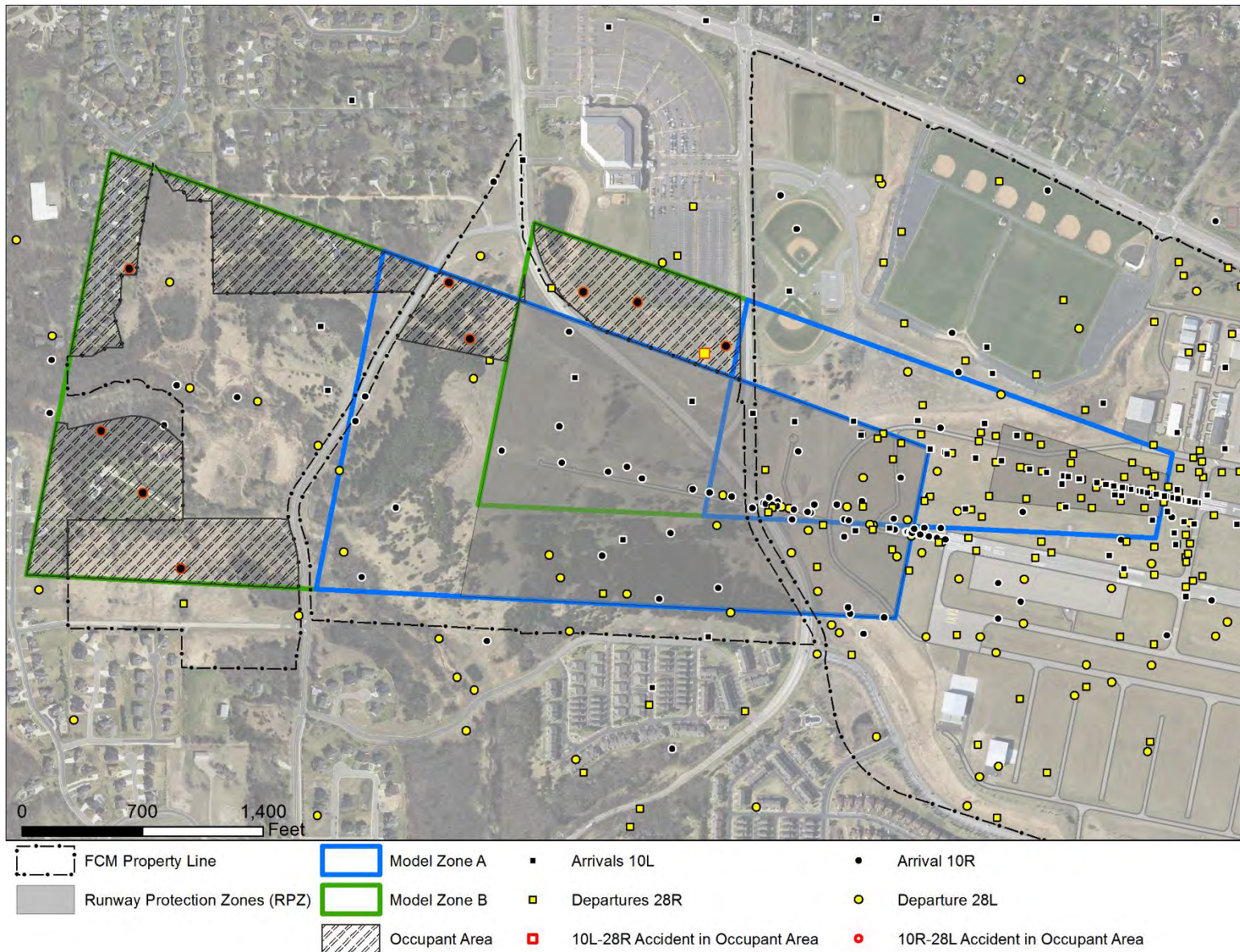




Figure 2-6: Historic Nationwide GA Accident Locations Superimposed on FCM Runway 28L and 28R Ends

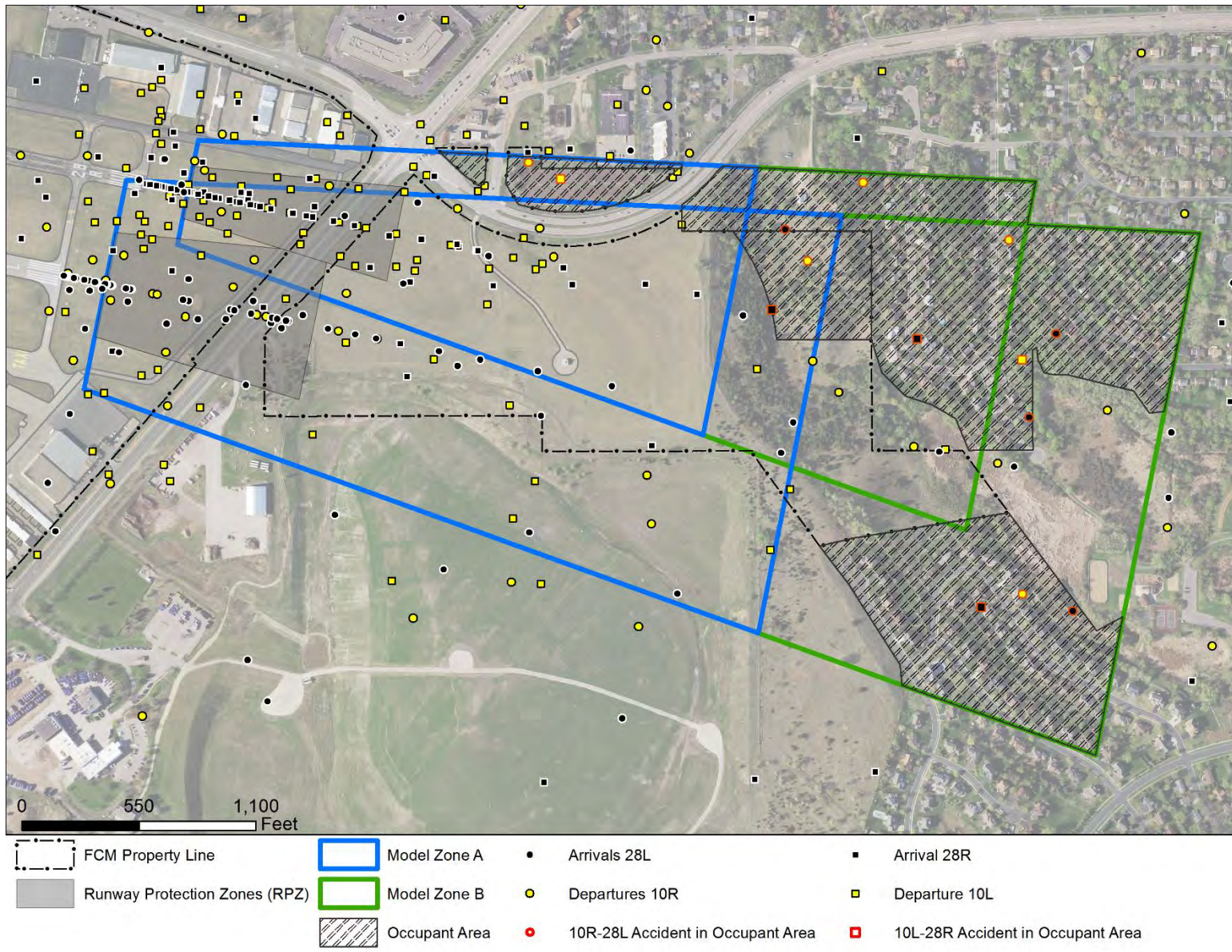


Figure 2-7: Historic Nationwide GA Accident Locations Superimposed on FCM Runway 18 End

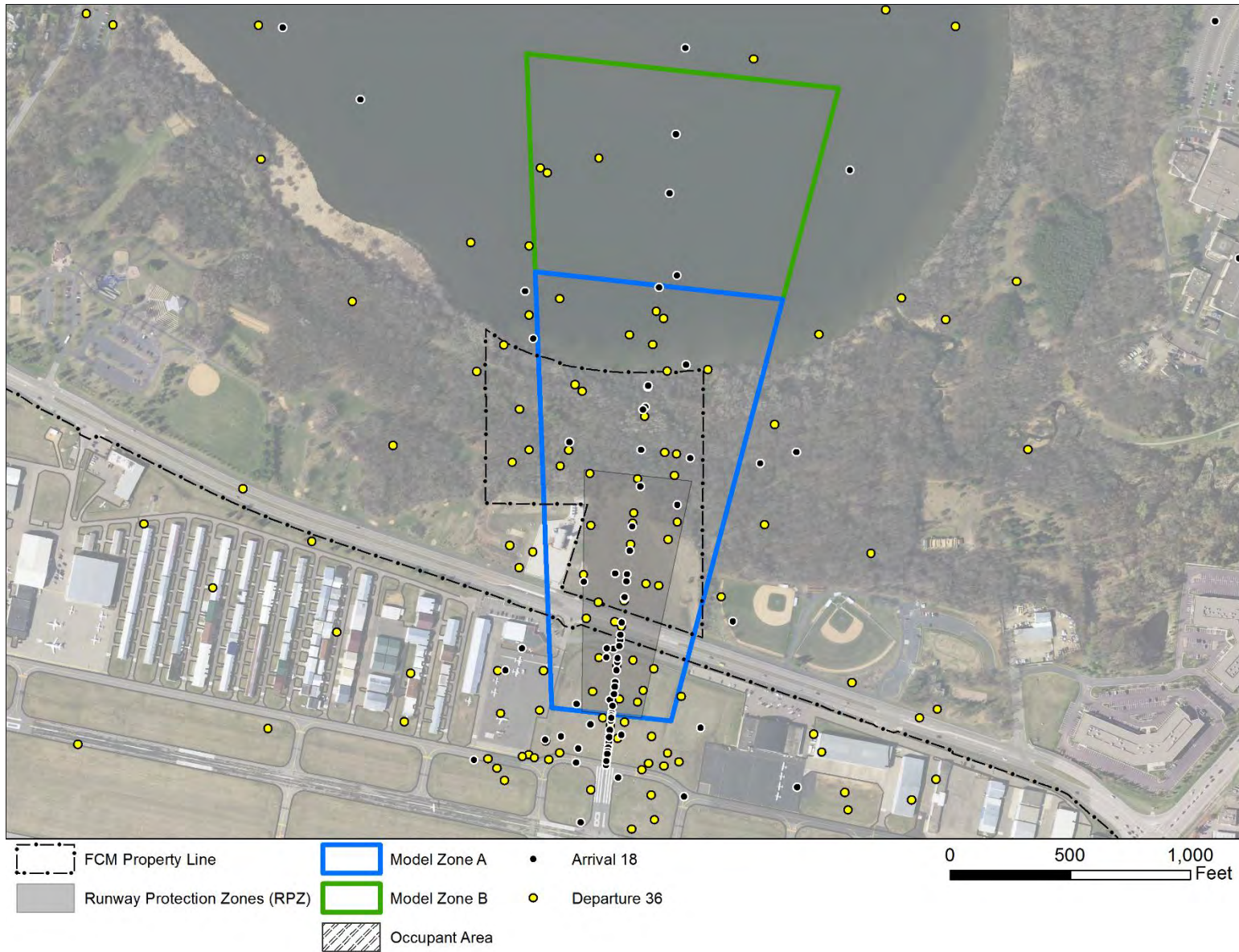


Figure 2-8: Historic Nationwide GA Accident Locations Superimposed on FCM Runway 36 End

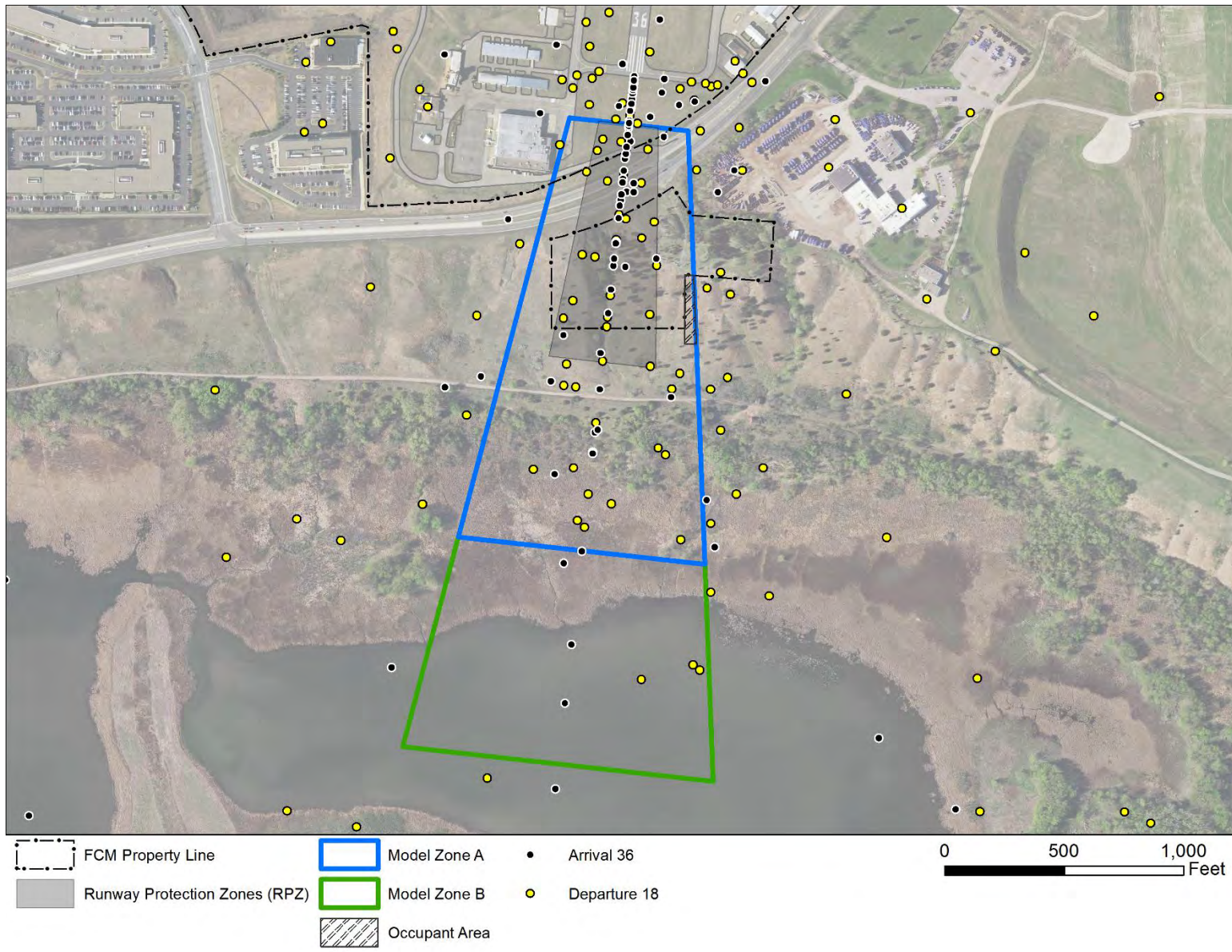
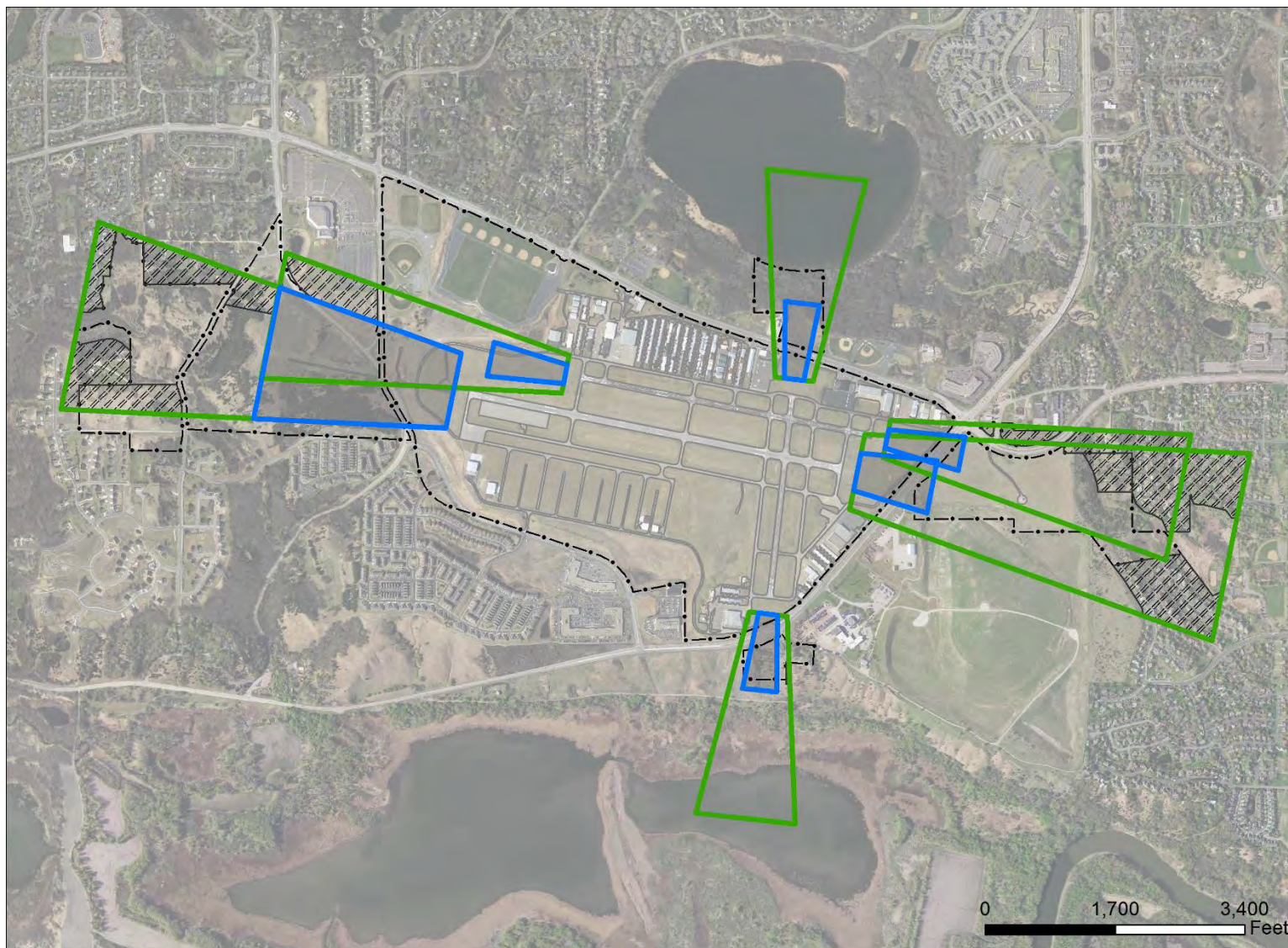


Figure 2-9: Proposed JAZB Safety Zones



FCM Property Line    Runway Protection Zones (RPZ)    JAZB Zone A    JAZB Zone B    Occupant Area

**SECTION 3:**

**ECONOMIC IMPACT ANALYSIS UPDATE**

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### 3. ECONOMIC IMPACT ANALYSIS

#### 3.1 INTRODUCTION

In determining what minimum airport zoning regulations to adopt, Minnesota State Statutes guide the local airport zoning authority (JAZB) to consider the social and economic costs of restricting land uses versus the benefits derived from a strict application of the standards of the commissioner (the State's Model Zoning Ordinance).

In 2010, the City of Eden Prairie's planning and economic development team identified the impacts related to lost private property development potential, property taxes, and employment that would be associated with a strict application of the State Model Zoning Ordinance. The study concluded that strict implementation of the State Model Zoning Ordinance would result in an estimated loss of \$150,000,000 in commercial development, \$12,000,000 in residential development, and \$600,000 in annual property taxes.

This chapter summarizes updates that have been made to the City's Economic Impact Analysis completed in 2010 to bring the analysis up-to-date. The updated study will be referred to as the 2017 Economic Impact Analysis.

#### 3.2 STUDY METHODOLOGY

The 2017 Economic Impact Analysis evaluated the economic development potential of two development scenarios for comparison:

- Value of development under the MnDOT State Model Zoning Ordinance land use criteria within State Safety Zones A and B (State Model Safety Zone scenario); and
- Value of development under the proposed JAZB Airport Zoning Ordinance (JAZB Safety Zone scenario).

The study evaluates the following economic impact categories:

- Value of building development, both residential and commercial
- Value of city real estate taxes, both residential and commercial
- Number of potential jobs associated with proposed development

Each parcel within the JAZB Safety Zones was assigned a probable land use so that its economic development potential could be assessed. The only exception is a parcel of MAC-owned property on the west side of FCM that is labeled with an "undefined" land use as its ultimate disposition is unclear at this time. This parcel was identified as a Permitted Residential Area in the draft Zoning Ordinance, so it was included in the Safety/Risk Study as an Occupant Area. From an economic impact perspective, this parcel will be evaluated in two separate cases – one for a Residential development scenario, and another as a Commercial/Office development scenario.

Acreages of assigned land uses off each runway end are presented in **Table 3-1**. The assigned land uses are shown in **Figure 3-1** for the State Model Safety Zone scenario and **Figure 3-2** for the proposed JAZB Safety Zone scenario.

The analysis does not consider the financial impact of property takings claims in the State Model Safety Zone scenario, which could be significant.

**Table 3-1: Land Use Acreages by Runway End Within Safety Zones**

Land Use	FCM Runway End				Total	% of Total
	10L/ 10R	28L/ 28R	18	36		
Airport Commercial	---	3.5	---	---	3.5	1%
Airport Office	5.3	6.1	---	---	11.4	3%
Airport Undeveloped	92.5	67.4	9.3	3.1	172.3	44%
Church	12.2	---	---	---	12.2	3%
Commercial	---	0.3	---	---	0.3	0%
Former Landfill	---	23.3	---	---	23.3	6%
Industrial	---	0.3	---	0.3	0.6	0%
Park / Open Space	8.1	30.6	5.7	25.6	70.0	18%
Residential	29.4	58.4	---	---	87.8	22%
Undefined	11.1	---	---	---	11.1	3%
<b>Total</b>	<b>158.6</b>	<b>189.9</b>	<b>14.9</b>	<b>29.0</b>	<b>392.5</b>	<b>100%</b>

Source: MAC analysis

### 3.3 FINDINGS

#### 3.3.1 Residential Development

Of the residential development acreage presented in **Table 3-1**, only 6.9 acres are currently undeveloped. Of this, 2.7 acres are in Model State Safety Zone A, and thus undevelopable for residential uses in the State Model Safety Zone scenario, with the remaining 4.2 acres in Model State Safety Zone B. The entire 6.9 acres are within JAZB Safety Zone B.

The study evaluated residential development potential in two separate cases for both the State Model Safety Zone and JAZB Safety Zone scenarios:

- Case 1 assumes that the MAC-owned parcel with an undefined land use would be developed as Residential. Thus, total residential land use acreage would increase to 18.0 acres.
- Case 2 assumes that the MAC-owned parcel with an undefined land use would be developed as Commercial/Office. Thus, total residential land use acreage would remain at 6.9 acres.



The following assumptions were applied in the analysis:

- Residential Units per Acre:
  - 2.5 for the JAZB Safety Zone Scenario based on Eden Prairie development criteria
  - 0.3 for the State Model Safety Zone Scenario based on Zone B density restrictions in MnDOT zoning guidance. This constrains development to no more than one unit per a minimum three-acre lot.
- Value per Residential Unit: average of \$378,000
- Annual Real Estate Tax Per Unit: average of \$1,255

As shown in **Table 3-2**, the impact of strictly implementing the State Model Safety Zone Scenario on residential development is estimated to be:

- Reduction in total residential development value of approximately \$6,000,000 (Case 1) to \$15,000,000 (Case 2)
- Reduction in annual real estate taxes of approximately \$20,000 (Case 1) to \$50,000 (Case 2)

**Table 3-2: Residential Development Economic Impact Results**

<b>Residential Development Scenario</b>	<b>Acres</b>	<b>Units/Acre</b>	<b>Units</b>	<b>Value /Unit</b>	<b>Total Development Value</b>	<b>Real Estate Tax/Unit</b>	<b>Annual Real Estate Tax Value</b>
<b><u>JAZB Scenario</u></b>							
Case 1	18.0	2.5	44.8	\$378,000	\$16,935,040	\$1,255	\$56,226
Case 2	6.9	2.5	17.2	\$378,000	\$6,483,592	\$1,255	\$21,526
<b><u>State Model Scenario</u></b>							
Case 1	15.3	0.3	5.1	\$378,000	\$1,927,473	\$1,255	\$6,399
Case 2	4.2	0.3	1.4	\$378,000	\$527,584	\$1,255	\$1,752
<b><u>Differential</u></b>							
Case 1	2.7	2.2	39.7	0.0	\$15,007,567	0.0	\$49,827
Case 2	2.7	2.2	15.8	0.0	\$5,956,008	0.0	\$19,775

Notes:

Case 1 assumes residential development on the undefined MAC-owned parcel

Case 2 assumes office development on the undefined MAC-owned parcel

JAZB scenario units per acre, value per unit, and real estate tax per unit values assigned by City of Eden Prairie

State Model scenario units per acre assigned consistent with MnDOT zoning guidance

Source: Eden Prairie analysis

### 3.3.2 Commercial Development

For the purpose of this analysis, commercial development is inclusive of commercial, office, and industrial land uses.

The following assumptions were applied in the analysis:

- Building Square Footage
  - Based on floor-to-area ratios developed by Eden Prairie for the JAZB Safety Zone scenario. For each case, a low and high range were developed. The low range represents a typical floor-to-area ratio for a single story building, while the high range represents a typical floor-to-area ratio for a multi-story building. For summary purposes, the mid-point of the low and high ranges will be reported in this section. The results of the individual low and high range calculations are reported separately in **Appendix 6**.
  - Based on Zone B density restrictions in MnDOT zoning guidance for the State Model Safety Zone scenario. This constrains development to a square footage that would support a site population of no more than 15 times the site acreage.
- Value per Square Foot (SF)
  - \$180 per SF for Airport Commercial uses (on airport leased land)
  - \$150 per SF for Airport Office uses (on airport leased land)
  - \$200 per SF for Commercial uses (not on airport leased land)
  - \$80 per SF for Industrial uses (not on airport leased land)
- Annual Real Estate Tax Value: calculated and provided by Eden Prairie

As shown in **Table 3-3**, the impact of strictly implementing the State Model Safety Zone Scenario on commercial development is estimated to be:

- Reduction in total commercial development value of approximately \$38,000,000 (Case 1) to \$58,000,000 (Case 2)
- Reduction in annual real estate taxes of approximately \$89,000 (Case 1) to \$237,000 (Case 2)

**Table 3-3: Commercial Development Economic Impact Results**

<b>Commercial Development Scenario</b>	<b>Acres</b>	<b>Building SF</b>	<b>Value/SF</b>	<b>Total Commercial Value</b>	<b>Annual Real Estate Tax Value</b>
<b><u>JAZB Scenario Case 1</u></b>					
Range Midpoint	15.8	258,942	\$153	\$39,747,510	\$97,722
<b><u>State Model Scenario Case 1</u></b>					
Range Midpoint	2.4	13,322	\$150	\$1,998,285	\$8,233
<b><u>Differential Case 1</u></b>					
Range Midpoint	13.4	245,620	\$3	\$37,749,225	\$89,489
<b><u>JAZB Scenario Case 2</u></b>					
Range Midpoint	26.9	452,348	\$152	\$68,758,485	\$282,700
<b><u>State Model Scenario Case 2</u></b>					
Range Midpoint	13.5	73,707	\$150	\$11,056,084	\$45,551
<b><u>Differential Case 2</u></b>					
Range Midpoint	13.4	378,641	\$2	\$57,702,401	\$237,149

Notes:

Includes office, commercial, and industrial development

Case 1 assumes residential development on the MAC-owned undefined parcel

Case 2 assumes office development on MAC-owned undefined parcel

Building SF based on the mid-point of low and high floor-to-area ratios assigned by City of Eden Prairie for JAZB Scenario and MnDOT density restrictions for State Scenario

Value per SF of development ranged from \$80/SF to \$200/SF

Annual real estate tax value assigned by City of Eden Prairie

Source: Eden Prairie analysis

### 3.3.3 Combined Development

**Table 3-4** illustrates the impact that strictly implementing the State Model Safety Zone scenario could have on combined residential and commercial development potential in the vicinity of FCM.

- Reduction in total development value of approximately \$53,000,000 (Case 1) to \$64,000,000 (Case 2)
- Reduction in annual real estate taxes of approximately \$139,000 (Case 1) to \$257,000 (Case 2)

While the development value is a one-time economic impact, the loss of tax revenue is an ongoing occurrence. To estimate the long-term impact of strictly implementing the State Model Safety Zone scenario, the aggregated value of 20 years of real estate taxes was combined with the total development value to arrive at the following impact:

- Reduction in long-term economic impact value of approximately \$56,000,000 (Case 1) to \$69,000,000 (Case 2)

**Table 3-4: Combined Residential and Commercial Economic Impact Results**

Combined Development Scenario	Total Development Value	Total Annual Real Estate Tax Value	20-Year Value
<b><u>JAZB Scenario Case 1</u></b>			
Range Midpoint	\$56,682,550	\$153,948	\$59,761,503
<b><u>State Model Scenario Case 1</u></b>			
Range Midpoint	\$3,925,758	\$14,632	\$4,218,405
<b><u>Differential Case 1</u></b>			
Range Midpoint	\$52,756,792	\$139,315	\$55,543,098
<b><u>JAZB Scenario Case 2</u></b>			
Range Midpoint	\$75,242,077	\$304,226	\$81,326,601
<b><u>State Model Scenario Case 2</u></b>			
Range Midpoint	\$11,583,668	\$47,303	\$12,529,722
<b><u>Differential Case 2</u></b>			
Range Midpoint	\$63,658,409	\$256,924	\$68,796,879

Notes:

Scenario 1 assumes residential development on the MAC-owned undefined parcel

Scenario 2 assumes office development on the MAC-owned undefined parcel

20-year value sums one-time development value plus recurring annual real estate tax value

Source: Eden Prairie analysis

### 3.3.4 Potential Employment Generation Impacts

Another economic impact factor to consider is the regional employment potential that could be generated on commercial land uses within the Safety Zones at FCM. **Table 3-5** illustrates the impact that strictly implementing the State Model Safety Zone scenario could have on new employment generation potential.

- Reduction in employment generation potential of approximately 600 (Case 1) to 1,000 (Case 2) new jobs

**Table 3-5: Impacts to Employment Potential**

Development Scenario	Employment Potential
<b><u>JAZB Scenario Case 1</u></b>	
Range Midpoint	641
<b><u>State Model Scenario Case 1</u></b>	
Range Midpoint	37
<b><u>Differential Case 1</u></b>	
<i>Range Midpoint</i>	604
<b><u>JAZB Scenario Case 2</u></b>	
Range Midpoint	1,173
<b><u>State Model Scenario Case 2</u></b>	
Range Midpoint	203
<b><u>Differential Case 2</u></b>	
<i>Range Midpoint</i>	970

Notes:

Scenario 1 assumes residential development on the MAC-owned undefined parcel

Scenario 2 assumes office development on the MAC-owned undefined parcel

Employment potential for JAZB Scenario estimated by Eden Prairie

Employment potential for State Model Scenario based on MnDOT site density restrictions

Source: Eden Prairie analysis

### 3.3.5 Summary

The 2017 Economic Impact Analysis concludes that strict implementation of the State Model Zoning Ordinance would result in an estimated loss of approximately \$38,000,000 to \$58,000,000 in commercial development, approximately \$6,000,000 to \$15,000,000 in residential development, and approximately \$139,000 to \$257,000 in annual property taxes. While these values are somewhat more conservative than those reported in the 2010 study, they still indicate that a strict implementation of the State Model Zoning

Ordinance would have a significant adverse long-term economic impact on the surrounding community in the magnitude of \$56,000,000 to \$69,000,000 over a 20-year period, not including the loss of employment generating potential. It is also noteworthy to consider that the Safety/Risk Study concluded that the statistical likelihood of an aircraft accident occurring in a designated Occupant Area in the vicinity of FCM is once every 185 years (see **Table 2-10**).

A graphic summarizing the results of the 2017 Economic Impact Analysis for both cases is provided in **Figure 3-3**.

Figure 3-1: FCM Safety Zone Land Uses for Economic Impact Analysis – Model State Safety Zones

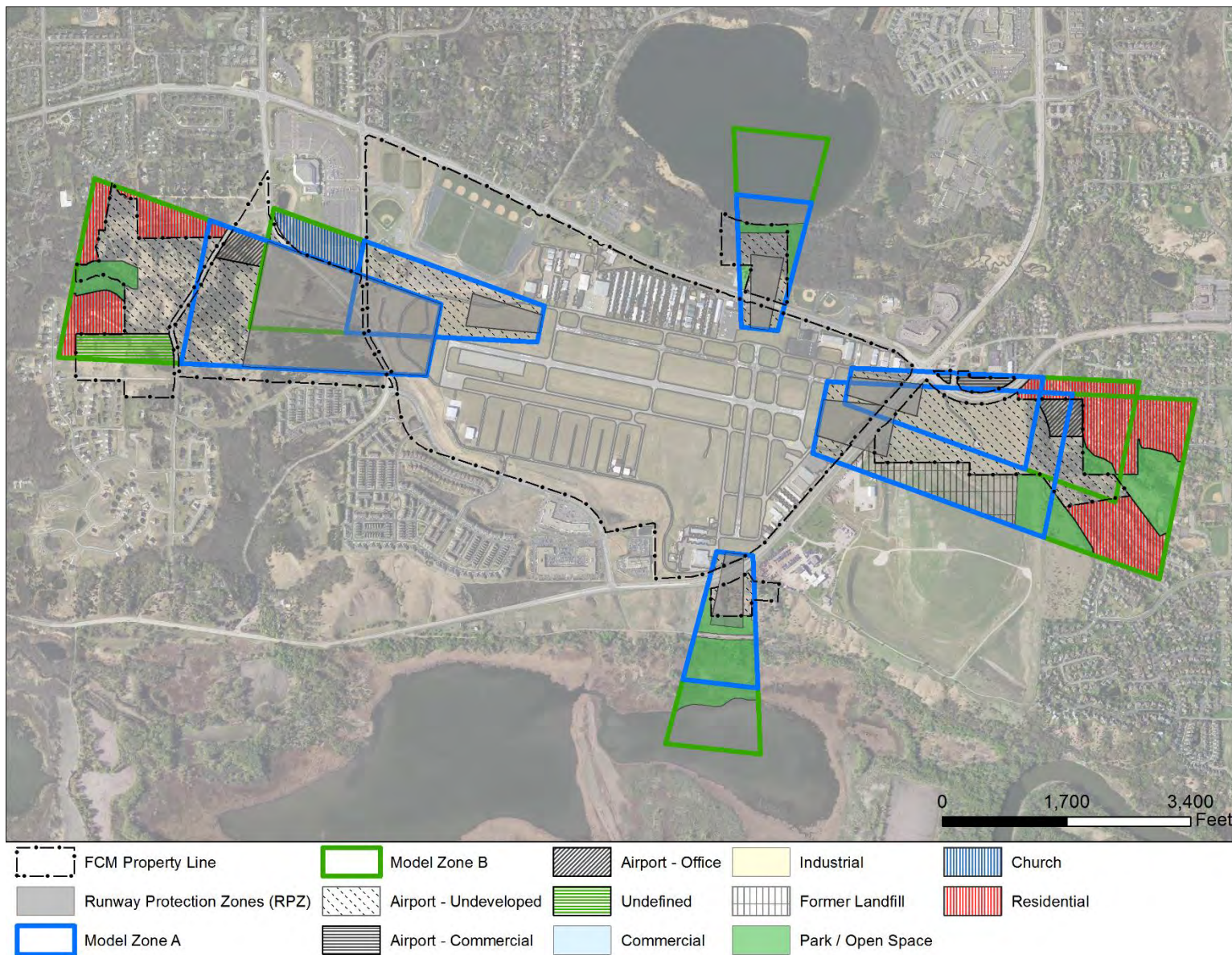




Figure 3-2: FCM Safety Zone Land Uses for Economic Impact Analysis – JAZB Safety Zones

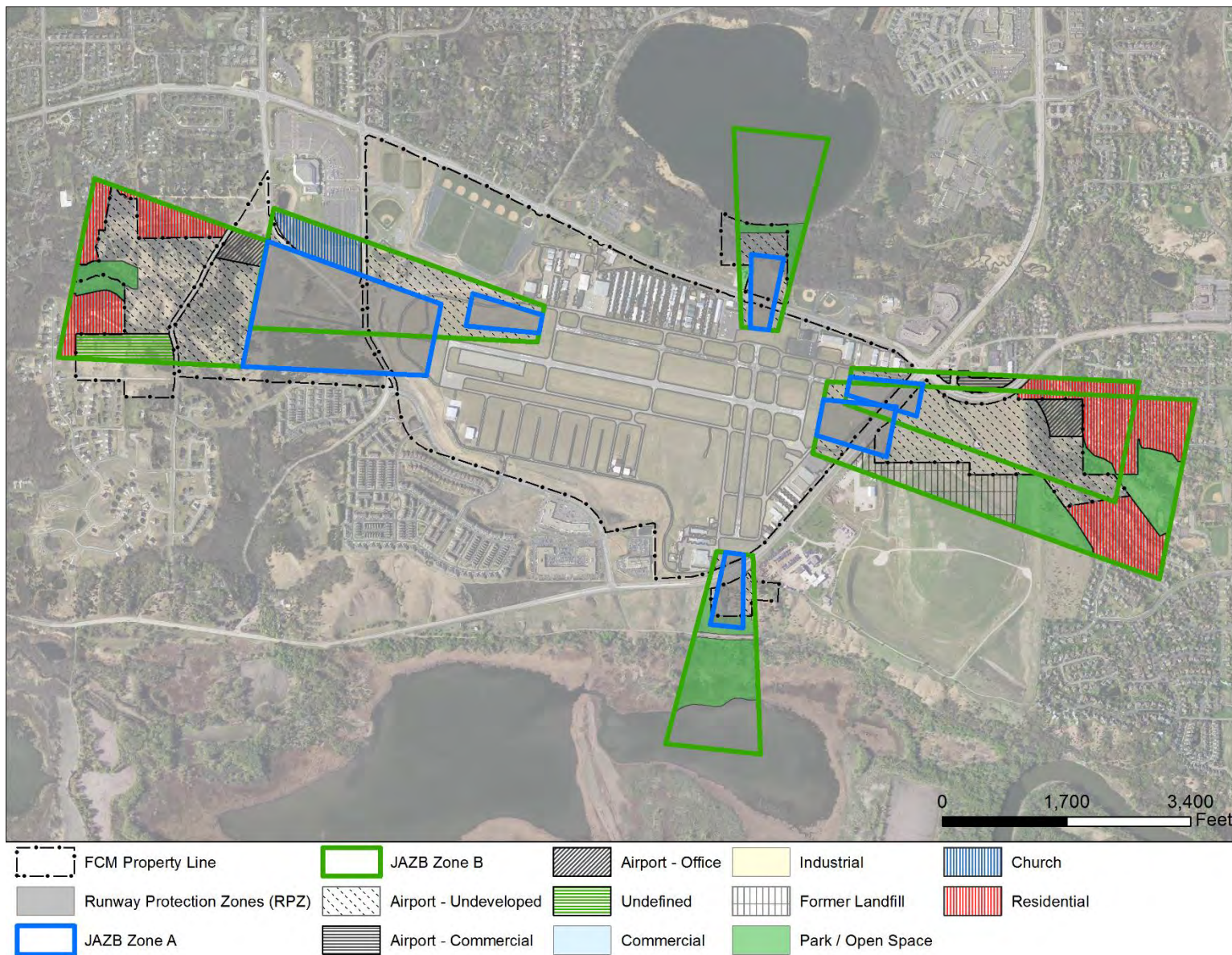


Figure 3-3: Summary of 2017 Economic Impact Analysis Results



**SECTION 4:**

**2017 FCM AIRPORT ZONING ORDINANCE**

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## 4. 2017 FCM AIRPORT ZONING ORDINANCE

### 4.1 INTRODUCTION

This chapter describes updates that have been made to the Draft FCM Airport Zoning Ordinance document.

### 4.2 FCM AIRPORT ZONING ORDINANCE LANGUAGE AND FIGURES

The proposed language and accompanying figures for the updated Draft FCM Zoning Ordinance are presented in **Appendix 7**.

Changes from the 2010 Draft Ordinance language are shown as tracked-changes in **Appendix 7**. Most of the language changes reflect simple updates to items that have described in this report. Other changes include the following items:

- Section I, Purpose and Authority: Removed the City of Bloomington from the list of JAZB participants as the proposed zoning surfaces do not extend into the municipal boundaries of Bloomington (page 1)
- Section IV, Airspace Obstruction Zoning, Subsection B, Height Restrictions: Added clarifying language to items 1 and 2 about use of an FAA 7460 Obstruction Evaluation and determination by FAA (pages 9 and 10)
- Section XIV, Judicial Review: Clarified language to better align with state statute (page 22)

In addition, the following Zoning Ordinance Exhibits have been updated:

- Exhibit A, Airport Boundary
- Exhibit B, Residential Permitted Parcels on JAZB Zone B
- Exhibit C, Permitted Residential Areas
- Exhibit D, Airport Boundary and Airspace Zoning Limits
- Exhibit E, Airport Boundary and Airspace Contours
- Exhibit F, Airport Boundary and Safety Zoning Limits

#### 4.2.1 Permitted Residential Areas

The updated Draft FCM Zoning Ordinance will continue to allow for the improvement, expansion and development of new residential uses in existing and planned Occupant Areas guided for residential use. These residential uses, as designated Permitted Residential Areas, are recognized and treated as conforming land uses in the ordinance.

Designated Permitted Residential Areas are identified in the Draft FCM Zoning Ordinance Figures B and C, which are provided in **Appendix 7**.

#### **4.3 FCM AIRSPACE ZONES WITHIN ZONING LIMITS GRID MAPS (AIRSPACE ZONES)**

The FCM Airspace Zone grid maps depict height limitations imposed by the Draft Zoning Ordinance. These airspace heights are based on the Federal Aviation Administration's (FAA) 14 CFR Part 77<sup>3</sup> criteria. The FCM Airspace Zones have been updated to reflect the airfield configuration changes described in **Section 2.3**. The most noticeable change from the previous version of the ordinance is that the airspace zones for the north parallel Runway 10L-28R are based on a steeper, or less restrictive, approach surface slope due to the change in runway designation.

**Figure 4-1** summarizes the FCM Airspace Zones grid maps that have been developed for the updated Draft FCM Airport Zoning Ordinance. The individual grip maps showing airspace zone heights on a parcel basis are provided in **Appendix 8**.

#### **4.4 FCM SAFETY ZONES WITHIN ZONING LIMITS GRIP MAPS (SAFETY ZONES)**

The FCM Safety Zone grid maps depict the JAZB-proposed Safety Zones described in **Section 2-10**.

**Figure 4-2** summarizes the FCM Safety Zone grid maps that have been developed for the updated Draft FCM Airport Zoning Ordinance. The individual grip maps showing safety zone limits on a parcel basis are provided in **Appendix 9**.

#### **4.5 FCM MAXIMUM CONSTRUCTION HEIGHTS WITHOUT PERMIT WITHIN ZONING LIMITS GRID MAPS (MAXIMUM CONSTRUCTION HEIGHTS WITHOUT A PERMIT)**

The updated Draft Ordinance carries forward the policy that an airport zoning permit will not be required for development up to a "maximum construction height without a permit" elevation established on a parcel-by-parcel basis.

The Maximum Construction Height Without Permit grid maps have been updated based upon the following factors:

- The airspace zoning surfaces associated with north parallel Runway 10L-28R are less restrictive (i.e., a steeper slope) with the "utility" designation. This results in greater allowable building heights without a permit for some parcels to the northeast and northwest of FCM;
- Updated and more precise ground elevation contours are available; and,
- Updated and more precise airspace surface elevation contours are available.

The elevation for each parcel is determined in the following manner:

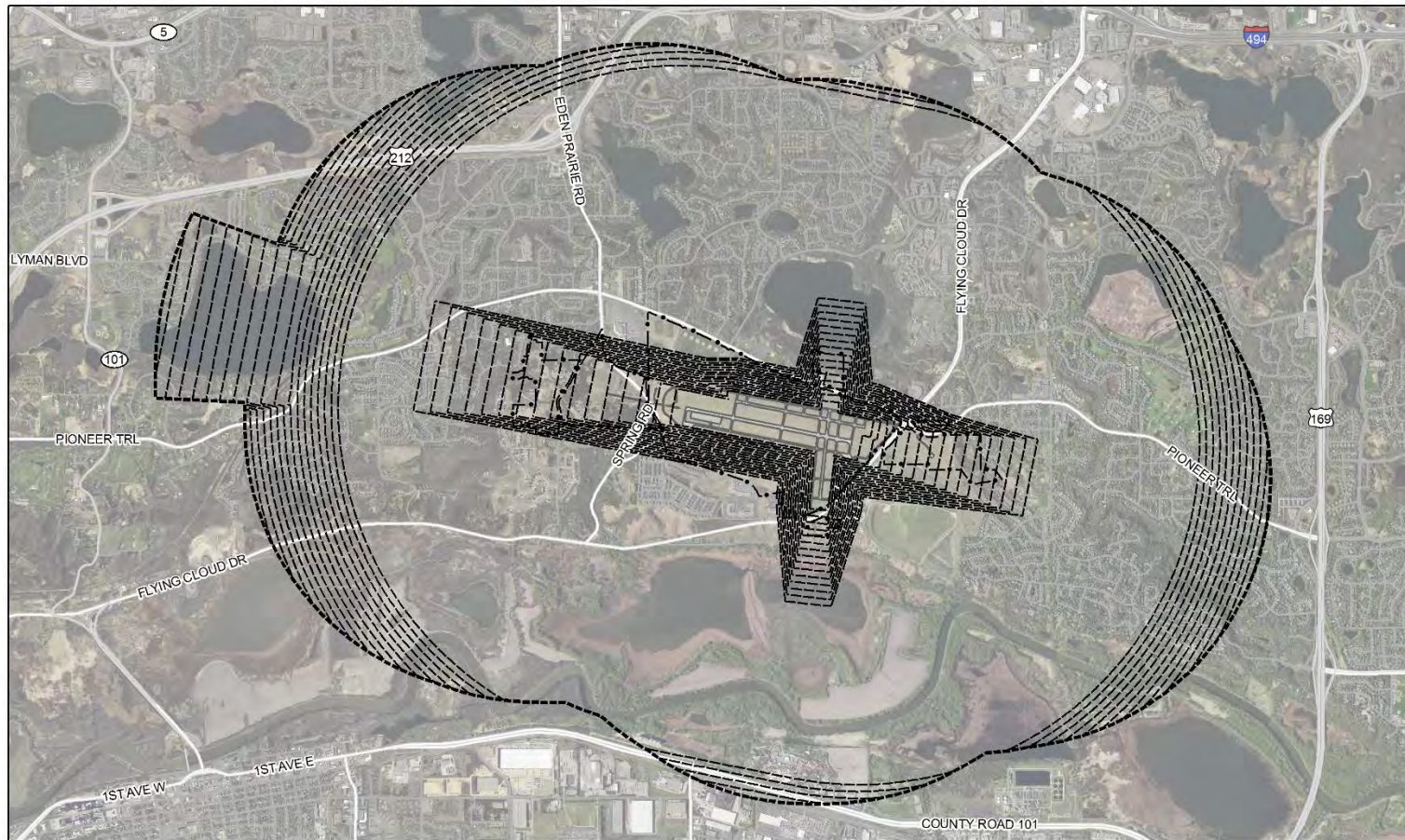
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<sup>3</sup> *Safe, Efficient Use, and Preservation of the Navigable Airspace* (14 CFR Part 77)

- Identify the location on each parcel where the highest ground elevation underlies the lowest airspace zoning elevation;
- Subtract the ground elevation from the airspace zoning elevation at the identified location; and,
- Round the height down to the nearest ten foot interval.

**Figure 4-3** summarizes the Maximum Construction Height Without Permit grid maps that have been developed for the updated Draft FCM Airport Zoning Ordinance. Exhibits showing a greater level of detail on a parcel basis are provided in **Appendix 10**.

Figure 4-1: FCM Airspace Zones Grip Map Summary



**FCM Airspace Zones Within Zoning Limits**

**A - Index Sheet**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

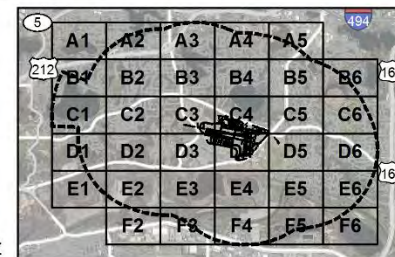
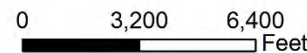
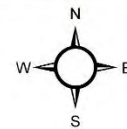
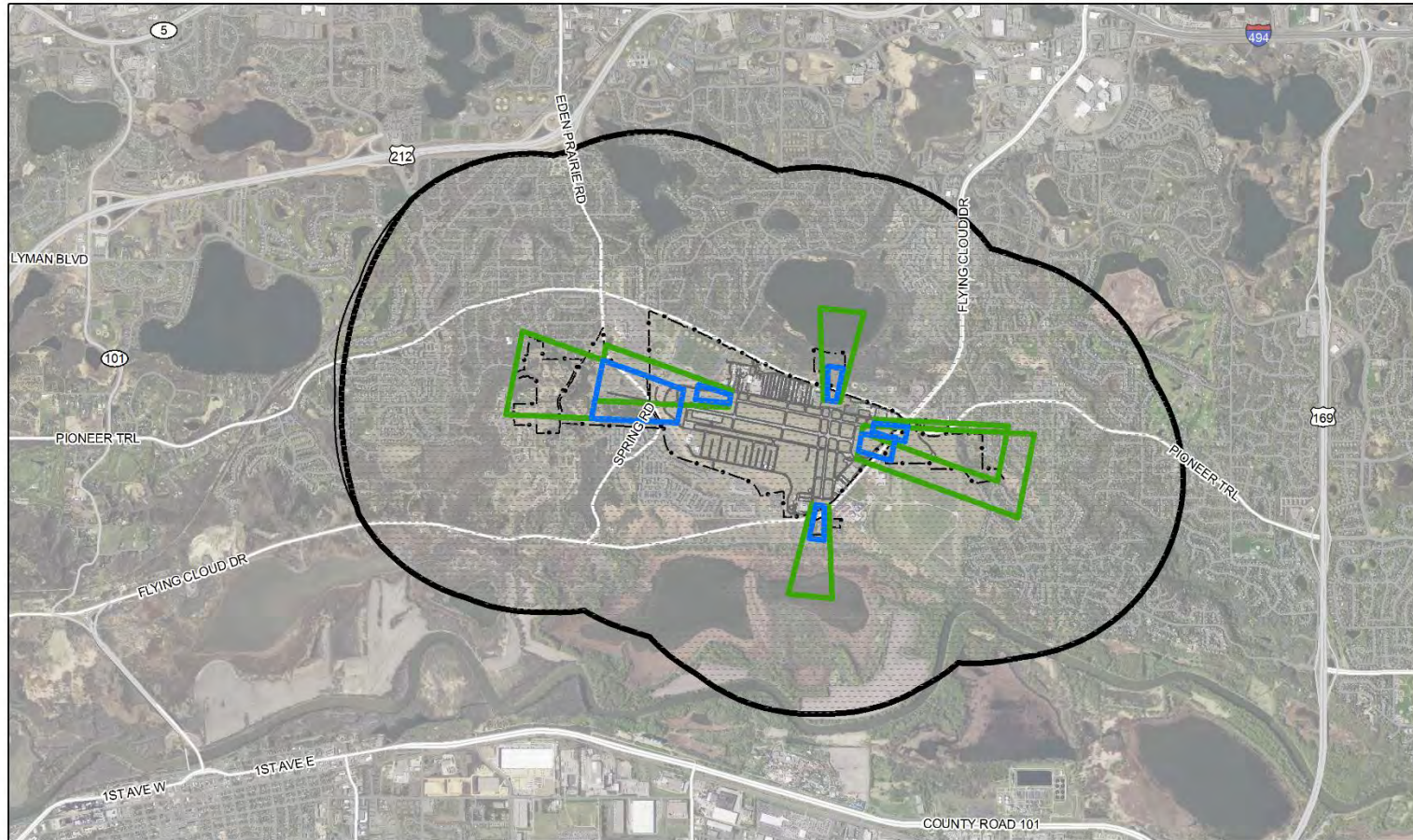




Figure 4-2: FCM Safety Zones Grip Map Summary



**FCM Airspace Zones  
Within Zoning Limits**

**SZ - Index Sheet**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

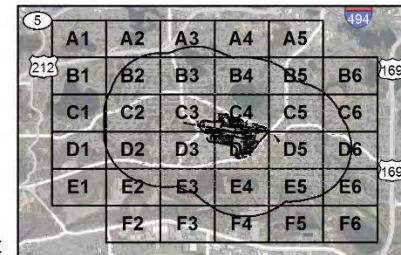
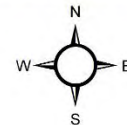
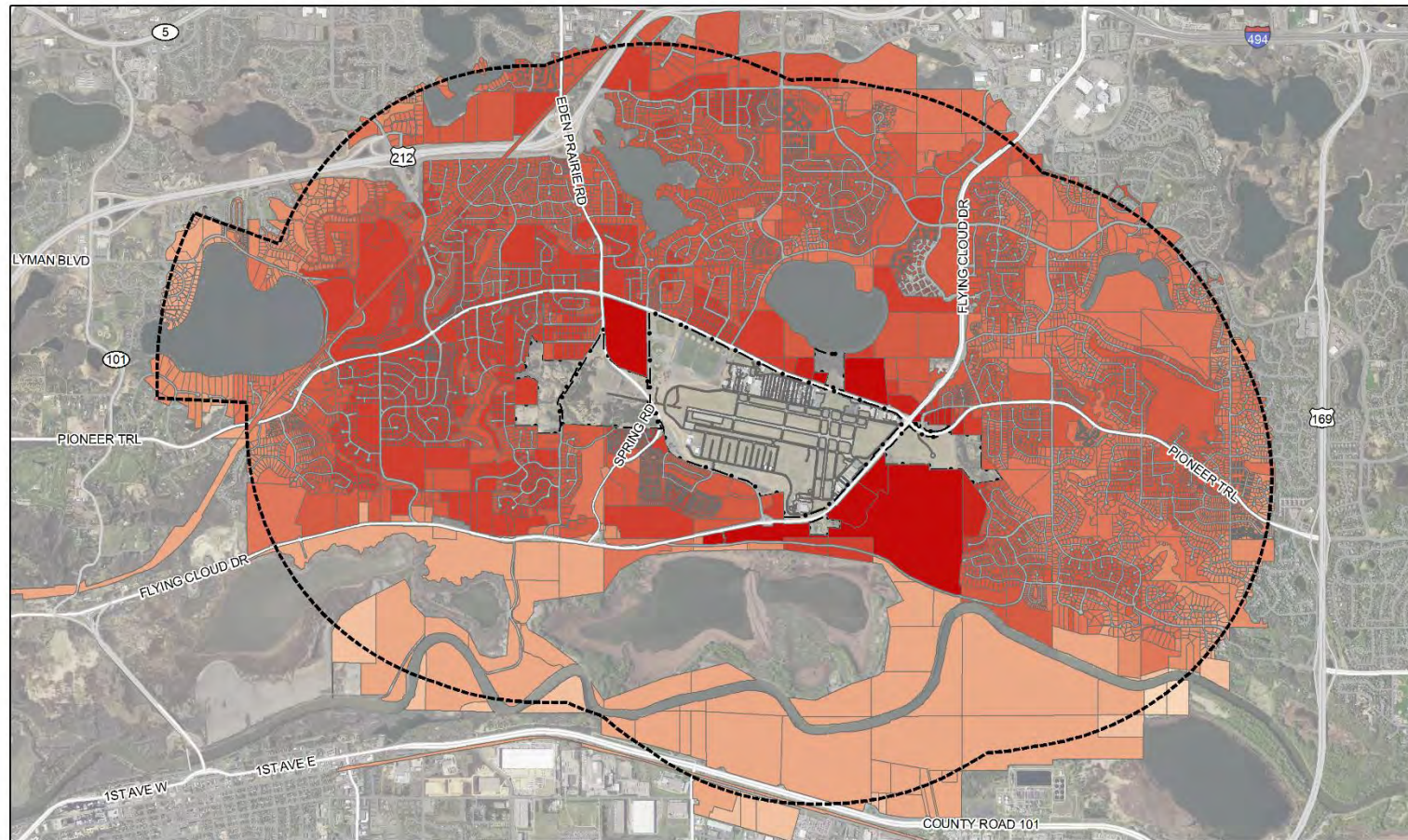
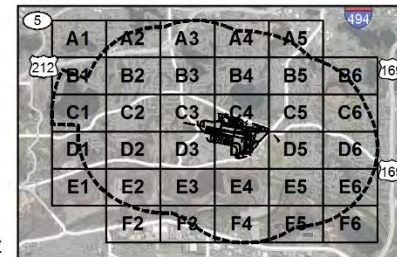
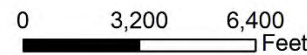
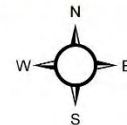
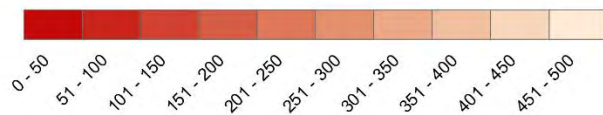


Figure 4-3: FCM Maximum Construction Height Without Permit Grip Map Summary



**FCM Maximum Construction Heights Without Permit Within Zoning Limits**

**MCH - Index Sheet**



## 5. STAKEHOLDER ENGAGEMENT AND PUBLIC INFORMATION PROCESS

### 5.1 INTRODUCTION

One of the stated goals for the JAZB is to ensure that an appropriate level of stakeholder/community engagement occurs throughout the process of developing and implementing the proposed airport zoning ordinance for Flying Cloud Airport.

Between September 2017 and April 2018, the JAZB conducted four (4) meetings that were open to the public, along with an advertised public hearing. These meetings are listed in **Table 5-1**.

**Table 5-1: JAZB Meetings (September 2017 – April 2018)**

Date	Time	Location	Materials Covered
09/21/17	4:30pm	Eden Prairie City Center	JAZB Kickoff
10/26/17	9:00am	Eden Prairie City Center	Proposed Zoning Ordinance Updates
01/18/18	4:00pm	Eden Prairie City Center	Results of Zoning Ordinance Updates
02/27/18	6:00pm	Eden Prairie City Center	Public Hearing
04/05/18	2:00pm	Eden Prairie City Center	Review of Public Input & Approval to Submit

A record of all JAZB meeting materials is available on the MAC website through the following link:

<https://metroairports.org/General-Aviation/Airports/Flying-Cloud/Joint-Airport-Zoning-Board-Flying-Cloud.aspx>

### 5.2 PUBLIC COMMENT PERIOD

At its meeting on January 18, 2018, the JAZB formally approved an updated version of the Draft Airport Zoning Ordinance for formal public review and comment, and to serve as the basis for the public hearing.

The public comment period for the Draft Flying Cloud Airport Zoning Ordinance opened on Monday, February 12, 2018. A public hearing was held on Tuesday, February 27, 2018 to provide information about the draft ordinance to interested stakeholders and citizens. Materials from the public hearing are reproduced in **Appendix 11**. The public comment period closed on Wednesday, March 14, 2018.

Notices about the public hearing were published in the following periodicals:

- Star Tribune newspaper on February 12 and February 19, 2018;
- Eden Prairie News newspaper on February 15; and

- State Register on February 12.

In addition, notices were mailed to the governing Boards of JAZB member cities, Hennepin County and Scott County; to property owners within approximately one mile of the Flying Cloud Airport boundary as determined by the City of Eden Prairie (approximately 4,400 addresses); and distributed electronically to persons subscribing to the Metropolitan Airports Commission GovDelivery news service. The public notice was also posted on the Flying Cloud Airport JAZB page of the MAC website.

The notice and proposed Flying Cloud Airport Zoning Ordinance were available for public inspection at the following locations: the Metropolitan Airports Commission's Main Office, 6040 28th Avenue South, Minneapolis; the City Halls of the cities of Eden Prairie, Shakopee, and Chanhassen; and the Eden Prairie Library, 565 Prairie Center Drive, Eden Prairie.

Twelve people signed in on the hearing attendance sheets. No verbal testimony was given during the hearing. A transcript from the hearing is included in **Appendix 11**.

During the public comment period, the JAZB received a total of four written comments from members of the public. Based on the public comments received, no content changes are proposed to the updated Draft Airport Zoning Ordinance that was presented at the hearing.

### **5.3 RESPONSES TO PUBLIC QUESTIONS AND COMMENTS**

Responses to the written public comments received are provided in Appendix 11. In addition, the JAZB offers the following responses to verbal questions received during the public comment period that were generally relevant to the proposed ordinance and not parcel specific.

#### **5.3.1 JAZB Safety Zone C Restrictions**

Questions were raised as to whether the proposed restrictions within JAZB Safety Zone C would prohibit the use of rooftop solar panels on homes or restrict the use of FCC-approved amateur radio stations.

The draft ordinance does not seek to prohibit residential solar installations or restrict the use of properly-permitted amateur radio stations within JAZB Safety Zone C.

If a particular solar installation is determined to cause glare issues for pilots using the airport, the zoning ordinance would serve as a basis to work with the property owner to mitigate the visual impairment. However, based on operational experience, the likelihood of a residential rooftop solar installation to cause a serious glare problem is expected to be a very rare occasion.

Similarly, if a particular amateur radio station is determined to cause interference with navigational aids or communications between aircraft and air traffic controllers, the zoning ordinance would serve as the basis to work with the radio operator and/or the FCC to mitigate the interference.

### **5.3.2 JAZB Safety Zone B Contiguous Open Space Requirements**

A property owner asked if the proposed JAZB Safety Zone B requirement for contiguous open space was meant to be applied to each parcel within the zone.

JAZB Safety Zone B contains a requirement to provide a minimum of 20% of the total Zone B acreage, or 20 acres, whichever is greater, to remain as contiguous open space. The purpose for this open space is to provide an extra margin of safety by providing a large area for the pilot of a disabled aircraft to use for an emergency landing.

This open space requirement applies to the totality of the proposed JAZB Safety Zone B area, and not to each parcel within the zone. The JAZB Safety Zone B open space requirement is easily met by existing airport-owned land, along with off-airport property guided to remain as open space or otherwise not expected to be regularly occupied.

## **5.4 SUMMARY OF MNDOT AERONAUTICS REVIEW (FIRST SUBMITTAL)**

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## **LIST OF APPENDICES**

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**Appendix 3: California Study Aircraft Accident Locations**

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The HNTB Companies

## MEMORANDUM

**TO:** FCM Joint Airport Zoning Board  
**FROM:** HNTB Corporation (HNTB)  
**DATE:** November 6, 2009  
**SUBJECT:** Analysis of Probability of Aircraft Accidents in Mn/DOT Safety Zones A and B for Runways 10R-28L, 10L-28R and 18-36 at Flying Cloud Airport

### I. Background

At the August 13<sup>th</sup>, 2009 meeting of the Flying Cloud Airport Joint Airport Zoning Board (JAZB), the Board directed staff (MAC) to complete a safety study for the Flying Cloud Airport (FCM). MAC retained HNTB to prepare the study. The safety study in this memorandum will be based upon the following statute.

Minnesota law, Chapter 360.066, Subdivision 1. includes the following:

“**Reasonableness** Standards of the commissioner defining airport hazard areas and the categories of uses permitted and airport zoning regulations adopted under sections 360.011 to 360.076, shall be reasonable, and none shall impose a requirement or restriction which is not reasonably necessary to effectuate the purposes of sections 360.011 to 360.076. In determining what minimum airport zoning regulations may be adopted, the commissioner and a local airport zoning authority shall consider, among other things, the character of the flying operations expected to be conducted at the airport, the location of the airport, the nature of the terrain within the airport hazard area, the existing land uses and character of the neighborhood around the airport, the uses to which the property to be zoned are planned and adaptable, and the social and economic costs of restricting land uses versus the benefits derived from a strict application of the standards of the commissioner.”

The purpose of this memorandum is to help evaluate the reasonableness of the land use restrictions in the Mn/DOT’s rules<sup>1</sup> pertaining to areas off the runway ends at Flying Cloud Airport (FCM) based upon the probability of an accident occurring in Mn/DOT Safety Zone A outside the runway protection zone (RPZ) and Mn/DOT Safety Zone B, the character of the flying operations expected to be conducted at the airport, the location of the airport, and the nature of the terrain within the airport hazard area. The analysis herein incorporates appropriate

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<sup>1</sup> Minnesota Rules 8800.2400

information provided in the Mn/DOT *Airport Land Use Compatibility Manual* published in September 2006.

## **A. Definitions**

### Operation

An “operation” is defined as a takeoff/departure or landing/arrival of an aircraft at FCM.

### FCM Accident

An “FCM accident” is defined as an occurrence associated with the act of operating an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage as the result of an FCM operation and a collision with the ground or an object on the ground located within four miles of FCM.

### Incident

An “incident” is defined as an occurrence other than an accident that is associated with the act of operating an aircraft and that affects, or could affect, the safety of an operation. For example, if a maintenance vehicle hits an aircraft with no one on board with the intent to fly, then this is an incident even though there is substantial damage to the aircraft or serious injury to maintenance or other personnel.

### FCM Accident Rate

The “FCM accident rate” is defined as the number of FCM accidents that have been reported to the National Transportation Safety Board (NTSB) during the past 20 years – divided by the total number of FCM operations during the past 20 years.

### 2025 Forecast

The “2025 forecast” is the number of based aircraft, and the associated number of operations on each runway predicted to occur, at FCM in the year 2025.

### Probability of an Accident at FCM Runway End in 2025

The “Probability of an Accident at FCM Runway End in 2025” is equal to the FCM accident rate multiplied by the 2025 forecast of operations at the runway end.

### Probability of an Accident in Mn/DOT Safety Zone in 2025

The probability of an accident occurring in a Mn/DOT Safety Zone off an FCM runway end in 2025 is equal to the Probability of an Accident at the FCM Runway End in 2025 multiplied by the percent of historical general aviation accidents throughout the United States that have occurred in an area the same size as the Mn/DOT Safety Zone, as reported to the NTSB<sup>2</sup>.

## **II. Accident Probability Analysis Methodology**

The accident probability analysis in this report uses an eight-step methodology, as follows:

1. Determine the appropriate data to be used in the analysis based on the factors to be considered stated in Minn. Stat. §360.066, subd. 1.

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<sup>2</sup> This data was compiled by the University of California at Berkeley in 1993 and is the only available data for the location of general aviation accidents in the vicinity of a general aviation airport in the U.S.

2. Identify applicable probability standards.
3. Define the areas to be studied.
4. Compile the appropriate data to determine accident rates and locations.
5. Distribute accident data to the areas being analyzed.
6. Determine the number of future operations for the runway end being studied.
7. Calculate the accident probabilities in the study areas.
8. Compare the accident probabilities to the applicable probability standards.

### **III. Appropriate Data to be Used in the Analysis**

The appropriate data to be used in the statistical analysis should best represent the conditions expected to be present at FCM in the analysis year (2025) – the fleet mix, airport instrumentation and airport operating procedures (i.e., the character of the flying operations expected to be conducted at the airport in accordance with Minn. Stat. §360.066, subd. 1). Data can be available at the national level and the local level. The issue is which data best represents the conditions at FCM – national data or site specific local data. This is also an issue in determining ground traffic impacts from a proposed land use in a city or neighborhood. The Institute of Transportation Engineers (ITE) compiles traffic generated by different land uses across the U.S. and publishes a *Trip Generation Handbook* and user guide.<sup>3</sup> ITE states that there is a “need to collect local trip generation data to either validate the use of *Trip Generation* data for local use or establish a new trip generation rate”.

Aircraft accidents in the U.S. are reported to the National Transportation Safety Board (NTSB). The NTSB provides a general aviation (GA) accident rate per 100,000 flight hours for the previous 20 years. This data could be used for the accident rate at FCM in 2025 by attempting to estimate the number of flight hours per operation; however, this data is not representative of the operating conditions at FCM. It includes GA airports with short, unpaved runways, runways without a precision instrument landing system (ILS), airports without an Air Traffic Control Tower, airports that serve aircraft without sophisticated instrumentation, and airports located in rugged terrain.

Based on the above and the analysis in Subsections A and B below, it was determined that available site-specific local data is the appropriate data to be used in determining the accident rate for the analysis in this memorandum.

The following is an analysis of “the character of the flying operations expected to be conducted at the airport, the location of the airport, (and) the nature of the terrain within the airport hazard area” in accordance with Minn. Stat. §360.066, subd. 1.

#### **A. Character of FCM Flying Operations**

The character of flying operations is based on the types of aircraft operating at the airport, the purpose of their operations, their safety records and the airport facilities that influence their operations.

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<sup>3</sup> *Trip Generation Handbook, Second Edition, an ITE Recommended Practice, ITE June 2004.*

FCM is classified as a Minor Airport in the Metropolitan Council’s Metropolitan Airport System Plan and is a secondary reliever of Minneapolis/St. Paul International Airport (MSP). It has an Air Traffic Control Tower (ATCT) and three runways. The longest runway is Runway 10R-28L. It is under construction and will be 5,000 feet in length with a precision instrument approach to Runway 10R. FCM provides the facilities and services to attract and serve general aviation and corporate aircraft that require a runway up to 5,000 feet. The existing and forecast fleet of based aircraft is given in **Table 1**. In 2007, 80% were single engine piston aircraft and 5.5% of the based aircraft were jets. The 2025 forecast of based aircraft has 71% single engine piston aircraft and 15% jets. The safety record of jets is significantly better than single engine piston aircraft. When considering the current NTSB records of accidents in 2008 through May it is noteworthy to consider that flights conducted for personal, aerial applications, instructional and other reasons are made primarily by non-jet aircraft and constituted about 97% of the accidents through May of 2008.

**Table 1  
FCM 2025 Based Aircraft Forecast**

Year	Single Engine Piston	Multi-Engine Piston	Turbo-prop	Jets		Helicopter	Other	Total
				Microjet	Other			
2007	336	37	20	0	23	5	0	421
2010	326	36	21	3	27	7	0	420
2015	310	32	20	8	34	7	0	411
2020	296	29	20	15	38	8	0	406
2025	286	27	20	20	40	8	0	401

Source: HNTB, April 2009.

According to the NTSB’s Annual Review of Aircraft Accident Data U.S. General Aviation, Calendar Year 2003, “in 2003, the highest proportion of flying time was associated with personal recreation/business operations, which accounted for the largest proportion of accidents, 69% (n = 1197), a percentage consistent with the 10-year average. Less than 1% of the accidents (n = 5) were corporate/executive operations, 5% were aerial application (n = 86), and 14.7%, instructional flying (n = 255).” The proportion of flight hours was higher than the proportion of accidents for corporate operations reflecting the relative safety of these types of flights.

General Aviation encompasses a wide range of operations, including personal recreation/business, corporate, flight instruction and aerial applications. National NTSB accident rates include all of these operations together. Personal recreation/business flights make up the bulk of GA activity, and typically use single and multi engine piston aircraft. Corporate flying includes business transportation with a professional crew and usually involves larger twin piston, turboprop and jet aircraft. The proportion of corporate flying is expected to continue to increase at FCM.

Based on the above, accident data specific to FCM is the appropriate data to be used in determining the accident rate at FCM. This eliminates the inaccuracies that would result from the use of national generalized GA data that include GA airports with short unpaved runways,

runways without an ILS, airports without an Air Traffic Control Tower, airports that serve aircraft without sophisticated instrumentation, and airports located in rugged terrain. Moreover, utilizing specific FCM accident data is in keeping with the statutory requirement to consider “the character of the flying operations expected to be conducted at the airport,” due to the fact that the accident statistics at the airport are a direct result of the character of the flying operations conducted at the airport.

**B. FCM Location and Nature of Terrain within Model State Safety Zones**

FCM is located on a plateau north of the Minnesota River at an elevation of 906 feet above MSL (mean sea level). The plateau drops off sharply towards the Minnesota River (200 feet lower) to the south and east and into a ponding area to the west. Staring Lake, to the north, is approximately 100 feet lower than the airport. The airport location is generally good for airport operations; there are no features that would cause substantive turbulence or adverse wind conditions. When winds are strong out of the north, pilots landing on Runway 36 tend to come in high so as not to be effected by potential downdrafts from the Minnesota River Valley.

State Safety Zones A and B overlay these lower areas off the runways’ ends. The terrain does not impact the approach slope to any of the runways. Higher than normal climb and descent rates are not necessary. The runways have standard approach and departure procedures.

**IV. Applicable Probability Standard**

The FAA Flight Standards Division employs a collision-risk model for some proposed Instrument Landing Systems to determine the probability of a collision with an object on the ground during landings. This model determines the probability of a collision involving aircraft regardless of whether injuries or deaths result from a collision. The FAA uses a threshold probability of  $10^{-7}$  or one collision per 10,000,000 landings. That is, if the collision-risk analysis determines there could be more than one collision per 10 million landings, then the placement of the proposed object is not approved.

For purposes of this analysis, the threshold probability of  $10^{-7}$  or one collision/accident per 10 million operations will be used as the standard for measuring the accident probabilities in the analysis areas and will be known as the FAA Collision Standard. An “accident” will be considered as a collision with the ground or with an object on the ground that results in substantial damage to the aircraft or serious injury to persons in the aircraft or on the ground.

**V. Definition of Analysis Areas**

Four analysis areas will be assessed, as listed below and shown in **Figure 1**. (Figures are located at the back of this memorandum following Appendix A.4)

1. The area within the airfield plus the FAA runway protection zone (RPZ)
2. Mn/DOT Model Safety Zone A outside the RPZ
3. Mn/DOT Model Safety Zone B
4. The area outside the airfield and Zones A and B (Off Airport).

### **A. On Airfield + RPZ**

At each runway end, there is a runway protection zone (RPZ) that is to be clear of any structures except navigational aids and is trapezoidal in shape. The RPZ commences at the end of the runway's Primary Surface, which is 200 feet from the runway end. The length and width of the RPZ differ depending on the characteristics of the critical aircraft using the runway (weight and approach speed) and the type of landing approach available for the runway end (visual, non-precision or precision with visibility minimums). Runway 18-36 is designated as a "utility" runway, which means it serves small aircraft exclusively (aircraft under 12,500 pounds maximum gross take-off weight). The RPZ for Runway 18-36 is 250 feet inner width, 450 feet outer width and 1,000 feet in length. The RPZ for Runway 10L-28R is 500 feet inner width, 700 feet outer width and 1,000 feet in length. Runway 10R has a precision instrument landing system (ILS) with approach visibility minimums of ½ mile. This requires an RPZ of 1,000 feet inner width, 1,750 feet outer width and 2,500 feet long. Runway 28L has non-precision instrument approach capability with 1 mile visibility minimums. This requires an RPZ of 500 feet inner width, 700 feet outer width and 1,000 feet long. The runway RPZs are shown in **Figure 1** (all figures are in Appendix B of this Memorandum).

### **B. Land Use Safety Zones A and B**

Mn/DOT has promulgated rules requiring airports in Minnesota to establish, by zoning for each runway end, two land use safety zones, State Safety Zones A and B, in which both land uses and densities are restricted. State Safety Zone A is to begin at the end of the Primary Surface (200 feet from the runway end) and extend for a distance equal to two-thirds the runway length, which includes the RPZ. State Safety Zone B is to begin at the end of State Safety Zone A and extend a distance equal to one-third the runway length. Together, the zones are to comprise a trapezoid with a total length equal to the runway length. The trapezoid follows the airspace approach zones of a runway as defined in subpart 3.D of Minnesota Rules 8800.2400

## **VI. Accident Frequency Data**

Aircraft accident data was obtained from two sources for this analysis – the FAA and the National Transportation Safety Board (NTSB). This section presents the data specific to FCM. The number of aircraft accidents reported from 1989-2008 for operations at FCM are listed in **Table 2**. The use of the past 20 years of accident data is consistent with accident frequency data presented annually by the NTSB and with page 10 of Appendix 7 of the Minnesota Airport Land Use Compatibility Manual, which assessed data in a 20-year history. There were a total of 28 incidents at FCM from 1989-2008; all were accidents attributable to FCM, as discussed in Appendix A.1. Sixteen of the accidents occurred on the airfield; twelve occurred in the area considered airport vicinity. Of those twelve, two accidents occurred in the RPZs, one in a State Safety Zone A outside the RPZ and one in a State Safety Zone B. **Figure 2** shows the approximate locations of the accidents that were considered in this analysis and have occurred near the airport over the past 20 years. Location information was not available for three of the accidents and therefore are not depicted, and one accident occurred beyond the limits of the figure. The recent accident that occurred near the airport on 8/12/2009 is shown on **Figure 2** but is not included in the accident rate calculation because a full year of 2009 operation and accident data is not available. The accidents and incidents are described in the Appendix A.1. The majority of the accidents occurred on the airport and their locations are estimated based on the NTSB accident report. NTSB does not supply this information on their public web site.



Based on the 1989-2008 data, the accident rate is **0.7544 accidents per 100,000 operations**.

**Table 2**  
**Number of Accidents<sup>A</sup> and Accident Rates at FCM (1989 – 2008)**

Year	All Aircraft		
	No. of Accidents <sup>B</sup>	No. of Operations (x 100,000)	Accidents per 100,000 Operations
1989	1	2.077 <sup>C</sup>	0.481
1990	3	2.274	1.319
1991	1	1.865	0.536
1992	0	1.983	0.0
1993	1	2.186	0.457
1994	1	2.390	0.418
1995	3	2.163	1.387
1996	2	2.127	0.940
1997	1	1.982	0.505
1998	3	2.109	1.422
1999	2	1.927	1.038
2000	2	1.861	1.075
2001	2	1.856	1.078
2002	0	1.764	0.0
2003	1	1.558	0.642
2004	2	1.596	1.253
2005	1	1.577	0.634
2006	1	1.442	0.694
2007	1	1.182	0.846
2008	0	1.191	0.0
<b>Total</b>	<b>28</b>	<b>37.112</b>	
<b>Average Accident Rate</b>			<b>0.75447</b>

Sources: National Transportation Safety Board; Federal Aviation Administration; HNTB analysis.

<sup>A</sup> “Accident” is an occurrence associated with the act of operating an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage as the result of an FCM operation and a collision with the ground or an object on the ground located within four miles of FCM.

<sup>B</sup> See Appendix A.1 for a brief summary of the accident damage and injuries.

<sup>C</sup> Since OPSNET records were only available since 1990, MAC records were used for 1989.

## VII. Location and Distribution of Accident Data

Since there have been relatively few accidents reported in the Mn/DOT safety zones for FCM and since there is the possibility of an accident/crash in these areas in 2025, more generalized national location data was researched. An aircraft accident distribution study was done by the University of California at Berkeley for the *California Airport Land Use Planning Handbook* (January 2002). The purpose of the study was to compile accident locations that had land use compatibility implications from the NTSB data base. The findings of that study were referred to and used in the Mn/DOT *Airport Land Use Compatibility Manual* and are used here to determine where accidents have occurred. The Berkeley study compiled 873 general aviation aircraft accidents that occurred between 1983 and 1992. It found that the number and location of reported accidents varied by runway length and displayed the locations for runways less than 4,000 feet, 4,000 to 5,999 feet and 6,000 feet or more. These accident locations are included in the Mn/DOT *Airport Land Use Compatibility Manual* as Figures D, E and F in Appendix 7, and are used in the HNTB analysis.

In order to determine the distribution of accidents for a runway end, the total number of accidents for the runway end must be known. The Berkeley accident location study did not provide the total accidents for the runway lengths. The purpose of the study was to provide the locations of accidents that have land-use compatibility implications. The 10-year NTSB records included over 11,000 incidents and/or accidents that occurred on or near the runway, but they were not researched because they did not have land-use compatibility implications. As stated on pages 8-5 to 8-7 of the January 2002 *California Land Use Compatibility Handbook*, compilation of NTSB accident-proximity data for the years 1990 through 2000 showed that 68 percent of GA accidents occur on the airport and 3 percent occur en route, which leaves 29 percent as airport-vicinity accidents. The accidents shown in Figures D and/or E in Appendix B of this Memorandum obtained from the Mn/DOT manual were superimposed on the appropriate FCM runway end as shown on **Figures 3, 4, 5 and 6**. The number of airport-vicinity accidents were counted and divided by 29 percent to obtain the total accidents. Because the parallel runways are closely spaced, arrival and departure accidents on each runway end overlap one another. That is, there are arrival and departure accidents on 10L-28R that occur in the analysis areas of 10R-28L and vice-versa, as shown in **Figures 3 and 4**. Therefore, the accidents for these runways are combined. The results are shown in **Table 3**.

**Table 3**  
**Determination of Number of Accidents at Runway End**

Runway Length	Runway End	Airport Vicinity (29%)	Total	En Route (3%)	On Airfield (68%)	On Airfield + RPZ
Figure D (Less than 4,000 ft.) as shown in Figures 5 and 6	18	204	703	21	478	535
	36	211	728	22	495	552
Figure D Combined with Figure E (4,000 – 5,999 ft.) As shown in Figure 3	10L	357	1,231	37	837	893
	10R	357	1,231	37	837	891
Figure D Combined with Figure E As shown in Figure 4	28R	399	1,376	41	936	995
	28L	401	1,383	41	940	959

Sources: Mn/DOT *Airport Land Use Compatibility Manual*; *California Land Use Compatibility Handbook (January 2002)*; HNTB analysis

The number and percent of the accidents in each analysis area are presented in **Table 4**.

**Table 4**  
**Distribution of Accident Locations**

Runway End	On Airfield + RPZ		State Safety Zone A outside RPZ		State Safety Zone B		Off Airport		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
10R	891	74.63	7	0.59	17	1.42	279	23.36	1,194	100.00
28L	959	71.52	149	11.11	19	1.42	214	15.95	1,341	100.00
10L	893	74.79	38	3.18	21	1.76	242	20.27	1,194	100.00
28R	995	74.52	34	2.55	11	0.82	295	22.10	1,335	100.00
18	535	78.46	33	4.84	15	2.20	99	14.51	682	100.00
36	552	78.18	33	4.68	15	2.13	106	15.02	706	100.00

Sources: Mn/DOT *Airport Land Use Compatibility Manual*; *California Land Use Compatibility Handbook (January 2002)*; HNTB analysis

### VIII. Forecast of Operations

To determine the probability of an accident off a runway end, the expected number of operations must be known. The forecast of operations prepared in July 2008 at each runway end for the year 2025 is given in **Table 5**.

**Table 5  
FCM 2025 Forecast**

Runway	Arrivals	Departures	Total Operations at Runway End <sup>A</sup>
10R	11,299	10,055	24,309
28L	14,759	13,009	24,814
10L	6,439	9,210	19,128
28R	11,759	12,689	20,969
18	9,078	8,599	12,454
36	3,605	3,376	12,204
<b>Total</b>	<b>56,938</b>	<b>56,938</b>	<b>113,877</b>

<sup>A</sup> Operations at a runway end are the arrivals at that end plus the departures from the opposite end (e.g., for 10R, it is 11,299 + 13,009 = 24,309)  
Sources: HNTB Forecast, April 2009; MAC Runway Use, August 2009.

**IX. Calculation of Accident Probabilities**

The probability of an accident occurring in an accident analysis area in 2025 is calculated by multiplying the applicable accident rate by the number of forecast operations in 2025, which is then multiplied by the percent of historical accidents distributed to the applicable analysis area. The probability of an accident in each analysis area is calculated by applying the overall probability of accidents on the ends of the runways in 2025 to the distribution of accidents presented in **Table 4**. The results of these calculations are presented in **Table 6**.

**Table 6  
Probability of an Accident in Runway End Analysis Areas in 2025**

Runway End	2025 Forecast of Operations	On Airfield + RPZ	State Safety Zone A outside RPZ	State Safety Zone B	Off Airport	Total
10R	43,437 <sup>A</sup>	0.24456 (4 yrs.) <sup>B</sup>	0.00192 (521 yrs.)	0.00467 (214 yrs.)	0.07657 (13 yrs.)	0.32772 (3 yrs.)
28L	45,783 <sup>A</sup>	0.24704 (4 yrs.)	0.03837 (26 yrs.)	0.00489 (204 yrs.)	0.05511 (18 yrs.)	0.34542 (3 yrs.)
10L	43,437 <sup>A</sup>	0.24511 (4 yrs.)	0.01043 (96 yrs.)	0.00576 (174 yrs.)	0.06642 (15 yrs.)	0.32772 (3 yrs.)
28R	45,783 <sup>A</sup>	0.25742 (4 yrs.)	0.00880 (114 yrs.)	0.00285 (351 yrs.)	0.07635 (13 yrs.)	0.34542 (3 yrs.)
18	12,454	0.07372 (14 yrs.)	0.00454 (220 yrs.)	0.00207 (484 yrs.)	0.01363 (73 yrs.)	0.09396 (11 yrs.)
36	12,204	0.07198 (14 yrs.)	0.00431 (232 yrs.)	0.00196 (511 yrs.)	0.01383 (72 yrs.)	0.09207 (11 yrs.)

<sup>A</sup> Parallel runway operations are combined.

<sup>B</sup> Average number of years between an accident assuming 2025 forecast operations at the runway end remain constant.

For example, the estimated number/overall probability of an annual accident that could occur for the Runway 10R end is 0.32772 ( $0.75447 \times 43,437 / 100,000$ ). Land use in Safety Zone A outside the RPZ would have an annual probability of 0.00192 accidents per 43,437 operations or one accident every 521 years (assuming 43,437 operations each year). Land use in State Safety Zone B would have an annual probability of 0.00467 accidents per 43,437 operations or one accident every 214 years. All the probabilities are calculated for 2025 forecast traffic levels. Any increase or decrease in operations off the west end of Runway 10R-28L would proportionally increase or decrease the probability of an accident.

As shown in **Table 6**, there is a higher probability of an accident/crash in the Off Airport area than in Safety Zone A outside the RPZ and Safety Zone B at each runway end. This is due to the size of the Off Airport area; the probability of a crash at a site within the area would be lower. All the probabilities are calculated for 2025 forecast traffic levels. Any increase or decrease in operations off the ends of the runways would proportionally increase or decrease the probability of an accident.

The average number of years between an accident in Safety Zone A outside the RPZ varies from 26 years for the Runway 28L end to 521 years for the Runway 10R end, assuming the 2025 forecast operations at the runway ends remain constant. The average number of years between an accident in Safety Zone B varies from 174 years for the Runway 10L end to 511 years for the Runway 36 end, assuming the 2025 forecast operations at the runway ends remain constant.

It is important to recognize that the probabilities in each analysis area presented in **Table 6** assume an above ground object equal to the total size of each analysis area. An object/structure on a specific site within an analysis area would have a much lower probability of a collision by an aircraft. The purpose of the Mn/DOT safety standards is to protect the lives and property of users of the airport and of occupants of land in its vicinity.<sup>4</sup> The only existing occupants of land in the analysis areas are the residential areas in State Safety Zone B at the Runway 10R and 28R ends and the residential and park areas at the 28L end. Based on Figure 3.2, Land Use Guide Plan Map 2030, in the adopted Eden Prairie Comprehensive Plan Update 2007, land use with occupants in the analysis areas expected by 2025 is shown in **Figures 7 and 8** (none are planned at the Runway 18-36 ends). Inspection of **Figures 7 and 8** shows there are two (2) accidents from the Berkeley study in the land use area with occupants in 10L Zone B, four (4) in 10R Zone B, three (3) in 28R Zone B, ten (10) in 28L Zone B and three (3) in 28L Zone A. The probability of an accident in these areas is given in **Table 7**. The average number of years between accidents in these areas varies from 388 years to 1,821 years, assuming the 2025 forecast operations at the runway ends remain constant.

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<sup>4</sup> Minnesota Law, Chapter 360.062(a)

**Table 7**  
**Probability of an Accident in Existing and Planned Occupant Areas within the Mn/DOT Safety Zones in 2025**

Runway End	2025 Forecast Per 100,000 Operations	State Safety Zone A outside RPZ		State Safety Zone B	
		Probability	Avg. Yrs. Between Accident	Probability	Avg. Yrs. Between Accident
10R	0.43437 <sup>A</sup>			0.001098 (0.43437 x 0.75447 x 4/1,194)	910
28L	0.45783 <sup>A</sup>	0.0007727 (0.45783 x 0.75447 x 3/1,341)	1,294	0.002576 (0.45783 x 0.75447 x 10/1,341)	388
10L	0.43437 <sup>A</sup>			0.0005494 (0.43437 x 0.75447 x 2/1,194)	1,821
28R	0.45783 <sup>A</sup>			0.0007762 (0.45783 x 0.75447 x 3/1,335)	1,288

<sup>A</sup> Parallel runway operations are combined.  
Sources: Figures 3, 4, 7 and 8; Table 4; HNTB analysis.

**X. Comparison of FCM Accident Probabilities to the FAA Collision Standard**

The probability of an accident in each analysis area based on the forecast of operations in **Tables 6 and 7** is converted to 10,000,000 operations by multiplying the values in **Tables 6 and 7** by 10,000,000 divided by the number of operations forecast at each runway end. The results are except for Safety Zone A outside the RPZ at the 10R end and Safety Zone B at the 28R end, which are below the Standard. The probability of an accident in the residential areas is well below the FAA Collision Standard.

It is important to note that if the 2025 forecasted number of operations was increased or decreased, the comparison of accident probabilities for the runway ends in 2025 to the FAA Collision Standard outlined in **Table 8** remains unchanged. This is due to the fact that these probabilities are based upon 10,000,000 operations instead of the forecast number, in accordance with the FAA Collision Standard of one accident per 10 million operations.

**Table 8**  
**Comparison of Accident Probabilities for the Runway Ends in 2025**  
**to the FAA Collision Standard of One Accident per 10 Million Operations**

<b>Runway End</b>	<b>On Airfield + RPZ</b>	<b>State Safety Zone A outside RPZ</b>	<b>State Safety Zone B</b>	<b>Off Airport</b>	<b>FAA Collision Standard</b>
10R	56.30	0.44	1.07	17.63	1.00
10R Occupant Area in E.P. 2030 Plan			0.253		1.00
28L	53.93	8.38	1.07	12.04	1.00
28L Occupant Area in E.P. 2030 Plan		0.169	0.563		1.00
10L	56.43	2.40	1.33	15.29	1.00
10L Occupant Area in E.P. 2030 Plan			0.126		1.00
28R	56.23	1.92	0.62	16.68	1.00
28R Occupant Area in E.P. 2030 Plan			0.170		1.00
18	59.19	3.65	1.66	10.95	1.00
36	58.98	3.53	1.60	11.33	1.00

Sources: NTSB 1988-2007 data; *California Airport Land Use Planning Handbook (January 2002)* data; Figure 3.2, Land Use Guide Plan Map 2030, Eden Prairie Comprehensive Plan Update 2007; HNTB analysis.

## **XI. Risk**

According to the FAA, risk is the composite of predicted severity and likelihood of the potential effect of a hazard. The FAA published a *Safety Management System Manual (Version 1.1)* in May 21, 2004, which is applicable to air traffic control (ATC) and navigation services in the National Airspace System. Excerpts from the Manual are presented in Appendix A.2. As presented in Table 4.3 of the Manual, the likelihood of the most severe consequence from an occurrence is “extremely remote” if the probability is equal to or less than 1 in 10,000,000 operations, and is “extremely improbable” if it occurs less than once every 100 years. For development in the existing and planned occupant areas in Mn/DOT Safety Zones at each FCM runway end, the likelihood of fatalities from an accident is extremely remote based on the FAA criteria – since each is less than 1 in 10,000,000 operations and would occur less than once every 100 years<sup>5</sup>.

Risk is measured in probability of a certain level of consequence (e.g., probability of fatalities). An aircraft accident in the vicinity of FCM would have different consequences. For example, if the pilot has some control of the aircraft and there is enough altitude and an open space to carry out the emergency operation, he/she may do it safely. However, if the area where the pilot can

<sup>5</sup> The least occurrence in an occupant area is 388 years, which is 0.26 occurrences every 100 years.

land has buildings and structures, he/she may not be able to land safely and the consequences can be severe. If the pilot has no control, even with open spaces, there is the possibility of additional consequences to the accident if the aircraft strikes a building or a structure. The Berkeley study identified that in only 5 percent of the accidents in the vicinity of airports, the pilot had no control of the aircraft.

The potential severity of an off-airport aircraft accident is highly dependent upon the nature of the land use at the accident site. Three characteristics are most important -- intensity of use; type of use (residential or non-residential); and sensitivity of use. Uses that attract a large assembly of people are the most severe. Uses that are populated 24 hours a day and 365 days a year (e.g., hospitals and nursing homes) are more likely to result in a fatality than uses that are not.

## **XII. The Concept of “Acceptable Risk”**

In striking a balance between land use restrictions based on safety and the social and financial costs to the community, the concept of “acceptable risk” should be discussed. A discussion of the concept of acceptable airport-related risk taken from the California Department of Transportation (Caltrans) *Airport Land Use Handbook, December 1993*, is presented in Appendix A.3. Mn/DOT representatives have stated that the Mn/DOT State Safety Zones and land use restrictions therein are historically based on the 1952 *Report to the President’s Airport Commission*, chaired by General Doolittle.<sup>6</sup> The Mn/DOT minimum standard for land use in Safety Zone A is the same as that for the FAA RPZ – no structure or use that creates, attracts, or brings together an assembly of persons therein. In other words, Safety Zone A is ideally to have zero risk to a person or structure as the result of an aircraft crash in the zone -- that is, *absolute safety* for individuals in Safety Zone A outside the RPZ (the RPZ is regulated by the FAA).<sup>7</sup>

As presented in the [1993] Caltrans report, “With respect to airport-related risks, the assessment presented in the 1952 *Report to the President’s Airport Commission*, chaired by General Doolittle, remains valid today. The report remarks that:

“Absolute safety for the individual is an ideal which has ever been sought but never attained. Because man does not have full control over his environment, the very function of living has inherent hazards which become more pronounced as the scheme of living grows more complex. Thus, since absolute safety is a theoretical concept, one can speak only of relative risk (pages 47-48).”

The report goes on to say that:

“... ‘calculated risk’ is an American concept which gives mobility to the whole social structure. The phrase simply means a willingness to embark deliberately on a course of action which offers prospective rewards outweighing its estimated dangers” (page 49).”

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<sup>6</sup> May 15, 2008 meeting of the St. Paul Downtown Airport Joint Airport Zoning Board

<sup>7</sup> Minnesota Law, Chapter 360.062, grandfathers existing land uses that are not airport hazards, but they become nonconforming uses under the Mn/DOT Rules.



Based on the above, the Mn/DOT land use compatibility standards appear to be inconsistent with the Doolittle report. Mn/DOT has the most restrictive airport safety zoning standards in the United States. As presented in Appendix A.4, it is (as of 2002) the only state with laws or rules that restrict commercial, industrial, and residential uses in airport safety zones other than the RPZ. Only five states other than Minnesota had some form of airport-related land use safety zoning.

### **XIII. Findings**

#### **A. Assessment of Minn. Stat. §360.066, subd. 1 Variables in the Context of FCM**

##### Character of Flying Operations Expected at FCM

- The character of flying operations is based on the types of aircraft operating at the airport, the purposes of their operations and their safety records;
- There are fewer accidents by jet aircraft than single engine piston (SEP) aircraft;
- The expected proportion of based aircraft at FCM in 2025 is 15% jets and 71% SEP;
- FCM provides the facilities and services to attract and serve aircraft that require a runway less than or equal to 5,000 feet;
- Accident rates and associated probabilities are directly related to the character of the flying operations at a given airport.

##### Location of FCM and Nature of Terrain in State Safety Zones A and B

- The airport location is generally good for airport operations; there are no features that cause substantive turbulence or adverse wind conditions;
- State Safety Zones A and B overlay relatively flat terrain to the west and east, the Minnesota River Valley to the south and Staring Lake to the north. Higher than normal climb and descent rates are not necessary. The runways have standard approach and departure procedures.

#### **B. Probability of Accident Compared to the FAA Collision Standard**

##### State Safety Zone A outside the RPZ

- The average number of years between an accident at the runway ends varies from 26 years for the Runway 28L end to 521 years for the Runway 10R end, assuming the 2025 forecast operations at the runway ends remain constant.
- Assuming an above-ground object equal to the total size of Zone A outside the RPZ, the probability of an aircraft accident at the Runway 10R end in 2025 is less than the FAA Collision Standard of 1.0 accidents per 10,000,000 operations and greater than the Standard at the Runway 18, 36, 10L, 28R and 28L ends.

##### State Safety Zone B

- The average number of years between an accident at the runway ends varies from 174 years for the Runway 10L end to 511 years for the Runway 36 end, assuming the 2025 forecast operations at the runway ends remain constant.
- Assuming an above-ground object equal to the total size of Zone B, the probability of an aircraft accident at the Runway 28R end in 2025 is less than the FAA Collision Standard

of 1.0 accidents per 10,000,000 operations and greater than the Standard at the Runway 18, 36, 10L, 10R and 28L ends.

- There is a higher probability of an aircraft accident/crash in the Off Airport area than in Safety Zone A outside the RPZ and Safety Zone B at each runway end.

#### Occupant Areas in State Safety Zones

- Minnesota Law states that the purpose of the Mn/DOT safety standards is to protect the lives and property of users of the airport and of occupants of land in its vicinity.
- The probabilities of an aircraft accident in the areas where people could use/occupy the land based on the Land Use Guide Plan Map 2030 in the *Eden Prairie Comprehensive Plan Update 2007* are as follows:
  - 0.253 per 10,000,000 operations in Runway 10R State Safety Zone B
  - 0.169 per 10,000,000 operations in Runway 28L State Safety Zone A
  - 0.563 per 10,000,000 operations in Runway 28L State Safety Zone B
  - 0.126 per 10,000,000 operations in Runway 10L State Safety Zone B
  - 0.170 per 10,000,000 operations in Runway 28R State Safety Zone B

These probabilities are well below the FAA Collision Standard of one (1.0) accident per 10,000,000 operations.

- The least accident occurrence in an occupant area in a State Safety Zone is 388 years, which is 0.26 occurrences every 100 years.
- The likelihood of a fatality from an accident in the occupant areas in the State Safety Zones is extremely remote based on FAA Risk Criteria – since the probability of each accident is less than 1.0 per 10,000,000 operations and would occur less than once every 100 years in these areas.

#### **C. Accident Severity and Pilot Control**

- The potential severity of an off-airport aircraft accident is highly dependent upon the nature of the land use at the accident site. Three characteristics are most important—intensity of use; type of use (residential or non-residential); and sensitivity of use. Uses that attract a large assembly of people are the most severe. Uses that are populated 24 hours a day and 365 days a year (e.g., hospitals and nursing homes) are more likely to result in a fatality than uses that are not.
- The Berkeley study found that the pilot had control of the aircraft in 95 percent of the accidents that occurred in the vicinity of GA airports – only 5 percent had no control.

#### **D. General Conclusion from the Findings**

- While the findings of this study do not establish that strict application of the Mn/DOT Modeling Zoning Ordinance is required to provide a reasonable standard of safety around FCM, they do support additional consideration be given to land use controls around the airport beyond what might be applied when the accident probability within a State Safety Zone is less than 1 accident in 10 million operations.

## **Appendix A**

- A.1 NTSB Accident Data for FCM
- A.2 FAA Risk Criteria
- A.3 The Concept of Acceptable Risk
- A.4 Survey of Airport Land Use Safety Zoning by other States

## A.1 NTSB Accident Data for FCM

The following is a summary of the incident reports in the NTSB record for FCM between 1989 and 2008. These are incidents located within 20,000 feet of a runway end.

#	Event Date	Make / Model	Event Severity	Type of Operation	Description
1	8/12/2009 <sup>1</sup>	Beech E18S	Substantial Damage 2 Fatalities	Part 91: General Aviation	Aircraft collided with terrain following loss of control after take-off.
2	7/15/2007	Mooney M20J	Substantial Damage Minor Injuries	Part 91: General Aviation	Aircraft collided with terrain following loss of control during take-off.
3	10/27/2006	Bellanca 7ECA	Substantial Damage No Injuries	Part 91: General Aviation	Aircraft hit a sign during landing.
4	7/4/2005	Piper PA-32-300	Substantial Damage No Injuries	Part 91: General Aviation	Aircraft hit a sign during landing.
5	10/9/2004	Buss Rotorway Exec	Substantial Damage No Injuries	Part 91: General Aviation	Helicopter lost power during landing approach. Hit crops in field.
6	1/19/2004	Piper PA-46-500TP	Substantial Damage No Injuries	Part 91: General Aviation	Gear-up forced landing following loss of power during take-off.
7	7/2/2003	Debay Dragonfly Mark II	Substantial Damage Serious Injuries	Part 91: General Aviation	Lost power and hit trees and terrain after take-off.
8	7/19/2001	Mooney M-20R	Substantial Damage 1 Fatality	Part 91: General Aviation	Lost power and hit trees and terrain after take-off.
9	7/17/2001	Beech B19	Substantial Damage Minor Injuries	Part 91: General Aviation	Bounced while landing. Veered off runway. Nose gear collapsed.
10	10/20/2000	Piper PT-46	Substantial Damage No Injuries	Part 91: General Aviation	Bounced while landing. Propeller hit ground.
11	6/8/2000	Piper PA-28-161	Substantial Damage Minor Injuries	Part 91: General Aviation	Lost power on take-off. Tried to return. Hit trees and landed in swamp.
12	8/30/1999	Piper PA-24-180	Substantial Damage No Injuries	Part 91: General Aviation	Landed gear up.

13	7/31/1999	Cessna 310N	Substantial Damage No Injuries	Part 91: General Aviation	Landing gear collapsed while landing. Veered off runway, hitting taxiway sign.
14	11/25/1998	Piper PA-28- R200	Substantial Damage No Injuries	Part 91: General Aviation	Landed then lost steering and veered off runway and hit VASI.
15	9/8/1998	Culver- Revolution MINI 500	Substantial Damage No Injuries	Part 91: General Aviation	Helicopter lost power while hover taxiing on airport. Hit ground.
16	2/8/1998	Beech C-23	Substantial Damage Minor Injuries	Part 91: General Aviation	Hit hangar, fence, ditch and highway during go-around procedure.
17	11/20/1997	Mooney M20K	Substantial Damage No Injuries	Part 91: General Aviation	Hit runway edge lights while landing.
18	9/8/1996	Cessna 182	Substantial Damage No Injuries	Part 91: General Aviation	Ran out of fuel, lost power then landed short of runway.
19	8/21/1996	Beech C-23	Substantial Damage No Injuries	Part 91: General Aviation	Landed hard on runway.
20	12/22/1995	Beech 58	Substantial Damage No Injuries	Part 91: General Aviation	Landed short of runway.
21	12/10/1995	Beech B90	Substantial Damage No Injuries	Part 91: General Aviation	Hit a hangar during taxiing.
22	7/26/1995	Cessna 550	Substantial Damage No Injuries	Part 91: General Aviation	Veered off end of runway while landing.
23	2/13/1994	Piper PA-38- 112	Substantial Damage Serious Injuries	Part 91: General Aviation	Hit power lines during landing.
24	12/23/1993	Beech C23	Substantial Damage No Injuries	Part 91: General Aviation	Lost power while landing wing hit terrain.
25	12/10/1991	Cessna 140	Substantial Damage No Injuries	Part 91: General Aviation	Aircraft swerved off the runway and nosed over.

26	4/22/1990	Lake LA-4-200	Substantial Damage No Injuries	Part 91: General Aviation	Landing gear hit deer on runway while landing. Cartwheeled to a stop.
27	4/16/1990	Cessna 210	Substantial Damage Minor Injuries	Part 91: General Aviation	Veered off runway during landing. Tried go-around, aircraft bounced and wing hit, cartwheeled to stop.
28	3/30/1990	Bellanca 8KCAB	Substantial Damage No Injuries	Part 91: General Aviation	Flat tire caused aircraft to veer off runway during landing. Nosed over.
29	8/6/1989	Stinson L-5	Substantial Damage No Injuries	Part 91: General Aviation	Veered off runway during takeoff due to crosswinds.

<sup>1</sup>Since 2009 operations data is not yet available; accidents from 2009 are not included in the accident rate.

An “accident” is defined as an occurrence associated with the act of operating an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage as the result of a collision with the ground or an object on the ground (since the FAA Probability Standard is based on collisions). An “FCM accident” is an “accident” due to an FCM operation that was located within five miles of FCM. An “incident” is defined as an occurrence other than an accident that is associated with the act of operating an aircraft and that affects, or could affect, the safety of an operation.

The analysis in this memorandum considers FCM accidents during the past 20 years (1989 – 2008). The use of the past 20 years of accident data is consistent with the accident frequency data presented annually by the NTSB and with page 10 of Appendix 7 of the Mn/DOT *Airport Land Use Compatibility Manual*.

## **A.2 FAA Risk Criteria**

The FAA published a *Safety Management System Manual (Version 1.1)* in May 21, 2004, which is applicable to air traffic control (ATC) and navigation services in the National Airspace System (NAS). The following pages are taken from the *Safety Management System (SMS) Manual*.

**Table 4.2 - Severity Definitions**

Effect On: ↓	Hazard Severity Classification				
	No Safety Effect	Minor	Major	Hazardous	Catastrophic
<b>General</b>		Does not significantly reduce system safety. Required actions are within operator's capabilities. Includes (see below):	Reduces the capability of the system or operators to cope with adverse operating conditions to the extent that there would be a (see below):	Reduces the capability of the system or the operator's ability to cope with adverse conditions to the extent that there would be a (see below):	Total loss of systems control such that (see below):
<b>Air Traffic Control</b>	Slight increase in ATC workload	Slight reduction in ATC capability, or significant increase in ATC workload	Reduction in separation as defined by a low/moderate severity operational error (as defined in FAA Order 7210.56), or significant reduction in ATC capability	Reduction in separation as defined by a high severity operational error (as defined in FAA Order 7210.56), or a total loss of ATC (ATC Zero)	Collision with other aircraft, obstacles, or terrain
<b>Flying Public<sup>12</sup></b>	<ul style="list-style-type: none"> <li>- No effect on flight crew</li> <li>- Has no effect on safety</li> <li>- Inconvenience</li> </ul>	<ul style="list-style-type: none"> <li>- Slight increase in workload</li> <li>- Slight reduction in safety margin or functional capabilities</li> <li>- Minor illness or damage</li> <li>- Some physical discomfort</li> </ul>	<ul style="list-style-type: none"> <li>- Significant increase in flight crew workload</li> <li>- Significant reduction in safety margin or functional capability</li> <li>- Major illness, injury, or damage</li> <li>- Physical distress</li> </ul>	<ul style="list-style-type: none"> <li>- Large reduction in safety margin or functional capability</li> <li>- Serious or fatal injury to small number</li> <li>- Physical distress/excessive workload</li> </ul>	Outcome would result in: <ul style="list-style-type: none"> <li>- Hull loss</li> <li>- Multiple fatalities</li> </ul>

<sup>12</sup> For more information regarding these definitions, refer to FAA Advisory Circular 25.1309-1A, *System Design Analysis*, 06-21-88.



4.40 *What is likelihood, and how is it related to risk assessment?*

Remember that risk is the composite of the predicted severity and likelihood of the outcome or effect (harm) of the hazard in the worst credible system state. Likelihood is an expression of how often an event is expected to occur.

Severity must be considered in the determination of likelihood. Likelihood is determined by how often the resulting harm can be expected to occur at the worst credible severity. When determining likelihood, the worst credible system states will usually determine the worst credible severity.

Likelihood definitions should be tailored to the domain and service. Table 4.3 provides likelihood definitions that could be used in this step or could be used as information to support developing definitions that work for the change to be assessed.

NAS Systems' likelihood definitions (first three columns) are currently in use when acquiring new systems. Flight Procedures definitions (the fourth column) are used by Flight Standards (AFS) in assessing flight procedures. ATC Operational definitions (the last two columns) are proposed likelihood definitions for use in assessing ATC operations (e.g., airspace changes, ATC procedures and standards, etc.).

Appendix C contains information and guidance on applying SRM to ATC procedural changes.

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**Table 4.3 - Likelihood Definitions**

	NAS Systems			Flight Procedures	ATC Operational	
	Quantitative	Qualitative			Per Facility	NAS-wide
		Individual Item/System	ATC Service/NAS Level System			
<b>Frequent</b>	Probability of occurrence per operation/ operational hour is equal to or greater than $1 \times 10^{-3}$	Expected to occur about once every 3 months for an item	Continuously experienced in the system	Probability of occurrence per operation/ operational hour is equal to or greater than $1 \times 10^{-5}$	Expected to occur more than once per week	Expected to occur more than every 1-2 days
<b>Probable</b>	Probability of occurrence per operation/ operational hour is less than $1 \times 10^{-3}$ , but equal to or greater than $1 \times 10^{-5}$	Expected to occur about once per year for an item	Expected to occur frequently in the system		Expected to occur about once every month	Expected to occur about several times per month
<b>Remote</b>	Probability of occurrence per operation/ operational hour is less than or equal to $1 \times 10^{-5}$ but equal to or greater than $1 \times 10^{-7}$	Expected to occur several times in life cycle of an item	Expected to occur numerous times in system life cycle	Probability of occurrence per operation/ operational hour is less than or equal to $1 \times 10^{-5}$ but equal to or greater than $1 \times 10^{-7}$	Expected to occur about once every year	Expected to occur about once every few months
<b>Extremely Remote</b>	Probability of occurrence per operation/ operational hour is less than or equal to $1 \times 10^{-7}$ but equal to or greater than $1 \times 10^{-9}$	Unlikely to occur, but possible in an item's life cycle	Expected to occur several times in the system life cycle	Probability of occurrence per operation/ operational hour is less than or equal to $1 \times 10^{-7}$ but equal to or greater than $1 \times 10^{-9}$	Expected to occur about once every 10-100 years	Expected to occur about once every 3 years
<b>Extremely Improbable</b>	Probability of occurrence per operation/ operational hour is less than $1 \times 10^{-9}$	So unlikely that it can be assumed that it will not occur in an item's life cycle	Unlikely to occur, but possible in system life cycle	Probability of occurrence per operation/ operational hour is less than $1 \times 10^{-9}$	Expected to occur less than once every 100 years	Expected to occur less than once every 30 years

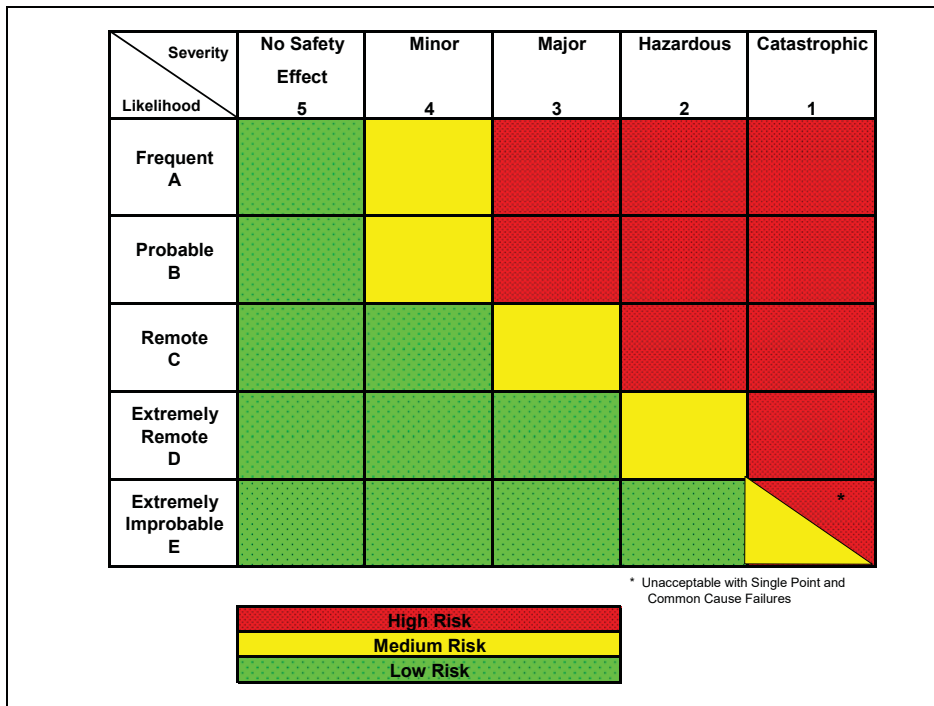
**Phase 4: Assess the Risk**

4.41 What is a risk matrix?

An estimation of risk is determined using the predictive risk matrix in Figure 4.9.

The risk levels used in the matrix can be defined as:

- **High risk** – Unacceptable risk - proposal cannot be implemented unless hazards are further mitigated so that risk is reduced to medium or low level and AOV approves the mitigating controls. Tracking and management are required. Catastrophic hazards that are caused by: (1) single-point events or failures, (2) common cause events or failures, or (3) undetectable latent events in combination with single point or common cause events are considered high risk, even if extremely remote. (Note: high risk is unacceptable at the time of hazard closure. However, for short periods of time, high risk may exist while mitigation plans are put into affect.)
- **Medium risk** – Acceptable risk - minimum acceptable safety objective; proposal may be implemented, but tracking and management are required.
- **Low risk** – Target - acceptable without restriction or limitation; hazards are not required to be actively managed but are documented.



**Figure 4.9 - Predictive Risk Matrix**

### A.3 The Concept of Acceptable Risk

The following discussion is taken from Airport Land Use Handbook, December 1993, prepared for California Department of Transportation by Hodges and Shutt in association with Flight Safety Institute, Chris Hunter & Associates, and University of California, Berkeley, Institute of Transportation.

“Definition of appropriate safety zones is one side of the safety compatibility equation. The other, even more difficult side is establishment of suitable land use criteria to be applied within each zone. As stated in Chapter 3, the basic objective of safety compatibility criteria is to minimize the risks associated with potential aircraft accidents. This objective has two components:

- To protect people and property on the ground when accidents occur; and
- To minimize injury to the occupants of aircraft involved in accidents.

For both of these components, the fundamental question to be answered when attempting to set land use development criteria is *how much risk is acceptable?* Answering this question is made particularly difficult by the fact that aircraft accidents occur infrequently and, for any specific location, probably will never happen. Yet, when an accident does take place, the consequences can be great.

The balancing side to the question of acceptable risk is *how much protection can be afforded?* When an airport is situated in a rural area, well away from development pressures, the cost – to the landowner, the community, and the airport – for a high degree of protection may be low. Important land use development can usually be redirected toward areas where the prospects of an aircraft accident are minimal. At the other end of the spectrum, the need for developable land around urban area airports typically is such that avoidance of only the most risky forms of development – those in the most accident-prone locations or ones which greatly increase the potential severity – may be affordable. The problem with accepting the latter concept, of course, is that an aircraft accident in a developed area hardly ever results in pressure to eliminate the conflicting land use; rather the pressure inevitably is to restrict or close the airport.

Some perspective on this tradeoff can perhaps be gained from a study which examined the implications of another type of hazard – the threat of volcanic eruption (William Spangle and Associates – 1987). A volcanic eruption can reasonably be considered an ultimate example of an event which occurs with very low frequency, but can have catastrophic results when it does occur. One of the responses considered in the report was whether anything at all should be done to protect against such an event given its extreme rarity. On the other hand, the report notes that “the potential for a major catastrophe which could be averted begs for some kind of public response” (page 86). As for where to strike the balance between acceptable risk and affordable protection, the report concludes: “Do what you can, politically and fiscally, to reduce the exposure and provide for effective emergency response and that becomes, by definition, acceptable risk. An official who proposes to go farther than his constituents want will find out quickly what the limits are” (page 86).

With respect to airport-related risks, the assessment presented in the 1952 *Report to the President's Airport Commission*, chaired by General Doolittle, remains valid today. The report remarks that:

“Absolute safety for the individual is an ideal which has ever been sought but never attained. Because man does not have full control over his environment, the very function of living has inherent hazards which become more pronounced as the scheme of living grows more complex. Thus, since absolute safety is a theoretical concept, one can speak only of relative risk” (pages 47-48).

The report goes on to say that:

“... ‘calculated risk’ is an American concept which gives mobility to the whole social structure. The phrase simply means a willingness to embark deliberately on a course of action which offers prospective rewards outweighing its estimated dangers” (page 49).”

## A.4 Survey of Airport Land Use Safety Zoning by other States

The following are the states with airport land use safety zoning in 2002 and the role of the DOT in the adoption of the zoning.

### States with Land Use Safety Zoning Outside the FAA RPZ (Other than Height Restrictions)

State	Responsibility for Adoption	Basis for Zoning Regulations	Applicability	Role of DOT
California (2002)	County establishes Airport Land Use Commission (ALUC) that adopts the zoning	1993 GA study recommendations; zones are based on the actual locations of accidents; major discussion of risk, including its measurement and criteria	General Aviation and Major Airports	Develops handbook that must be used by ALUCs as guidance
Washington	Local Government	1993 California study	General Aviation Airports	Consultation
New Jersey	Affected Municipalities	DOT Standards (zone is 3000' in length from runway end; commercial, industrial and residential uses are permitted outside RPZ)	General Aviation Airports	Adopt Standards
Florida	Local Government	Statute; public and private schools cannot be constructed along the extended runway centerlines	All Public Airports	Guidance; prohibited from establishing land use regulations or disapproving local government zoning regulations.
Maryland	Maryland Aviation Administration (MAA)	MAA; prohibits uses that would interfere with aircraft operations, and frequent or significant congregation of people in designated clear zones (e.g., RPZ)	All State-Owned Airports	Enforcement
Other Studies				
Denver, Colorado Council of Gov'ts	Local Government (not mandatory)	1993 California study statistics	General Aviation Airports	None

Source: HNTB survey, 2002.

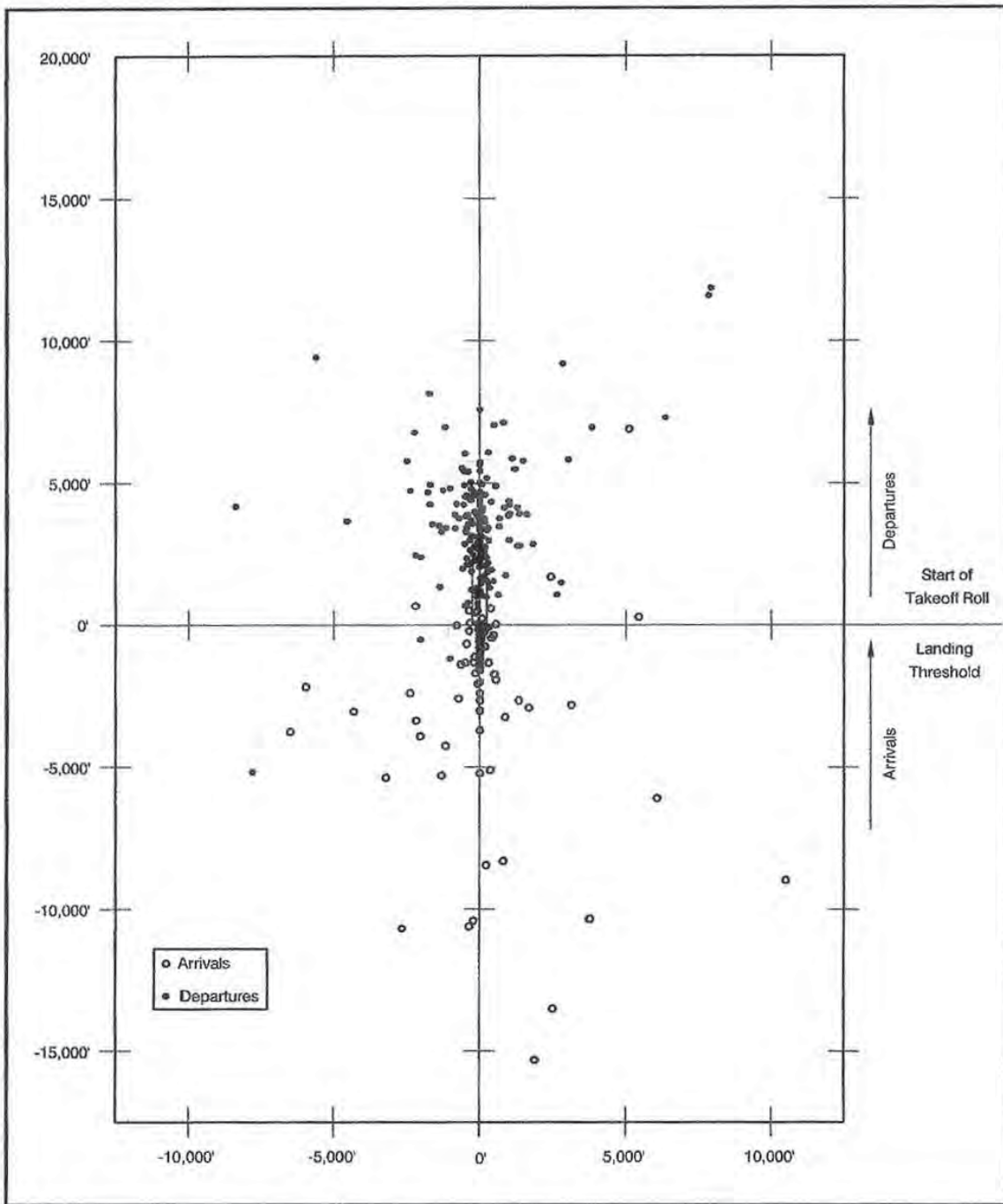
## Appendix B

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- Figure 8 Occupant Areas in State Safety Zones at Runway 28L & 28R Ends



Figure D



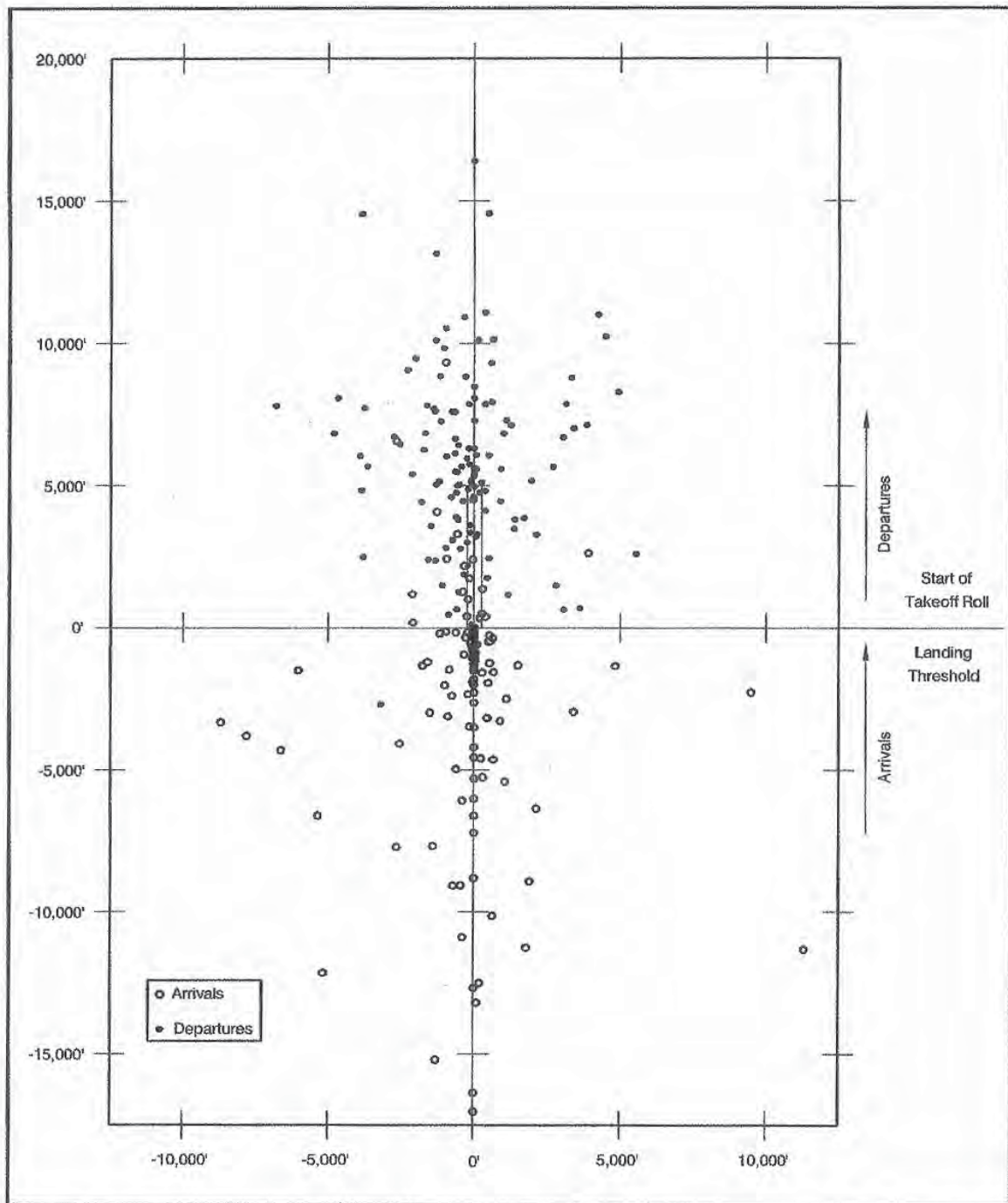
Accidents on Runways of Less than 4,000 Feet

California Airport Land Use Planning Handbook (January 2002)



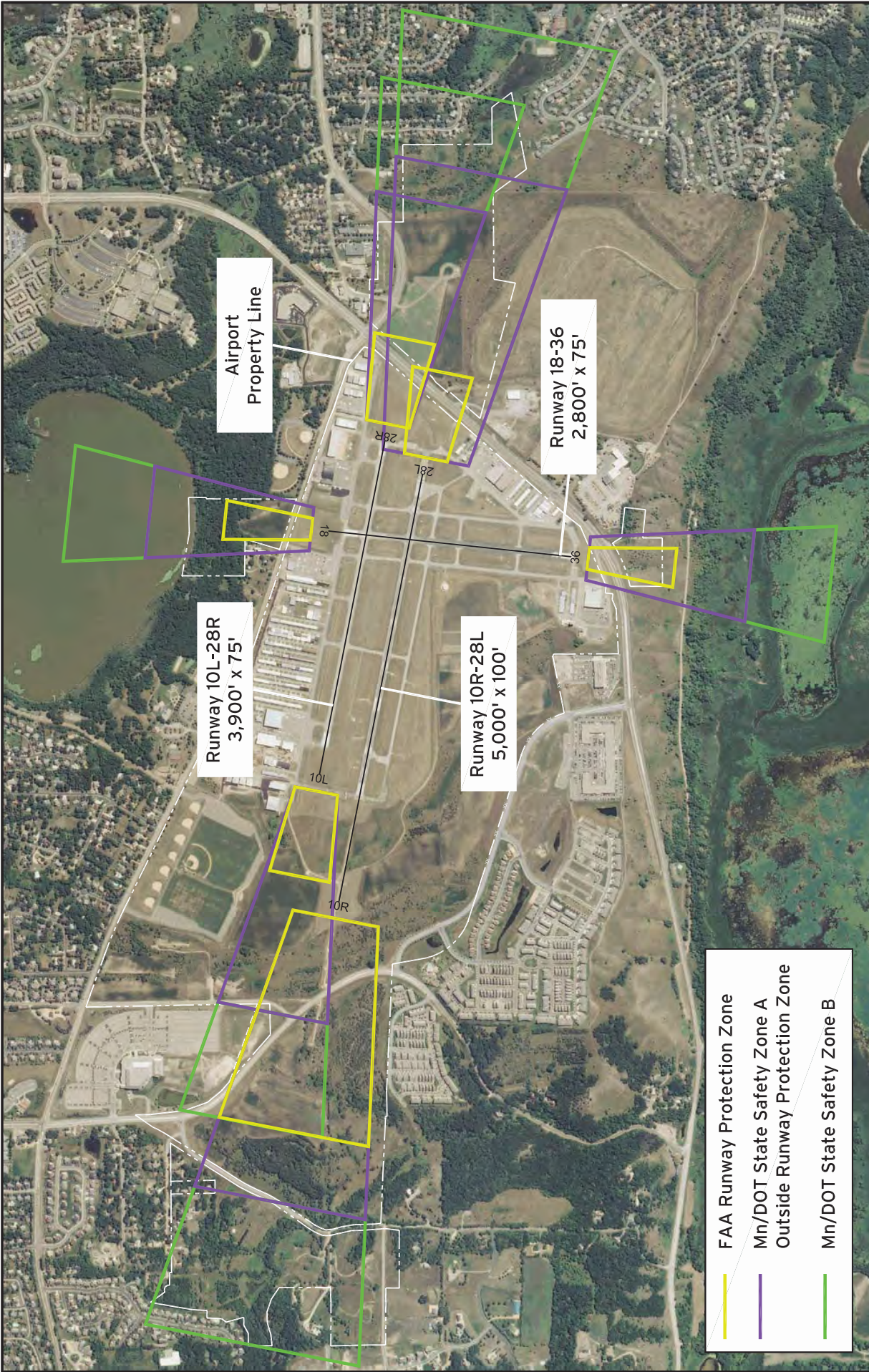


Figure E



## Accidents on Runways of 4,000 to 5,999 Feet

*California Airport Land Use Planning Handbook (January 2002)*

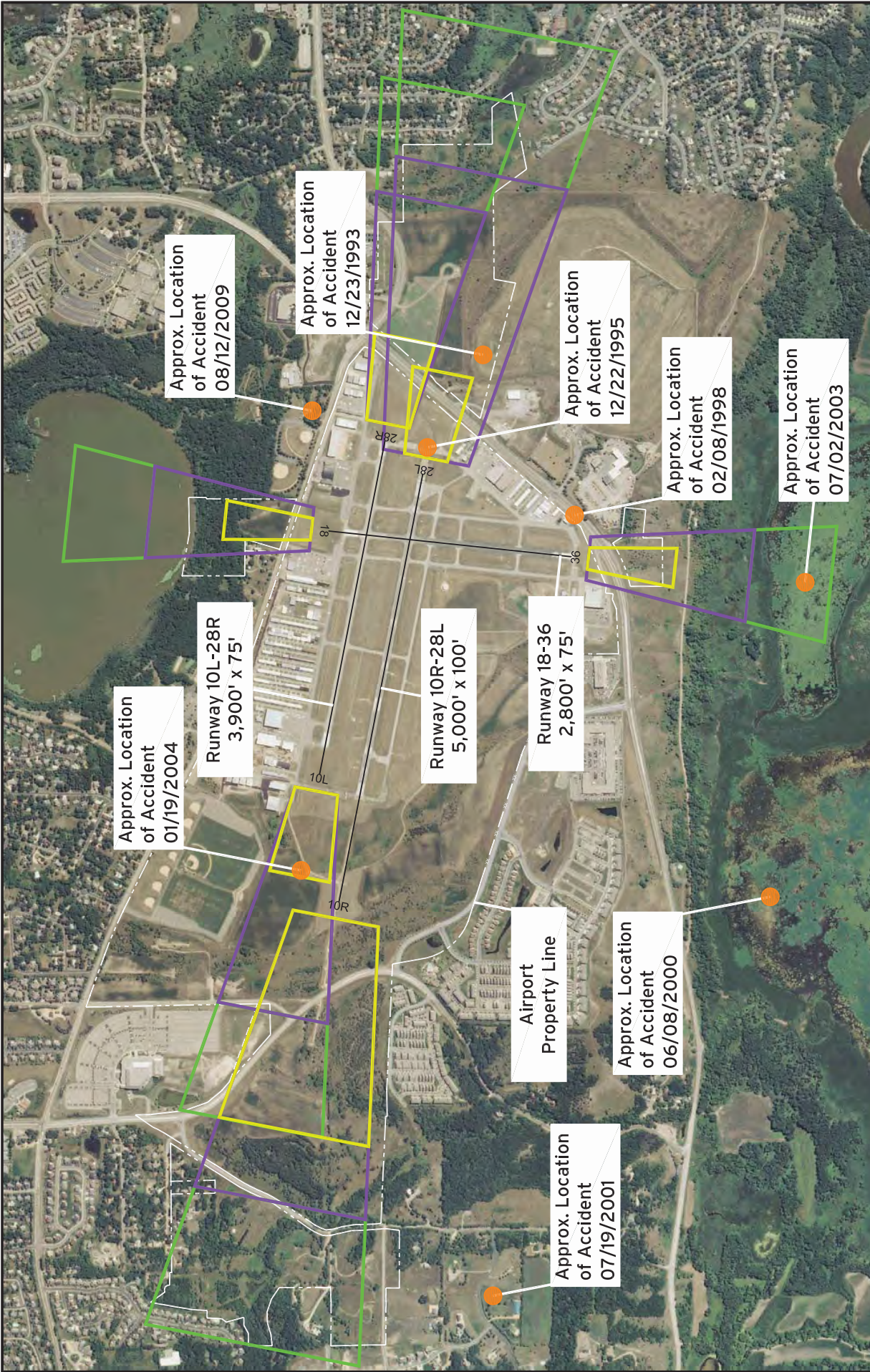


—	FAA Runway Protection Zone
—	Mn/DOT State Safety Zone A Outside Runway Protection Zone
—	Mn/DOT State Safety Zone B

	Runway 10R	Runway 28L	Runway 10L	Runway 28R	Runway 18	Runway 36
FAA Runway Protection Zone	2,500' x 1,000' x 1,750'	1,000' x 500' x 700'	1,000' x 500' x 700'	1,000' x 500' x 700'	1,000' x 250' x 450'	1,000' x 250' x 450'
Mn/DOT State Safety Zone A	3,333' x 1,000' x 2,000'	3,333' x 1,000' x 2,000'	2,600' x 500' x 1,280'	2,600' x 500' x 1,280'	1,867' x 500' x 1,060'	1,867' x 500' x 1,060'
Mn/DOT State Safety Zone B	1,667' x 2,000' x 2,500'	1,667' x 2,000' x 2,500'	1,300' x 1,280' x 1,670'	1,300' x 1,280' x 1,670'	933' x 1,060' x 1,340'	933' x 1,060' x 1,340'

Dimensions: Length x Inner Width x Outer Width

**Figure 1: FCM Analysis Areas**  
 Source: HNTB Analysis, September 2009  
 Aerial Photo: 2008



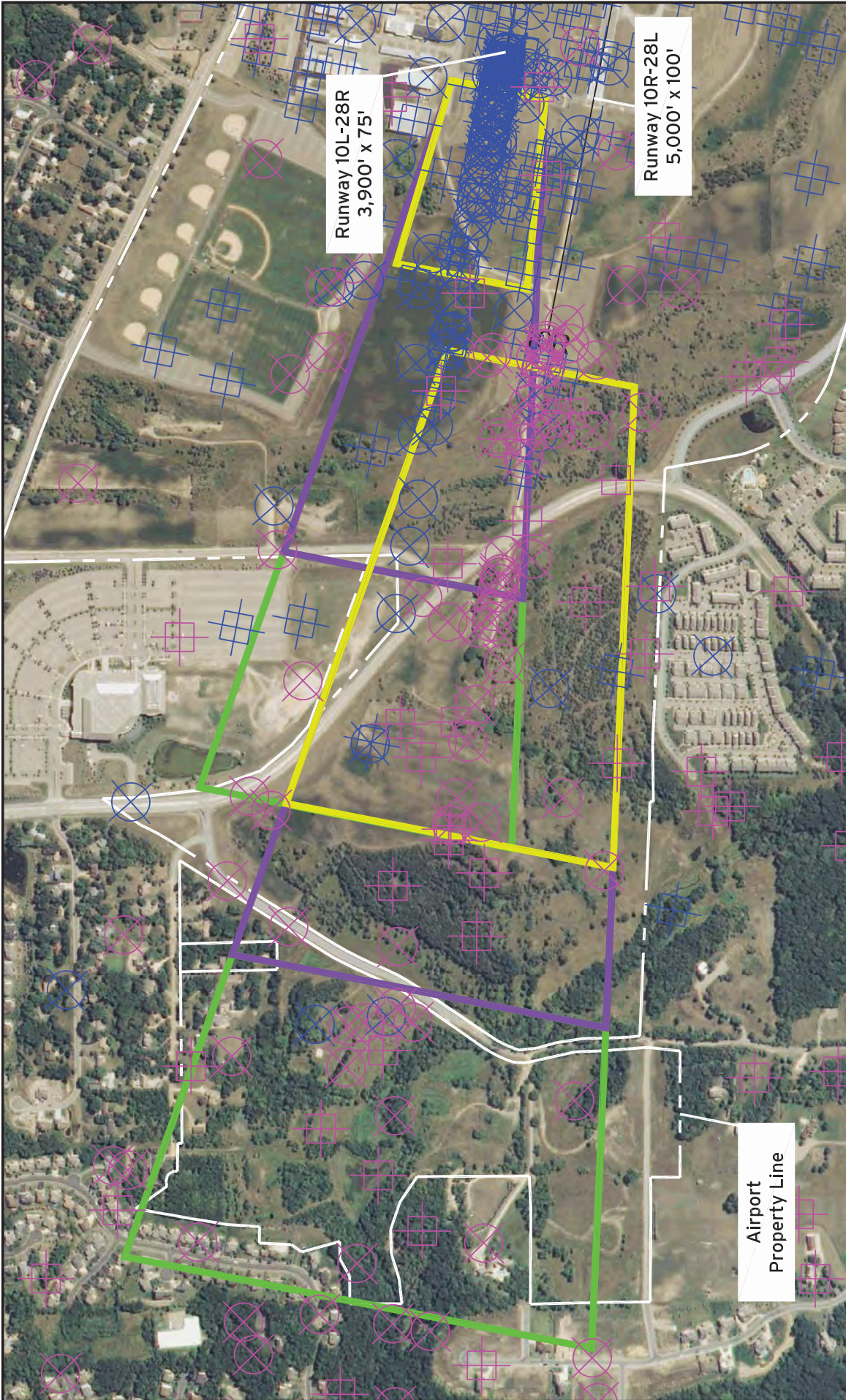
- FAA Runway Protection Zone
- Mn/DOT State Safety Zone A
- Outside Runway Protection Zone
- Mn/DOT State Safety Zone B

**Note:**

- Location of accidents 10/09/2004, 09/08/1996 and 04/16/1990 was not clear in NTSB accident report.
- Accident 02/13/1994 is located outside the limits of the figure.

**Figure 2: 1989-2009 FCM Related Accidents Located in Mn/DOT Safety Zones or Off Airport**

Source: NTSB and HNTB Analysis, September 2009  
Aerial Photo: 2008



Runway 10L-28R  
3,900' x 75'

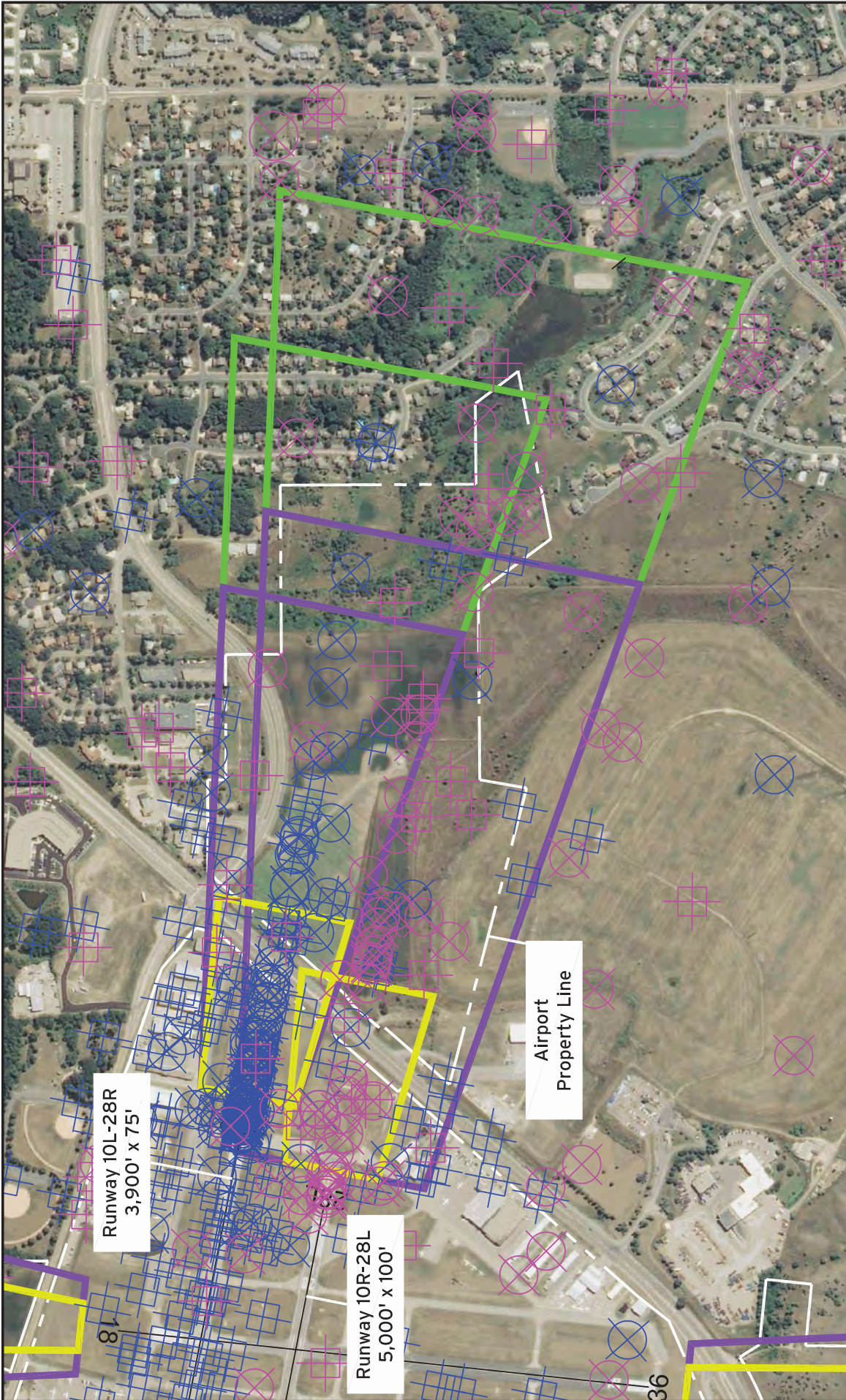
Runway 10R-28L  
5,000' x 100'

Airport  
Property Line

	FAA Runway Protection Zone		Rwy 10R Arrivals		Rwy 28L Departure
	Mn/DOT State Safety Zone A		Rwy 10L Arrivals		Rwy 28R Departure
	Outside Runway Protection Zone				
	Mn/DOT State Safety Zone B				

**Figure 3: Historic National GA Arrival and Departure Accident Locations Superimposed on Runway 10R & 10L Ends**

Source: California Land Use Compatibility Handbook 01/2002  
Aerial Photo: 2008



Runway 10L-28R  
3,900' x 75'

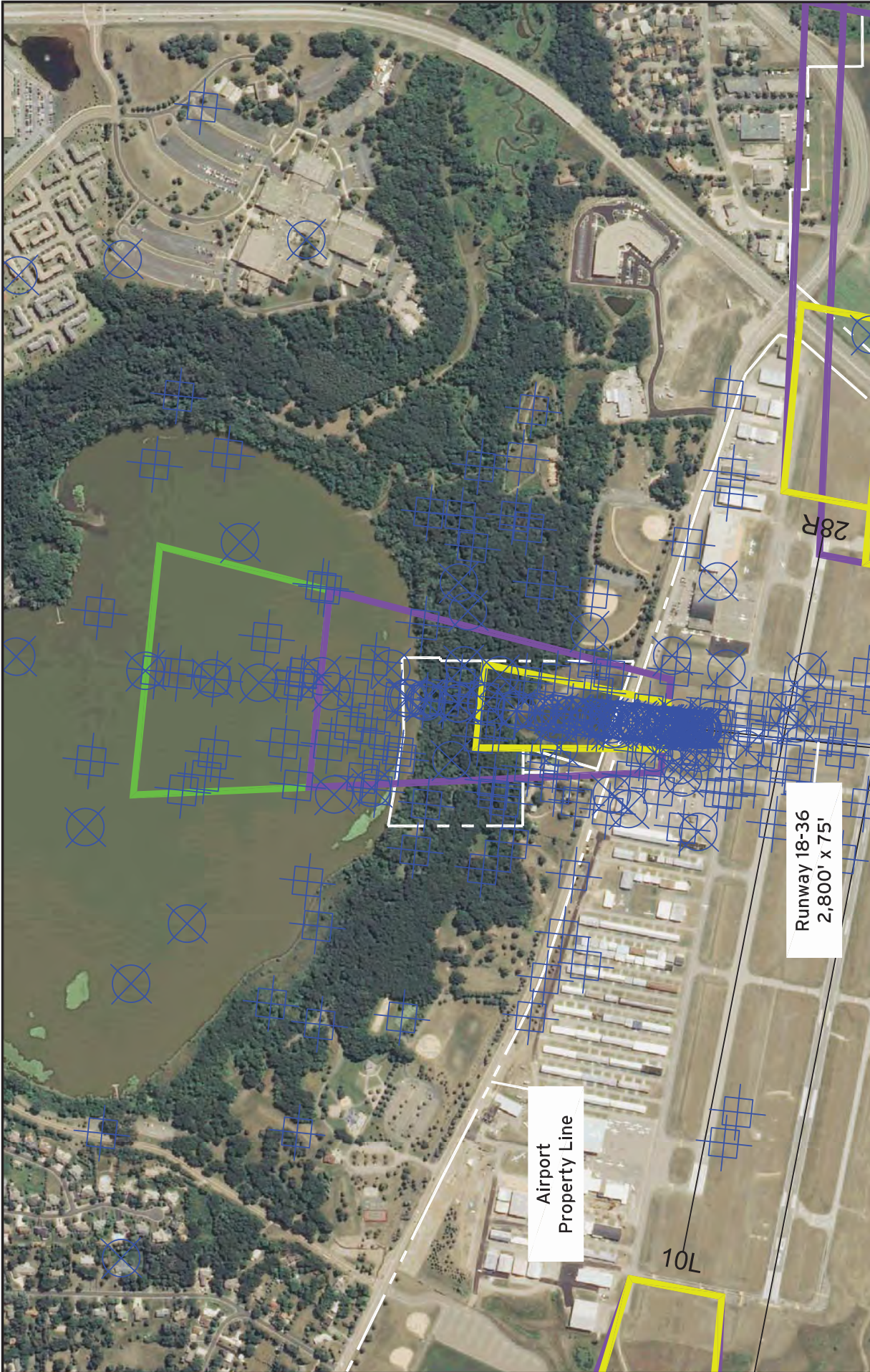
Runway 10R-28L  
5,000' x 100'

Airport  
Property Line

- █ FAA Runway Protection Zone
- █ Mn/DOT State Safety Zone A
- █ Outside Runway Protection Zone
- █ Mn/DOT State Safety Zone B
- ⊗ Rwy 28L Arrivals
- ⊗ Rwy 28R Arrivals
- ⊞ Rwy 10R Departure
- ⊞ Rwy 10L Departure

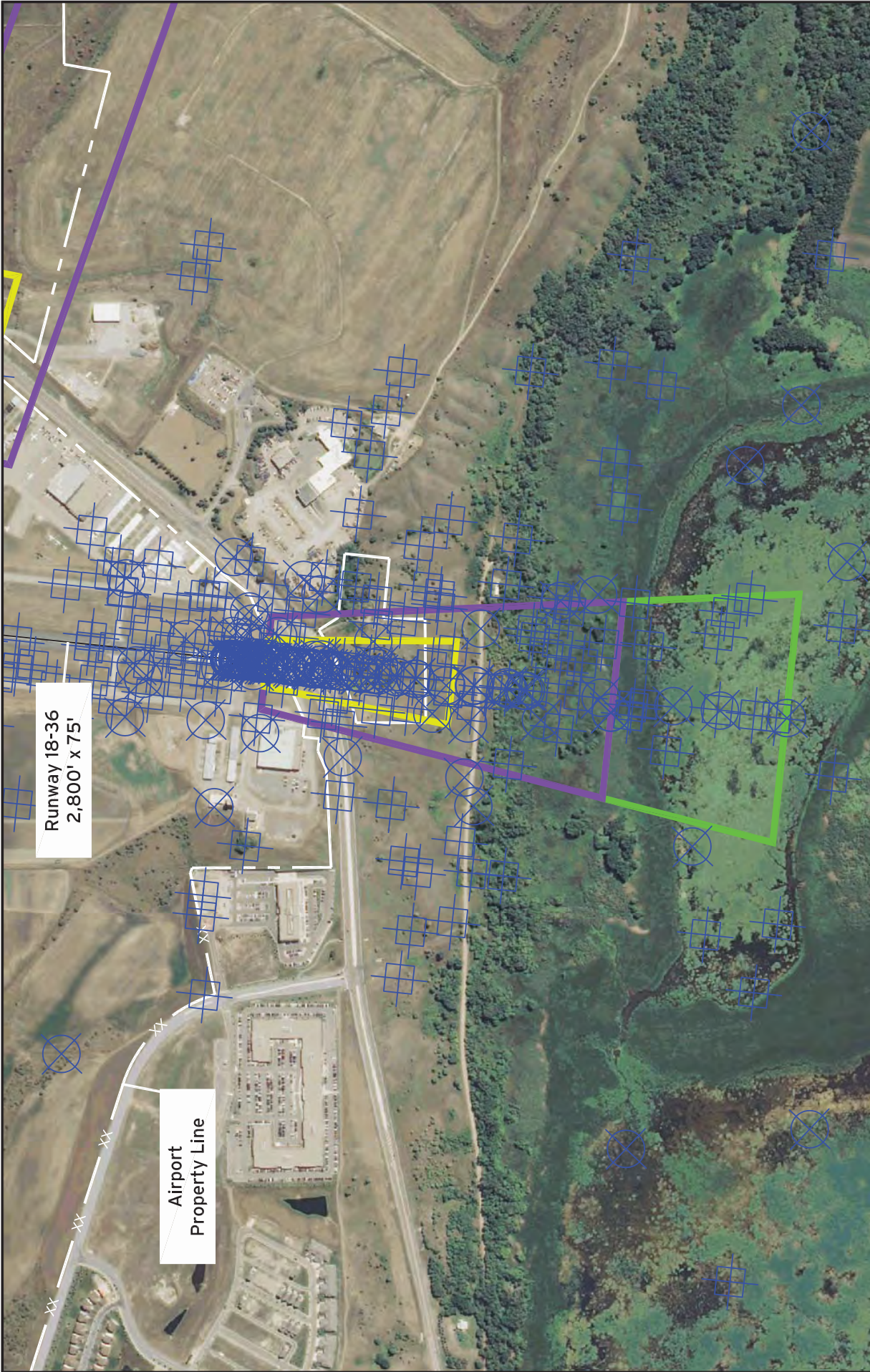
**Figure 4: Historic National GA Arrival and Departure Accident Locations Superimposed on Runway 28L & 28R Ends**

Source: California Land Use Compatibility Handbook 01/2002  
Aerial Photo: 2008



— FAA Runway Protection Zone     — Mn/DOT State Safety Zone B  
— Mn/DOT State Safety Zone A     ⊗ Rwy 18 Arrivals     ⊠ Rwy 36 Departure  
— Outside Runway Protection Zone

**Figure 5: Historic National GA Arrival and Departure Accident Locations Superimposed on Runway 18 End**  
 Source: California Land Use Compatibility Handbook 01/2002  
 Aerial Photo: 2008



Runway 18-36  
2,800' x 75'

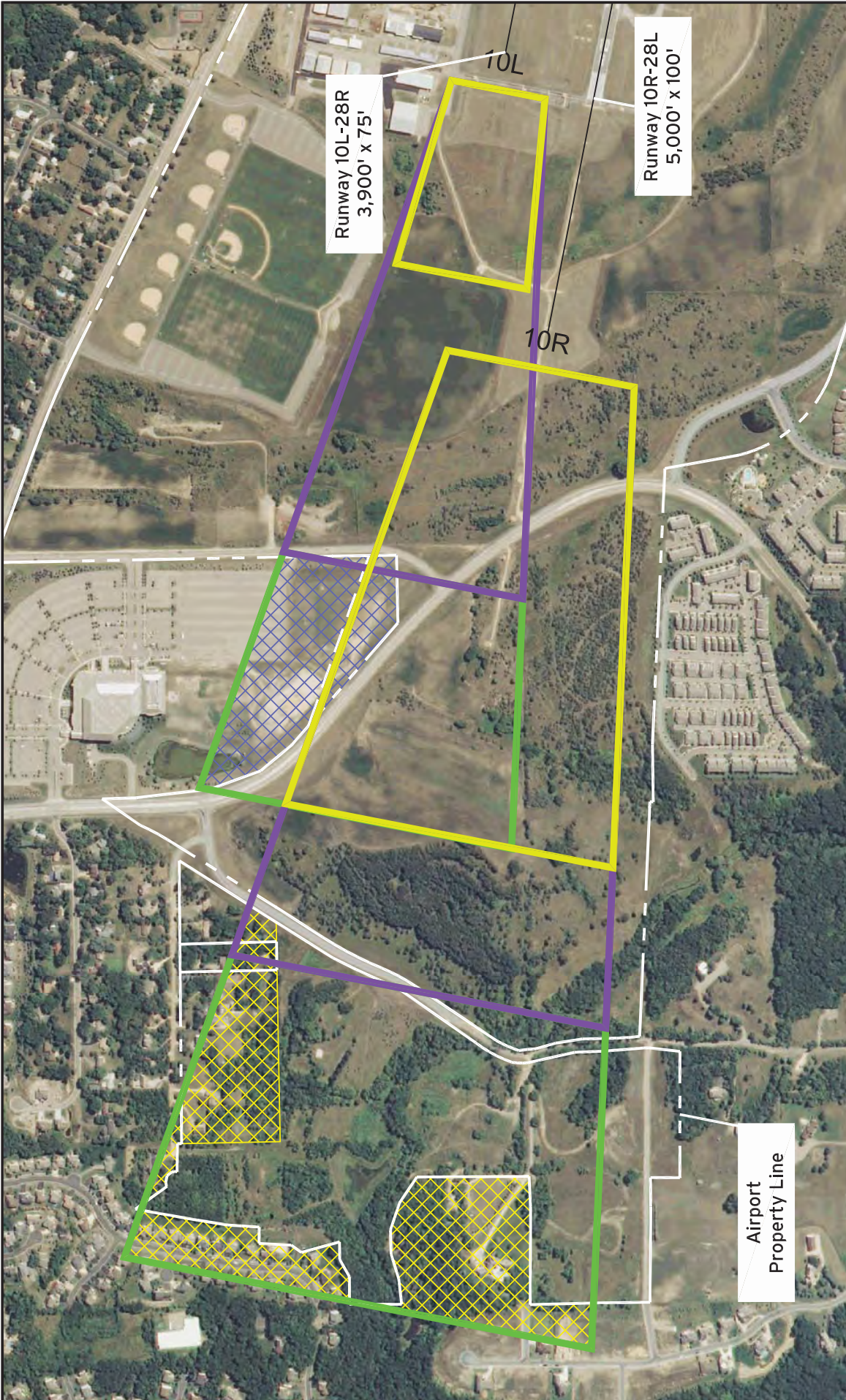
Airport  
Property Line

- FAA Runway Protection Zone
- Mn/DOT State Safety Zone A
- Outside Runway Protection Zone
- Mn/DOT State Safety Zone B

- Rwy 36 Arrivals
- Rwy 18 Departure

**Figure 6: Historic National GA Arrival and Departure Accident Locations Superimposed on Runway 36 End**

Source: California Land Use Compatibility Handbook 01/2002  
Aerial Photo: 2008

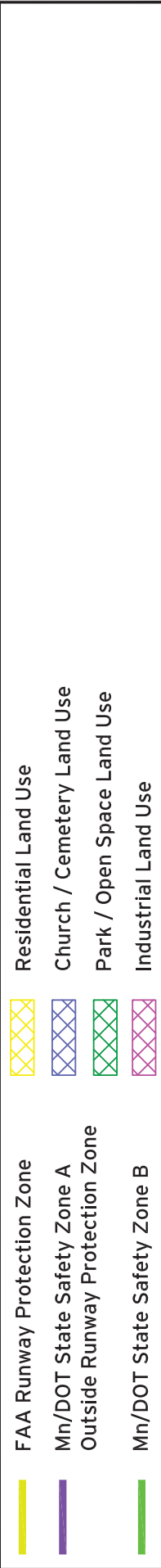
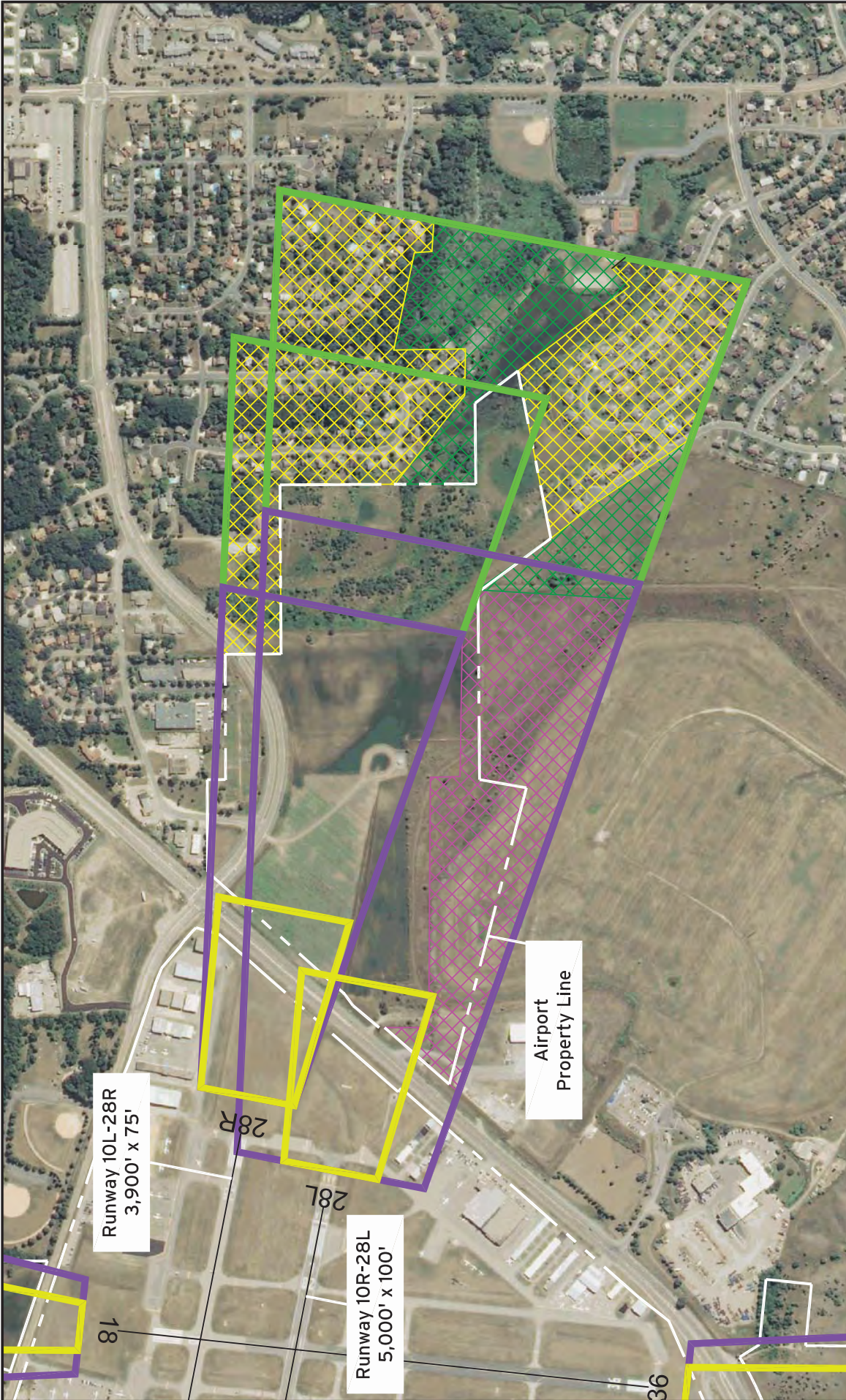


	Residential Land Use
	Church / Cemetery Land Use
	Park / Open Space Land Use
	Industrial Land Use
	FAA Runway Protection Zone
	Mn/DOT State Safety Zone A
	Mn/DOT State Safety Zone B
	Outside Runway Protection Zone

**Figure 7: Occupant Areas in State Safety Zones at Runway 10R & 10L Ends**

Source: Land Use Guide Plan Map 2030,  
Eden Prairie Comprehensive Plan Update 2007  
Aerial Photo: 2008





**Figure 8: Occupant Areas in State Safety Zones at Runway 28L & 28R Ends**

Source: Land Use Guide Plan Map 2030, Edén Prairie Comprehensive Plan Update 2007  
Aerial Photo: 2008

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**Appendix 2: FCM Aircraft Accident Data (1997 – 2016)**

<b>Content</b>	<b>Page</b>
FCM Aircraft Accident Summary (1997 – 2016)	2-1
FCM Aircraft Accident Data Records (1997 – 2016)	2-2

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**Flying Cloud Airport (FCM)  
Aircraft Accidents 1997 - 2016 from NTSB Records**

Event	Event Date	Aircraft Type	Severity	Location	Probable Cause
1	03/09/2014	Cessna 185	Non-Fatal	Airfield	The pilot's loss of directional control during takeoff with a gusty crosswind.
2	08/05/2013	Embraer EMB-505	Non-Fatal	RPZ	The flight crew's failure to execute a go-around during a non-stabilized approach, which resulted in a runway overrun.
3	07/12/2012	Mikoyan MIG-21MF	Non-Fatal	RPZ	The pilot's delayed application of wheel brakes to slow the airplane down on landing and the airplane's failed drag chute, which resulted in a runway overrun.
4	04/08/2011	Rockwell 500	Non-Fatal	Airfield	The pilot's inadequate compensation for the crosswind while landing, which resulted in a loss of directional control.
5	06/27/2010	Beech C23	Non-Fatal	Airfield	The student pilot's loss of airplane control while landing with gusting wind.
6	04/01/2010	Beech 95	Non-Fatal	Model SSZ A	The fatigue failure of an intake valve spring on the right engine, which resulted in a partial loss of engine power on takeoff.
7	08/12/2009	Beech 18S	Fatal	Off-Airport	The pilot's lack of experience flying the accident make and model of airplane, which led to a loss of control while maneuvering to return to the airport. Contributing to the accident was a partial loss of engine power for undetermined reasons.
8	07/15/2007	Mooney M20J	Non-Fatal	Airfield	The pilot's inability to maintain control of the airplane for undetermined reasons. Contributing to the accident were the embankment and the fence.
9	10/27/2006	Bellanca 7ECA	Non-Fatal	Airfield	The pilot not maintaining directional control of the tailwheel airplane during the landing roll. A factor was the runway sign that was impacted.
10	07/04/2005	Piper PA-32-300	Non-Fatal	Airfield	The pilot's inadequate compensation for wind conditions and his failure to maintain directional control. Factors associated with the accident were the crosswind and the taxiway sign.
11	10/09/2004	Buss Rotorway Exec	Non-Fatal	Airfield	The pilot's inadvertent deactivation of the battery switch leading to the helicopter's loss of engine power on base leg. A factor was the crops he encountered during the emergency landing.
12	01/19/2004	Piper PA-46-500TP	Non-Fatal	RPZ	A loss of engine power for undetermined reasons.
13	07/02/2003	Debay Dragonfly Mark II	Non-Fatal	Model SSZ B	The pilot's intentional operation of the airplane with a known deficiency with regard to an improper carburetor calibration that led to the loss of engine power. The improperly calibrated carburetor and the trees were contributing factors.
14	07/19/2001	Mooney M20R	Fatal	Off-Airport	The fractured camshaft gear and the pilot not maintaining aircraft control. Factors relating to this accident were metal fatigue in the camshaft gear teeth, the inadvertent stall, the low airspeed, and the trees.
15	07/17/2001	Beech B19	Non-Fatal	Airfield	The student pilot's failure to maintain aircraft control during the landing, her failure to recover from the bounced landing, and the nose gear overload.
16	10/20/2000	Piper PT-46	Non-Fatal	Airfield	The pilot misjudging the landing flare, and his failure to recover from the bounced landing.
17	06/08/2000	Piper PA-28-161	Non-Fatal	Off-Airport	The failure of the engine and the unsuitable terrain for landing encountered by the pilot-in-command. Factors to the accident were the fracture of the crankshaft due to fatigue, excessive main bearing wear, and the swampy terrain condition.
18	08/30/1999	Piper PA-24-180	Non-Fatal	Airfield	The failure of the pilot to follow the landing checklist and his failure to extend the landing gear.
19	07/31/1999	Cessna 310N	Non-Fatal	Airfield	Maintenance personnel installed washers which were not large enough in diameter to prevent the retraction/extension scissors links from separating from each other.
20	11/25/1998	Piper PA-28-R200	Non-Fatal	Airfield	The pilot misjudged the flare and did not maintain directional control during touchdown. A factor was the VASI lights.
21	09/08/1998	Culver-Revolution Mini 500	Non-Fatal	Airfield	A design change to the fuel tank filler neck sealant made by the owner/builder of the helicopter. Factors associated with this accident were an improper sealant material used by the owner/builder and an autorotation was not possible by the pilot due to the hover-taxis low altitude.
22	02/08/1998	Beech C-23	Non-Fatal	Off-Airport	The pilot's improper raising of flaps and not maintaining directional control of the aircraft during the go-around sequence.
23	11/20/1997	Mooney M20K	Non-Fatal	Airfield	The pilot's improper decision to continue the approach beyond decision height, when he could not see the runway; and his attempt to land without being properly aligned on the runway. Factors relating to this accident were: darkness, fog and and runway lights.

Source: NTSB Accident Records



# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CEN14CA154
<b>Date &amp; Time:</b>	03/09/2014, 0815 CDT	<b>Registration:</b>	N4764B
<b>Aircraft:</b>	CESSNA 185	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

While attempting to takeoff with a left crosswind of 10 knots gusting to 17 knots, the pilot began the takeoff roll with 1/2 throttle. He then advanced the throttle to full forward and pushed the control yoke forward to lift the tail. The airplane began to veer to the left with insufficient airspeed to lift off from the runway. The pilot aborted the takeoff and applied brakes. However, the airplane continued forward and collided with a snow bank, nosed over, and came to rest inverted. Substantial damage was sustained to the vertical stabilizer. The pilot reported that there were no mechanical malfunctions or failures prior to the accident. In addition, the pilot reported that the accident could have been prevented had he kept the tailwheel in contact with the runway longer and/or departed on a runway better aligned with the wind.

## Flight Events

- Takeoff - Other weather encounter
- Takeoff - Loss of control on ground
- Takeoff - Runway excursion
- Takeoff - Collision with terr/obj (non-CFIT)

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of directional control during takeoff with a gusty crosswind.

## Findings

- Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
- Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained
- Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
- Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Effect on operation
- Environmental issues-Conditions/weather/phenomena-Wind-Gusts-Effect on operation
- Environmental issues-Physical environment-Object/animal/substance-Snow/ice-Contributed to outcome

## Pilot Information

Certificate:	Private	Age:	46
Airplane Rating(s):	Single-engine Land; Single-engine Sea	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	258 hours (Total, all aircraft), 41 hours (Total, this make and model), 178 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	Registration:	N4764B
Model/Series:	185 F	Engines:	1 Reciprocating
Operator:	On file	Engine Manufacturer:	Continental Motors
Operating Certificate(s) Held:	None	Engine Model/Series:	IO-520-D
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KFCM, 944 ft msl	Weather Information Source:	Unknown
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	13 knots, 200°
Temperature:	-4° C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Eden Prairie, MN (FCM)	Destination:	Waconia, MN

## Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Asphalt
Runway Used:	28R	Runway Surface Condition:	Dry
Runway Length/Width:	3900 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827500, -93.458611 (est)		

## Administrative Information

Investigator In Charge (IIC):	Jason T Aguilera	Adopted Date:	04/23/2014
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=88899">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=88899</a>		

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The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CEN13LA462
<b>Date &amp; Time:</b>	08/05/2013, 0848 CDT	<b>Registration:</b>	N327FL
<b>Aircraft:</b>	EMBRAER S A EMB-505	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Positioning		

## Analysis

The flight crew of the light jet was conducting a landing to a wet 5,000-ft-long runway. Their preflight calculations indicated an approach speed of 110 knots given the airplane's estimated landing weight. Data obtained from the flight recorder showed that, as the airplane descended through about 500 ft above ground level on final approach, its speed was 186 knots and its rate of descent was over 3,000 ft per minute. The airplane crossed the runway threshold about 158 knots, and touched down about 1,000 feet down the runway about 145 knots. The airplane subsequently departed the end of the runway, impacted obstructions, and came to rest upright on a four-lane highway about 1,000 ft beyond the runway surface. A postaccident examination of the engines, airframe, and braking system revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

The operator's procedures stated that all approaches to land must be stabilized at 500 feet above airport elevation, and any approach that became unstabilized required an immediate go-around. Among the company's criteria for determining a stable approach was: airspeed no more than 20 knots over target, and descent rate no greater than 1,000 ft per minute. During the approach, the airspeed was 76 knots over the target approach speed and the descent rate of 3,000 ft per minute greatly exceeded the criteria for a stabilized approach.

## Flight Events

- Approach-VFR pattern final - Miscellaneous/other
- Landing-flare/touchdown - Abnormal runway contact
- Landing-landing roll - Miscellaneous/other
- Landing-landing roll - Runway excursion
- Landing-landing roll - Collision with terr/obj (non-CFIT)

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight crew's failure to execute a go-around during a non-stabilized approach, which resulted in a runway overrun.

## Findings

Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Incorrect use/operation - C

Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent rate-Incorrect use/operation - C

Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Surface speed/braking-Attain/maintain not possible - C

Personnel issues-Action/decision-Action-Incorrect action performance-Flight crew - C

Personnel issues-Action/decision-Action-Lack of action-Flight crew - C

## Pilot Information

Certificate:	Airline Transport	Age:	48
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	(Estimated) 8158 hours (Total, all aircraft), 1081 hours (Total, this make and model), 4610 hours (Pilot In Command, all aircraft), 153 hours (Last 90 days, all aircraft), 74 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

## Co-Pilot Information

Certificate:	Airline Transport	Age:	50
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	(Estimated) 12348 hours (Total, all aircraft), 150 hours (Total, this make and model), 5128 hours (Pilot In Command, all aircraft), 101 hours (Last 90 days, all aircraft), 48 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	EMBRAER S A	Registration:	N327FL
Model/Series:	EMB-505	Engines:	2 Turbo Fan
Operator:	FLIGHT OPTIONS LLC	Engine Manufacturer:	P&W CANADA
Operating Certificate(s) Held:	Fractional Ownership; On-demand Air Taxi (135)	Engine Model/Series:	PW535E
Flight Conducted Under:	Part 91: General Aviation - Positioning		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Overcast / 7000 ft agl	Wind Speed/Gusts, Direction:	4 knots, 150°
Temperature:	18° C	Visibility	6 Miles
Precipitation and Obscuration:	Moderate - Mist; In the Vicinity - Rain		
Departure Point:	Pittsburgh, PA (PIT)	Destination:	Eden Prairie, MN (FCM)

## Airport Information

Airport:	Flying Cloud Airport (FCM)	Runway Surface Type:	Asphalt
Runway Used:	10R	Runway Surface Condition:	Wet
Runway Length/Width:	5000 ft / 100 ft		

## Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.826667, -93.447500 (est)		

## Administrative Information

Investigator In Charge (IIC):	Thomas Latson	Adopted Date:	09/12/2016
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=87694">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=87694</a>		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Minneapolis, MN	<b>Accident Number:</b>	CEN12LA452
<b>Date &amp; Time:</b>	07/12/2012, 0958 CDT	<b>Registration:</b>	N9307
<b>Aircraft:</b>	MIKOYAN GUREVICH MIG 21MF	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot established an appropriate speed during the approach and landed about 300 feet down the 5,000-foot-long runway. Within seconds of touching down, the pilot brought the throttle control to idle and deployed the drag chute. However, when the chute deployed, it did not fully inflate and then separated from the airplane. The pilot was not immediately aware the drag chute had failed and continued to try to deploy the chute. The pilot said that he used maximum braking to slow the airplane but was unable to stop the airplane on the runway. The pilot swerved to the left to avoid crossing a state highway, and the airplane struck a berm and a fence before it stopped. The pilot said that he had successfully tested the drag chute in preparation for this particular landing and had no previous problems deploying the chute before the accident. A review of performance data revealed that the pilot had sufficient runway length to land without use of the drag chute had he applied the wheel brakes immediately upon landing.

## Flight Events

Landing-landing roll - Loss of control on ground  
Landing-landing roll - Miscellaneous/other

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's delayed application of wheel brakes to slow the airplane down on landing and the airplane's failed drag chute, which resulted in a runway overrun.

## Findings

Aircraft-Aircraft systems-Equipment/furnishings-(general)-Failure - C  
Aircraft-Aircraft systems-Landing gear system-Brake-Incorrect use/operation - C  
Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

## Pilot Information

Certificate:	Airline Transport	Age:	52
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	21000 hours (Total, all aircraft), 30 hours (Total, this make and model), 11000 hours (Pilot In Command, all aircraft), 65 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	MIKOYAN GUREVICH	Registration:	N9307
Model/Series:	MIG 21MF	Engines:	1 Turbo Jet
Operator:	WARD WILLIAM E	Engine Manufacturer:	Tomansky
Operating Certificate(s) Held:	None	Engine Model/Series:	R-13-300
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	7 knots, 170°
Temperature:	28° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	Dekalb, IL (DKB)	Destination:	Minneapolis, MN (FCM)

## Airport Information

Airport:	Flying Cloud (FCM)	Runway Surface Type:	Asphalt
Runway Used:	10R	Runway Surface Condition:	Dry
Runway Length/Width:	5000 ft / 100 ft		

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.823056, -93.455000 (est)		

## Administrative Information

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Investigator In Charge (IIC): Leah D Yeager

Adopted Date: 11/06/2013

Investigation Docket: <http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=84355>

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CEN11TA279
<b>Date &amp; Time:</b>	04/08/2011, 1730 CDT	<b>Registration:</b>	N51RF
<b>Aircraft:</b>	ROCKWELL INTERNATIONAL 500-S	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Public Aircraft		

## Analysis

The pilot reported that he performed a stabilized visual approach with a right crosswind. The airplane touched down on the centerline and subsequently drifted to the right. The pilot overcorrected for the drift and the airplane veered hard to the left. The airplane continued off the left side of the runway and skidded to a complete stop. The right main landing gear collapsed and the right wingtip hit the ground, which resulted in substantial damage to the fuselage and wing. A postaccident inspection of the airplane revealed no preimpact anomalies. The pilot additionally reported that there was no mechanical malfunction or failure.

## Flight Events

- Landing-landing roll - Loss of control on ground
- Landing-landing roll - Landing gear collapse
- Landing-landing roll - Runway excursion
- Landing-landing roll - Collision with terr/obj (non-CFIT)

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate compensation for the crosswind while landing, which resulted in a loss of directional control.

## Findings

- Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
- Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
- Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Contributed to outcome

## Pilot Information

Certificate:	Commercial	Age:	31
Airplane Rating(s):	Multi-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	473 hours (Total, all aircraft), 217 hours (Total, this make and model), 268 hours (Pilot In Command, all aircraft), 74 hours (Last 90 days, all aircraft), 61 hours (Last 30 days, all aircraft)		

## Flight Instructor Information

Certificate:	Airline Transport; Commercial	Age:	43
Airplane Rating(s):	Multi-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	4659 hours (Total, all aircraft), 2480 hours (Total, this make and model), 3544 hours (Pilot In Command, all aircraft), 106 hours (Last 90 days, all aircraft), 67 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	ROCKWELL INTERNATIONAL	Registration:	N51RF
Model/Series:	500-S	Engines:	2 Reciprocating
Operator:	UNITED STATES DEPARTMENT OF COMMERCE	Engine Manufacturer:	LYCOMING
Operating Certificate(s) Held:	None	Engine Model/Series:	TIO-540-E1B5
Flight Conducted Under:	Public Aircraft		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Overcast / 5500 ft agl	Wind Speed/Gusts, Direction:	14 knots, 170°
Temperature:	16° C	Visibility	10 Miles
Precipitation and Obscuration:	No Precipitation		
Departure Point:	Eden Prairie, MN (FCM)	Destination:	Eden Prairie, MN (FCM)

## Airport Information

Airport:	Flying Cloud Airport (FCM)	Runway Surface Type:	Asphalt
Runway Used:	10R	Runway Surface Condition:	Dry
Runway Length/Width:	5000 ft / 100 ft		



## Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827222, -93.458333 (est)		

## Administrative Information

Investigator In Charge (IIC):	James P Silliman	Adopted Date:	07/18/2011
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=78838">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=78838</a>		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CEN10CA356
<b>Date &amp; Time:</b>	06/27/2010, 1301 CDT	<b>Registration:</b>	N9253S
<b>Aircraft:</b>	BEECH C23	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

## Analysis

The student pilot and his certified flight instructor performed three takeoff and landings at the accident airport in preparation for the student pilot's second solo flight. During the takeoff and landings, the wind was from the northwest at 8 to 11 knots with no wind gusts. After approximately 0.7 hours of flight time, the certified flight instructor exited the airplane and the student pilot taxied to the runway for takeoff. About the time of departure, the wind began to gust to 17 knots. The student pilot stated that during the landing flare, he experienced a downwash and that the airplane ballooned and turned to the right. He added power and applied rudder, but the nosewheel hit the runway and the airplane veered off the runway. The certified flight instructor placed a maximum wind limitation of 15 knots on the student pilot's initial solo endorsement.

## Flight Events

- Landing-flare/touchdown - Other weather encounter
- Landing-flare/touchdown - Attempted remediation/recovery
- Landing-flare/touchdown - Abnormal runway contact

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be:  
The student pilot's loss of airplane control while landing with gusting wind.

## Findings

- Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Not attained/maintained - C
- Personnel issues-Task performance-Use of equip/info-Aircraft control-Student pilot - C

## Pilot Information

Certificate:	None	Age:	34
Airplane Rating(s):	None	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	71 hours (Total, all aircraft), 71 hours (Total, this make and model), 20 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	BEECH	Registration:	N9253S
Model/Series:	C23 NO SERIES	Engines:	1 Reciprocating
Operator:	Inflight Pilot Training LLC	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	O-360-A4K
Flight Conducted Under:	Part 91: General Aviation - Instructional		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	10 knots/ 17 knots, 320°
Temperature:	27° C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Eden Prairie, MN (FCM)	Destination:	Eden Prairie, MN (FCM)

## Airport Information

Airport:	Flying Cloud Airport (FCM)	Runway Surface Type:	Asphalt
Runway Used:	28L	Runway Surface Condition:	
Runway Length/Width:	5000 ft / 100 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827500, -93.458611 (est)		

## Administrative Information

Investigator In Charge (IIC):	Mitchell F Gallo	Adopted Date:	05/19/2011
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=76471">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=76471</a>		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CEN10LA188
<b>Date &amp; Time:</b>	04/01/2010, 1440 CDT	<b>Registration:</b>	N20FP
<b>Aircraft:</b>	BEECH 95	<b>Injuries:</b>	2 Serious
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot stated that he had no recollection of the events leading up to the accident. The passenger reported that the airplanes' engines seemed to come up to full power during takeoff. The airplane lifted off about halfway down the runway; however, it didn't climb very well. The stall warning sounded just as the airplane was off the end of the runway, and the pilot's efforts to continue flight were unsuccessful. The right wing dropped, and the airplane descended and impacted the ground. A witness reported that the airplane's nose was pitched up 10 to 15 degrees and the wings appeared to be level, as it was flying in ground effect about 10 feet agl. He noted that the engines seemed to be running without any obvious problems. A postaccident examination revealed a lack of compression on the right engine No. 4 cylinder. Further investigation determined that the intake valve spring on the cylinder had fractured. Metallurgical examination noted that the fracture surfaces exhibited features indicative of fatigue progression initiated by corrosion pitting. Corrosion pits and red rust deposits were observed on many areas of the spring. The fatigue initiation also coincided with longitudinal tooling marks consistent with the original forming of the spring. Maintenance records indicated the right engine had been overhauled nearly 2 years prior to the accident. The cylinders were replaced with new non-original equipment manufacturer (OEM) assemblies at that time. The replacement cylinder assemblies were furnished with the valves and valve springs installed. According to the pilot, the right engine had accumulated 18 hours since overhaul.

## Flight Events

- Initial climb - Powerplant sys/comp malf/fail
- Initial climb - Loss of engine power (partial)
- Initial climb - Aerodynamic stall/spin
- Initial climb - Loss of control in flight
- Uncontrolled descent - Collision with terr/obj (non-CFIT)

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The fatigue failure of an intake valve spring on the right engine, which resulted in a partial loss of engine power on takeoff.

## Findings

Aircraft-Aircraft power plant-Engine (reciprocating)-Recip eng cyl section-Failure - C  
Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Altitude-Attain/maintain not

possible

Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot

### Pilot Information

Certificate:	Airline Transport	Age:	56
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane
Flight Time:	11320 hours (Total, all aircraft), 55 hours (Total, this make and model), 11220 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	BEECH	Registration:	N20FP
Model/Series:	95	Engines:	2 Reciprocating
Operator:	Fischer Air LLC	Engine Manufacturer:	LYCOMING
Operating Certificate(s) Held:	None	Engine Model/Series:	O&VO-360 SER
Flight Conducted Under:	Part 91: General Aviation - Personal		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	11 knots, 150°
Temperature:	26° C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Minneapolis, MN (FCM)	Destination:	New Richmond, MN (RNH)

### Airport Information

Airport:	Flying Cloud Airport (FCM)	Runway Surface Type:	Asphalt
Runway Used:	18	Runway Surface Condition:	Dry
Runway Length/Width:	2691 ft / 75 ft		

### Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	1 Serious	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827500, -93.458611 (est)		

## Administrative Information

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Investigator In Charge (IIC): Timothy Sorensen

Adopted Date: 06/20/2011

Investigation Docket: <http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=75643>

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# National Transportation Safety Board

## Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CEN09FA518
<b>Date &amp; Time:</b>	08/12/2009, 1138 CDT	<b>Registration:</b>	N3038C
<b>Aircraft:</b>	BEECH E18S	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Ferry		

### Analysis

The pilot purchased the airplane approximately one year prior to the accident with the intention of restoring it for flight. The airplane had not been flown for approximately five years and had been used for spare parts. The pilot was flying the airplane to another airport to pick up passengers prior to returning. The pilot was cleared for takeoff and to circle the airport at 2,500 feet prior to departing the area. Witnesses reported that after taking off the airplane seemed to “wobble” at a slow airspeed in a nose-high attitude and that it never got higher than 500 feet. Some witnesses reported the engine(s) sputtering, and another stated that the airplane was loud and "didn't sound good," although other witnesses reported that the engines sounded normal. One witness reported seeing white smoke coming from the left engine and hearing the engine "popping" as the airplane took off. The airplane made three left turns and it appeared as if the pilot was attempting to return to land. Witnesses described the left wing rising prior to the airplane banking hard to the left and the nose dropping straight down. The airplane impacted the ground just northeast of the airport property and a postimpact fire ensued. Flight control continuity was established. The right side of the elevator/tailcone structure exhibited black rub marks and scrapes. Grass and nesting material was found inside the left wing. The left fuel valve was found in the OFF position and the right fuel valve was positioned to the rear auxiliary tank. Neither the fuel crossfeed valve nor the fuel boost pump switch was located. The left engine sustained substantial fire and impact damage. The right engine sustained heavy impact damage. The airplane was last fueled one month prior to the accident with 120 gallons of fuel. About 20 engine test runs in addition to high-speed taxi tests had been conducted since then. A Special Flight Permit had been obtained but had not been signed by the mechanic, who did not know that the pilot was going to fly the airplane on the day of the accident. The pilot reportedly did not have any Beech 18 flight experience.

### Flight Events

- Takeoff - Loss of engine power (partial)
- Maneuvering - Loss of control in flight
- Uncontrolled descent - Collision with terr/obj (non-CFIT)

### Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot’s lack of experience flying the accident make and model of airplane, which led to a loss of control while maneuvering to return to the airport. Contributing to the accident was a partial loss of engine power for undetermined reasons.

### Findings



Aircraft-Aircraft power plant-(general)-(general)-Failure - F  
 Personnel issues-Experience/knowledge-Experience/qualifications-Total experience w/ equipment-  
 Pilot - C  
 Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

### Pilot Information

Certificate:	Commercial; Private	Age:	53
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	1150 hours (Total, all aircraft), 0 hours (Total, this make and model)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	BEECH	Registration:	N3038C
Model/Series:	E185	Engines:	2 Reciprocating
Operator:	Wayne R. Monson	Engine Manufacturer:	Pratt & Whitney
Operating Certificate(s) Held:	None	Engine Model/Series:	R-985 SERIES
Flight Conducted Under:	Part 91: General Aviation - Ferry		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Unknown
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	8 knots/ 15 knots, 200°
Temperature:	28° C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Eden Prairie, MN (FCM)	Destination:	Osceola, WI (OEO)

### Airport Information

Airport:	Eden Prairie (FCM)	Runway Surface Type:
Runway Used:	N/A	Runway Surface Condition:
Runway Length/Width:		

## Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.829722, -93.448611		

## Administrative Information

Investigator In Charge (IIC):	Pamela S Sullivan	Adopted Date:	01/07/2011
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=74510">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=74510</a>		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CHI07LA211
<b>Date &amp; Time:</b>	07/15/2007, 0905 CDT	<b>Registration:</b>	N4785H
<b>Aircraft:</b>	Mooney M20J	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot reported that upon reaching rotation speed, the airplane did not properly "develop lift" and the rudder seemed to be stuck in a full deflected position. The airplane yawed to the left at an altitude of 8 to 10 feet above the runway. The airplane then settled to the ground off the left side of the runway where it contacted an embankment. The nose gear sheared off, and the airplane continued up the embankment coming to rest when it contacted a fence. Post accident inspection of the airplane failed to reveal any anomalies with the flight control system. Winds at the time of the accident were reported as being calm.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inability to maintain control of the airplane for undetermined reasons. Contributing to the accident were the embankment and the fence.

## Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: TAKEOFF - INITIAL CLIMB

### Findings

1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND  
-----

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

### Findings

2. TERRAIN CONDITION - GROUND  
-----

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER  
Phase of Operation: OTHER

### Findings

3. (F) TERRAIN CONDITION - DIRT BANK/RISING EMBANKMENT  
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Occurrence #4: NOSE GEAR COLLAPSED  
Phase of Operation: OTHER

### Findings

Page 1 of 3

#### 4. LANDING GEAR, NOSE GEAR ASSEMBLY - OVERLOAD

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Occurrence #5: ON GROUND/WATER COLLISION WITH OBJECT

Phase of Operation: OTHER

#### Findings

5. (F) OBJECT - FENCE

### Pilot Information

Certificate:	Private	Age:	45
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	353 hours (Total, all aircraft), 256 hours (Total, this make and model), 11 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Mooney	Registration:	N4785H
Model/Series:	M20J	Engines:	1 Reciprocating
Operator:	William R. Lynch, Jr.	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	IO-360-B
Flight Conducted Under:	Part 91: General Aviation - Personal		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	Calm
Temperature:	23°C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	Eden Prairie, MN (FCM)	Destination:	Gary, IN (GY)

### Airport Information

Airport:	Flying Cloud (FCM)	Runway Surface Type:	Asphalt
Runway Used:	28L	Runway Surface Condition:	Dry
Runway Length/Width:	3909 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827222, -93.457222		

## Administrative Information

Investigator In Charge (IIC):	Pamela S Sullivan	Adopted Date:	06/30/2008
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CHI07CA014
<b>Date &amp; Time:</b>	10/27/2006, 1351 CDT	<b>Registration:</b>	N57410
<b>Aircraft:</b>	Bellanca 7ECA	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The tailwheel airplane sustained substantial damage when it exited the runway and impacted a runway sign. The pilot stated, "Set up for a wheel landing left wing low to compensate for crosswind. Encountered a slight bounce. When wheels touched down again, aircraft swerved left [and] towards edge of [runway]. I did not feel attempting a go-around at that point was prudent due to proximity to wind sock pole. Left runway, rolled through grass [and] onto [runway] 18. I understand a [runway] sign was hit [with horizontal stabilizer]." The pilot reported no mechanical malfunctions with the airplane in reference to the accident flight.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot not maintaining directional control of the tailwheel airplane during the landing roll. A factor was the runway sign that was impacted.

## Findings

Occurrence #1: LOSS OF CONTROL - ON GROUND/WATER  
Phase of Operation: LANDING - ROLL

### Findings

1. TERRAIN CONDITION - GROUND
  2. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - PILOT IN COMMAND
- 

Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: LANDING - ROLL

### Findings

3. (F) OBJECT - SIGN

## Pilot Information

Certificate:	Private	Age:	39
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	201 hours (Total, all aircraft), 20 hours (Total, this make and model), 150 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Bellanca	Registration:	N57410
Model/Series:	7ECA	Engines:	1 Reciprocating
Operator:	Hummingbird Aviation, LLC	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	O-235-C1
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	10 knots, 230°
Temperature:	12°C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Eden Prairie, MN (FCM)	Destination:	

## Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Concrete
Runway Used:	28R	Runway Surface Condition:	Dry
Runway Length/Width:	3599 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827222, -93.457222		

## Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski	Adopted Date:	01/31/2007
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Minneapolis, MN	<b>Accident Number:</b>	CHI05CA168
<b>Date &amp; Time:</b>	07/04/2005, 1136 CDT	<b>Registration:</b>	CGGJB
<b>Aircraft:</b>	Piper PA-32-300	<b>Injuries:</b>	4 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The airplane collided with a taxiway sign while landing on runway 28L. The pilot stated that as he approached the airport, he received the automated terminal information service (ATIS) and the winds were reported as being from 250 degrees at 5 knots. He stated the approach was normal, but as he approached the threshold he had difficulty correcting for the crosswind and the airplane drifted to the right edge of the runway. The pilot stated the airplane touched down and continued to the right. He stated the airplane "ballooned slightly" and the nose gear impacted a taxiway sign. The pilot stated the nose gear collapsed and they came to rest in the grass between runways 28L and 28R. The wind conditions reported at 1153 were from 240 degrees at 10 knots.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate compensation for wind conditions and his failure to maintain directional control. Factors associated with the accident were the crosswind and the taxiway sign.

## Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

- 1. (F) WEATHER CONDITION - CROSSWIND
  - 2. (C) COMPENSATION FOR WIND CONDITIONS - INADEQUATE - PILOT IN COMMAND
  - 3. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - PILOT IN COMMAND
- 

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

- 4. (F) OBJECT - SIGN
- 

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

- 5. TERRAIN CONDITION - GROUND

## Pilot Information

Certificate:	Private	Age:	51
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	
Flight Time:	340 hours (Total, all aircraft), 39 hours (Total, this make and model), 172 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Piper	Registration:	CGGJB
Model/Series:	PA-32-300	Engines:	1 Reciprocating
Operator:	Robert J. McMane	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	IO-540-K1A5
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Broken / 25000 ft agl	Wind Speed/Gusts, Direction:	10 knots, 250°
Temperature:	26°C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	Minneapolis, MN (FCM)	Destination:	Minneapolis, MN (FCM)

## Airport Information

Airport:	Runway Surface Type:
Runway Used:	Runway Surface Condition:
Runway Length/Width:	

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	3 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	
Latitude, Longitude:	44.827222, -93.457222		

## Administrative Information

Investigator In Charge (IIC):	Pamela S Sullivan	Adopted Date:	09/13/2005
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CHI05CA005
<b>Date &amp; Time:</b>	10/09/2004, 0822 CDT	<b>Registration:</b>	N82DR
<b>Aircraft:</b>	Buss Rotorway Exec	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The experimental amateur-built helicopter sustained substantial damage on impact with terrain during an autorotation following an in-flight loss of engine power while on its base leg. The pilot stated in his accident report, "I was given clearance for the option and on the base leg I reached for, and pulled, the carburetor heat lever. After releasing the lever, I inadvertently bumped and threw the main battery switch. I felt the switch move. (These switches are located on the top of the center console, and they are hidden from view by the pilot's right leg due to cramped quarters). I then tried to find and reengage the switch and I threw the avionics switch. I immediately re-engaged the avionics switch. While searching for the battery switch, the engine stopped. ... Due to forward groundspeed, the helicopter slid forward and tipped forward. The rotor blades struck the ground in the front of the ship, which created torque forces, which tipped the machine onto its left side." The pilot reported that there were no mechanical malfunctions in reference to the helicopter on the flight. The pilot's safety recommendation was that the "battery switch should be relocated or [guarded]."

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadvertent deactivation of the battery switch leading to the helicopter's loss of engine power on base leg. A factor was the crops he encountered during the emergency landing.

## Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL  
Phase of Operation: APPROACH - VFR PATTERN - BASE LEG/BASE TO FINAL

### Findings

1. ELECTRICAL SYSTEM,ELECTRIC SWITCH - OTHER
2. (C) MISCELLANEOUS - INADVERTENT DEACTIVATION - PILOT IN COMMAND

Occurrence #2: FORCED LANDING  
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER  
Phase of Operation: EMERGENCY LANDING

### Findings

3. (F) TERRAIN CONDITION - CROP
4. TERRAIN CONDITION - GROUND

## Pilot Information

Certificate:	Commercial	Age:	57
Airplane Rating(s):	None	Instrument Rating(s):	None
Other Aircraft Rating(s):	Helicopter	Instructor Rating(s):	None
Flight Time:	228 hours (Total, all aircraft), 52 hours (Total, this make and model), 153 hours (Pilot In Command, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Buss	Registration:	N82DR
Model/Series:	Rotorway Exec	Engines:	1 Reciprocating
Operator:	Richard S. Buss	Engine Manufacturer:	Rotorway
Operating Certificate(s) Held:	None	Engine Model/Series:	RW152
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Broken / 25000 ft agl	Wind Speed/Gusts, Direction:	
Temperature:	7° C	Visibility	9 Miles
Precipitation and Obscuration:			
Departure Point:	Eden Prairie, MN (FCM)	Destination:	

## Airport Information

Airport:	Runway Surface Type:
Runway Used:	Runway Surface Condition:
Runway Length/Width:	

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827222, -93.457222		

## Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski	Adopted Date:	12/03/2004
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Minneapolis, MN	<b>Accident Number:</b>	CHI04LA060
<b>Date &amp; Time:</b>	01/19/2004, 1334 CST	<b>Registration:</b>	N1968W
<b>Aircraft:</b>	Piper PA-46-500TP	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The airplane was substantially damaged during a gear up forced landing after takeoff. The pilot reported that everything was normal during the preflight and engine run-up. The pilot reported that after being cleared for takeoff, he advanced the throttle to 1,270 pounds of torque before releasing the brakes and everything was normal. He stated that upon reaching 85 knots he rotated, achieved a positive rate of climb, and retracted the landing gear. The pilot continued, "Just after the wheels were up the engine shuddered with a very substantial loss of power. It felt like a car that was hitting on half its cylinders." He stated he brought the power back to idle and focused on getting the airplane back on the runway. The pilot reported that after the airplane touched down he "pulled the emergency fuel cutoff." The airplane traveled straight ahead, crossed a taxiway, and came to rest about 100 yards past the taxiway. The pilot then shut off the battery and exited the airplane via the rear door. The airplane had a total of 183 hours since new. The pilot reported having a propeller overspeed warning during the flight previous of the accident flight. The tach generator was replaced after this incident. The tach generator that was removed was tested and no discrepancies were found. A tear down inspection on the engine failed to reveal any malfunctions/failures which would have resulted in the loss of power. Both the primary and overspeed propeller governors were removed from the engine and tested. A visual inspection of the primary governor revealed lockwire found on the airbled system reset-eccentric screw was non-standard for Woodward and the torque sealant had been removed. A visual inspection of the overspeed governor revealed the inside of the speed setting hex screw did not contain any torque sealant. The sealant on the outside threads of the screw was cracked near the base of the screw and the housing. Bench testing of both the primary and overspeed governors revealed the overspeed governor was set to a lower rpm than the primary governor. Therefore, the overspeed governor would have been controlling the system. Manufacturing flight test documents indicate four occasions when the maximum reverse rpm was adjusted. Flight tests conducted with the governors calibrated to the settings at the time of the accident were conducted. Data from the flight tests indicate the propeller rpm was limited between 96-97% and that changes in the rpm stabilized within seconds.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power for undetermined reasons.

## Findings

Occurrence #1: LOSS OF ENGINE POWER

Phase of Operation: TAKEOFF

Findings

- 1. (C) REASON FOR OCCURRENCE UNDETERMINED
- 2. PROPELLER GOVERNOR CONTROL - OUT OF CALIBRATION
- 3. MAINTENANCE,ADJUSTMENT - IMPROPER - UNKNOWN

Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: EMERGENCY LANDING

Findings

- 4. TERRAIN CONDITION - RUNWAY
- 5. TERRAIN CONDITION - GROUND

### Pilot Information

Certificate:	Private	Age:	59
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	765 hours (Total, all aircraft), 102 hours (Total, this make and model), 699 hours (Pilot In Command, all aircraft), 52 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Piper	Registration:	N1968W
Model/Series:	PA-46-500TP	Engines:	1 Turbo Prop
Operator:	Stephen E. Watson	Engine Manufacturer:	Pratt & Whitney Canada
Operating Certificate(s) Held:	None	Engine Model/Series:	PT6-42A
Flight Conducted Under:	Part 91: General Aviation - Personal		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Broken / 10000 ft agl	Wind Speed/Gusts, Direction:	3 knots
Temperature:	-13 °C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	Minneapolis, MN (FCM)	Destination:	Sioux Falls, SD (FSD)



## Airport Information

Airport:	Flying Cloud (FCM)	Runway Surface Type:	Asphalt
Runway Used:	28R	Runway Surface Condition:	Dry
Runway Length/Width:	3599 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.827222, -93.457222		

## Administrative Information

Investigator In Charge (IIC):	Pamela S Sullivan	Adopted Date:	04/28/2005
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	Eden Prairie, MN	<b>Accident Number:</b>	CHI03LA192
<b>Date &amp; Time:</b>	07/02/2003, 2242 CDT	<b>Registration:</b>	N25JD
<b>Aircraft:</b>	Debay Dragonfly Mark II	<b>Injuries:</b>	1 Serious
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot was seriously injured and the experimental amateur-built airplane was destroyed when it impacted trees and terrain during a forced landing following a loss of engine power after takeoff. The amateur-built airplane was powered by a Volkswagen derived automobile engine with capacitive discharge ignition and a slide type carburetor. According to the manufacturer, the carburetor is not susceptible to carburetor icing because it does not incorporate a venturi. During an interview, the pilot stated that he had aircraft control during the forced landing. He stated that he had previous problems with the carburetor, and his internet website also listed problems, repairs and modifications made to the carburetor. The website indicated that the carburetor needle had been replaced, the carburetor slide had been modified and the throttle cable had been replaced. The website indicated that the mixture was "sensitive" and leaning was required in cruise flight or the "engine sputters from being too rich!" The website also states that the mixture during landing rollout "seems quite rich and [the engine] likes to die out" A section of the website titled "Repairs / Improvements to be made but are not stopping flight", listed "Continue to refine mixture / carb settings" as a listed item. Postaccident examination of the airplane revealed that the engine could be rotated, valve train continuity was confirmed and each cylinder produced "thumb compression." The ignition system was not tested. The linkages to the carburetor were damaged during the impact; however, no pre-impact defects could be found.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's intentional operation of the airplane with a known deficiency with regard to an improper carburetor calibration that led to the loss of engine power. The improperly calibrated carburetor and the trees were contributing factors.

## Findings

Occurrence #1: LOSS OF ENGINE POWER  
Phase of Operation: TAKEOFF - INITIAL CLIMB

### Findings

1. (F) FUEL SYSTEM, CARBURETOR - OUT OF CALIBRATION
2. (C) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - INTENTIONAL - PILOT IN COMMAND

Occurrence #2: FORCED LANDING  
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: EMERGENCY LANDING

Findings

3. (F) OBJECT - TREE(S)  
-----

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: EMERGENCY LANDING

Findings

4. TERRAIN CONDITION - GROUND

### Pilot Information

Certificate:	Private	Age:	26
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	79 hours (Total, all aircraft), 22 hours (Total, this make and model), 30 hours (Pilot In Command, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Debay	Registration:	N25JD
Model/Series:	Dragonfly Mark II	Engines:	1 Reciprocating
Operator:	Mark Felling	Engine Manufacturer:	Revmaster
Operating Certificate(s) Held:	None	Engine Model/Series:	R2100D
Flight Conducted Under:	Part 91: General Aviation - Personal		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KFCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Overcast / 20000 ft agl	Wind Speed/Gusts, Direction:	6 knots, 220°
Temperature:	13° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	Eden Prairie, MN (FCM)	Destination:	

### Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Asphalt
Runway Used:	18	Runway Surface Condition:	Dry
Runway Length/Width:	2691 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
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Passenger Injuries:	N/A	Aircraft Fire:	None
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Ground Injuries:	N/A	Aircraft Explosion:	None
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Latitude, Longitude:

## Administrative Information

Investigator In Charge (IIC):	John M Brannen	Adopted Date:	12/03/2004
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Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .
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# National Transportation Safety Board

## Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI01FA220
<b>Date &amp; Time:</b>	07/19/2001, 1730 CDT	<b>Registration:</b>	N2HW
<b>Aircraft:</b>	Mooney M-20R	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

### Analysis

The airplane was observed proceeding westbound from the airport at a low altitude. A witness said, "I watched and listened thinking he would soon apply power and climb. The engine noise was smooth sounding but low. The plane was not gaining altitude and slowly losing altitude." The witness said the airplane flew parallel to, and north of the road in front of her house. "As it crossed the point of my driveway, the plane banked slightly, hit the tree tops and crashed and exploded." Control tower communications revealed that shortly after being instructed to contact departure control, the pilot responded, "two hotel whiskey - engine failure". An examination of airframe records showed that a new engine was installed at the annual inspection on February 5, 2001. The airplane logged approximately 75.7 hours from the time of the annual inspection to the time of the accident. An examination of the airplane's engine revealed that three teeth from the camshaft gear were fractured. An additional eight teeth were crushed, in total rendering the camshaft unable to be driven. A Materials Laboratory examination of the camshaft gear and fractured gear teeth showed two of the three teeth indicating signs of fatigue. The third tooth showed evidence of overstress. Rockwell hardness measurements made on the gear portion of the camshaft gear showed an average hardness of Rockwell 64HR30-N. Specification drawings for the camshaft gear indicated that the gear teeth should be hardened by gas-nitride process to a hardness of Rockwell 69HR30-N, minimum.

### Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The fractured camshaft gear and the pilot not maintaining aircraft control. Factors relating to this accident were metal fatigue in the camshaft gear teeth, the inadvertent stall, the low airspeed, and the trees.

### Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF  
Phase of Operation: CLIMB

#### Findings

1. (C) ENGINE ASSEMBLY,GEAR - FRACTURED
  2. MATERIAL INADEQUATE - MANUFACTURER
  3. (F) ENGINE ASSEMBLY,GEAR - FATIGUE
  4. ENGINE ASSEMBLY,GEAR - OVERLOAD
- 

Occurrence #2: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: CLIMB

Findings

- 5. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
  - 6. (F) STALL - INADVERTENT - PILOT IN COMMAND
  - 7. (F) AIRSPEED - LOW
  - 8. ALTITUDE - LOW
- 

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT  
 Phase of Operation: DESCENT - UNCONTROLLED

Findings

- 9. (F) OBJECT - TREE(S)
- 

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER  
 Phase of Operation: DESCENT - UNCONTROLLED

### Pilot Information

Certificate:	Private	Age:	37
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	632 hours (Total, all aircraft), 382 hours (Total, this make and model), 487 hours (Pilot In Command, all aircraft), 13 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Mooney	Registration:	N2HW
Model/Series:	M-20R	Engines:	1 Reciprocating
Operator:	JOEL W. HOIUM & MICHAEL J. HOLTE	Engine Manufacturer:	Continental
Operating Certificate(s) Held:	None	Engine Model/Series:	IO-550-G(6)
Flight Conducted Under:	Part 91: General Aviation - Personal		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	3 knots, Variable
Temperature:	31 °C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	EDEN PRAIRIE, MN (FCM)	Destination:	ABERDEEN, SD (ABR)

## Airport Information

Airport:	Flying Cloud Airport (FCM)	Runway Surface Type:	Concrete
Runway Used:	27L	Runway Surface Condition:	Dry
Runway Length/Width:	3909 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.823333, -93.491389		

## Administrative Information

Investigator In Charge (IIC):	DAVID C BOWLING	Adopted Date:	08/26/2002
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI01FA209
<b>Date &amp; Time:</b>	07/17/2001, 1617 CDT	<b>Registration:</b>	N3214L
<b>Aircraft:</b>	Beech B19	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

## Analysis

The student pilot said she was flying in the traffic pattern and was on a long final to perform a touch-and-go landing. She said that the visual approach slope indicator lights showed she was on the proper glide path. The student pilot said that when she was sure she was in a position to land on the runway, she lowered a third notch of flaps. She said she reduced the power to idle as she crossed over the threshold and tried to maintain her altitude. The student pilot said, "I touchdown and ballooned up. Then the airplane returned to the runway and ballooned again. About the third bounce I lunged forward as the nosewheel had broken off." The student pilot said the airplane slid to a stop on the grass near the runway. An examination of the airplane revealed no anomalies.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The student pilot's failure to maintain aircraft control during the landing, her failure to recover from the bounced landing, and the nose gear overload.

## Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (C) RECOVERY FROM BOUNCED LANDING - NOT PERFORMED - PILOT IN COMMAND

Occurrence #2: NOSE GEAR COLLAPSED  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

3. (C) LANDING GEAR, NOSE GEAR - OVERLOAD



## Pilot Information

Certificate:	Student	Age:	26
Airplane Rating(s):	None	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	47 hours (Total, all aircraft), 43 hours (Total, this make and model), 4 hours (Pilot In Command, all aircraft), 24 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Beech	Registration:	N3214L
Model/Series:	B19	Engines:	1 Reciprocating
Operator:	GREAT LAKES AIRCRAFT INC.	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	O-320-E2D
Flight Conducted Under:	Part 91: General Aviation - Instructional		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	6 knots, 160°
Temperature:	32 °C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	EDEN PRAIRIE, MN (FCM)	Destination:	

## Airport Information

Airport:	FLYING CLOUD AIRPORT (FCM)	Runway Surface Type:	Asphalt
Runway Used:	18	Runway Surface Condition:	Dry
Runway Length/Width:	2691 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	44.826667, -93.456667		

## Administrative Information

Investigator In Charge (IIC): DAVID C BOWLING

Adopted Date: 06/03/2002

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI01LA028
<b>Date &amp; Time:</b>	10/20/2000, 1810 CDT	<b>Registration:</b>	N1RQ
<b>Aircraft:</b>	Piper PT-46	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

### Analysis

The pilot said that during the landing he noticed the airplane start to float up. 'When [the] plane came back down, it began to bounce up and down. On the third of maybe 5 or 6 bounces, the prop struck the ground.' An examination of the airplane revealed no anomalies.

### Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot misjudging the landing flare, and his failure to recover from the bounced landing.

### Findings

Occurrence #1: HARD LANDING  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

#### Findings

1. (C) FLARE - MISJUDGED - PILOT IN COMMAND
2. (C) RECOVERY FROM BOUNCED LANDING - NOT PERFORMED - PILOT IN COMMAND

Occurrence #2: GEAR COLLAPSED  
Phase of Operation: LANDING - ROLL

#### Findings

3. LANDING GEAR, NOSE GEAR - COLLAPSED

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	40
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Instrument Rating(s):</b>	Airplane
<b>Other Aircraft Rating(s):</b>	None	<b>Instructor Rating(s):</b>	None
<b>Flight Time:</b>	981 hours (Total, all aircraft), 39 hours (Total, this make and model), 847 hours (Pilot In Command, all aircraft), 39 hours (Last 90 days, all aircraft), 23 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Piper	Registration:	N1RQ
Model/Series:	PT-46 PT-46	Engines:	1 Turbo Prop
Operator:	RANDALL RAYMOND QUAST	Engine Manufacturer:	P&W
Operating Certificate(s) Held:	None	Engine Model/Series:	PT-6A-34
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	5 knots, 320°
Temperature:	16° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	DOWAGIAC, MI (C91)	Destination:	(FCM)

## Airport Information

Airport:	FLYING CLOUD AIRPORT (FCM)	Runway Surface Type:	Asphalt
Runway Used:	27L	Runway Surface Condition:	Dry
Runway Length/Width:	3909 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:			

## Administrative Information

Investigator In Charge (IIC):	DAVID C BOWLING	Adopted Date:	07/02/2001
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	MINNEAPOLIS, MN	<b>Accident Number:</b>	CHI00LA154
<b>Date &amp; Time:</b>	06/08/2000, 1545 CDT	<b>Registration:</b>	N8189T
<b>Aircraft:</b>	Piper PA-28-161	<b>Injuries:</b>	2 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

## Analysis

During initial climb after takeoff the engine crankshaft failed, resulting in a engine failure. The flight instructor took control of the aircraft and executed a forced landing into a swamp. Post-accident investigation revealed that the engine crankshaft had failed between the number three bearing journal and the number three connecting rod journal. According to the National Transportation Safety Board Materials Laboratory Factual Report, the fracture surface, on the forward piece of the crankshaft, "...appeared relatively smooth with curving crack arrest lines, features typical of fatigue." The report stated, "Fracture features for the fatigue region emanated from an origin...at the surface of the aft radius of the third main journal...." The factual report indicated that the fatigue cracking progressed through more than 80-percent of the check prior to the final separation. The factual report further added that that the inner and outer diameter surfaces of the number three main bearing halves were circumferentially rubbed. The report states, "One edge of each of these bearing halves was rubbed and worn in the approximate shape of the journal radius. In addition, the antirotation tabs for these bearing halves were worn away from the outside diameter surface." The factual report indicated that the number four main bearing halves were deformed and the inner diameter surface was gouged. The report states, "Also, some slight circumferential rubbing marks were observed on the inner diameter surface of the number 1 and 2 main bearing halves. No evidence of heat tinting was noted on any of the bearing halves."

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the failure of the engine and the unsuitable terrain for landing encountered by the pilot-in-command. Factors to the accident were the fracture of the crankshaft due to fatigue, excessive main bearing wear, and the swampy terrain condition.

## Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF  
Phase of Operation: TAKEOFF - INITIAL CLIMB

### Findings

1. (C) POWERPLANT - FAILURE, TOTAL
2. (F) ENGINE ASSEMBLY, CRANKSHAFT - FATIGUE
3. (F) ENGINE ASSEMBLY, CRANKSHAFT - FRACTURED
4. (F) ENGINE ASSEMBLY, BEARING - OTHER

Occurrence #2: FORCED LANDING  
Phase of Operation: EMERGENCY DESCENT/LANDING

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 Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
 Phase of Operation: EMERGENCY DESCENT/LANDING

**Findings**

- 5. (F) TERRAIN CONDITION - SWAMPY
- 6. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - ENCOUNTERED - PILOT IN COMMAND(CFI)

**Pilot Information**

<b>Certificate:</b>	Flight Instructor; Commercial	<b>Age:</b>	26
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Instrument Rating(s):</b>	Airplane
<b>Other Aircraft Rating(s):</b>	None	<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane
<b>Flight Time:</b>	537 hours (Total, all aircraft), 104 hours (Total, this make and model), 472 hours (Pilot In Command, all aircraft), 185 hours (Last 90 days, all aircraft), 76 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

**Aircraft and Owner/Operator Information**

<b>Aircraft Manufacturer:</b>	Piper	<b>Registration:</b>	N8189T
<b>Model/Series:</b>	PA-28-161 PA-28-161	<b>Engines:</b>	1 Reciprocating
<b>Operator:</b>	THUNDERBIRD AIRCRAFT COMPANY	<b>Engine Manufacturer:</b>	Lycoming
<b>Operating Certificate(s) Held:</b>	None	<b>Engine Model/Series:</b>	O-320-D3G
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

**Meteorological Information and Flight Plan**

<b>Conditions at Accident Site:</b>	Visual Conditions	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	FCM, 906 ft msl	<b>Weather Information Source:</b>	Weather Observation Facility
<b>Lowest Ceiling:</b>	None / 0 ft agl	<b>Wind Speed/Gusts, Direction:</b>	9 knots/ 18 knots, 160°
<b>Temperature:</b>	91° C	<b>Visibility</b>	10 Miles
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	(FCM)	<b>Destination:</b>	

**Airport Information**

<b>Airport:</b>	FLYING CLOUD MUNICIPAL (FCM)	<b>Runway Surface Type:</b>	Asphalt
<b>Runway Used:</b>	18	<b>Runway Surface Condition:</b>	
<b>Runway Length/Width:</b>	2691 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	2 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None

Latitude, Longitude:

## Administrative Information

Investigator In Charge (IIC): ANDREW T FOX      Adopted Date: 10/02/2001

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	MINNEAPOLIS, MN	<b>Accident Number:</b>	CHI00LA154
<b>Date &amp; Time:</b>	06/08/2000, 1545 CDT	<b>Registration:</b>	N8189T
<b>Aircraft:</b>	Piper PA-28-161	<b>Injuries:</b>	2 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

## Analysis

During initial climb after takeoff the engine crankshaft failed, resulting in a engine failure. The flight instructor took control of the aircraft and executed a forced landing into a swamp. Post-accident investigation revealed that the engine crankshaft had failed between the number three bearing journal and the number three connecting rod journal. According to the National Transportation Safety Board Materials Laboratory Factual Report, the fracture surface, on the forward piece of the crankshaft, "...appeared relatively smooth with curving crack arrest lines, features typical of fatigue." The report stated, "Fracture features for the fatigue region emanated from an origin...at the surface of the aft radius of the third main journal...." The factual report indicated that the fatigue cracking progressed through more than 80-percent of the check prior to the final separation. The factual report further added that that the inner and outer diameter surfaces of the number three main bearing halves were circumferentially rubbed. The report states, "One edge of each of these bearing halves was rubbed and worn in the approximate shape of the journal radius. In addition, the antirotation tabs for these bearing halves were worn away from the outside diameter surface." The factual report indicated that the number four main bearing halves were deformed and the inner diameter surface was gouged. The report states, "Also, some slight circumferential rubbing marks were observed on the inner diameter surface of the number 1 and 2 main bearing halves. No evidence of heat tinting was noted on any of the bearing halves."

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the failure of the engine and the unsuitable terrain for landing encountered by the pilot-in-command. Factors to the accident were the fracture of the crankshaft due to fatigue, excessive main bearing wear, and the swampy terrain condition.

## Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF  
Phase of Operation: TAKEOFF - INITIAL CLIMB

### Findings

1. (C) POWERPLANT - FAILURE, TOTAL
2. (F) ENGINE ASSEMBLY, CRANKSHAFT - FATIGUE
3. (F) ENGINE ASSEMBLY, CRANKSHAFT - FRACTURED
4. (F) ENGINE ASSEMBLY, BEARING - OTHER

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Occurrence #2: FORCED LANDING  
Phase of Operation: EMERGENCY DESCENT/LANDING



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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

- 5. (F) TERRAIN CONDITION - SWAMPY
- 6. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - ENCOUNTERED - PILOT IN COMMAND(CFI)

### Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	26
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane
Flight Time:	537 hours (Total, all aircraft), 104 hours (Total, this make and model), 472 hours (Pilot In Command, all aircraft), 185 hours (Last 90 days, all aircraft), 76 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Piper	Registration:	N8189T
Model/Series:	PA-28-161 PA-28-161	Engines:	1 Reciprocating
Operator:	THUNDERBIRD AIRCRAFT COMPANY	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	O-320-D3G
Flight Conducted Under:	Part 91: General Aviation - Instructional		

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	9 knots/ 18 knots, 160°
Temperature:	91° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	(FCM)	Destination:	

### Airport Information

Airport:	FLYING CLOUD MUNICIPAL (FCM)	Runway Surface Type:	Asphalt
Runway Used:	18	Runway Surface Condition:	
Runway Length/Width:	2691 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	2 Minor	Aircraft Damage:	Substantial
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Passenger Injuries:	N/A	Aircraft Fire:	None
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Ground Injuries:	N/A	Aircraft Explosion:	None
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Latitude, Longitude:

## Administrative Information

Investigator In Charge (IIC):	ANDREW T FOX	Adopted Date:	10/02/2001
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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI99LA315
<b>Date &amp; Time:</b>	08/30/1999, 1145 CDT	<b>Registration:</b>	N6606P
<b>Aircraft:</b>	Piper PA-24-180	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The airplane made a gear up landing. Visual meteorological conditions prevailed at the time of the accident. In a written statement, the pilot said that he 'forgot to put the gear down.' At a postaccident examination, the airplane landing gear extended under its own power while the aircraft was supported on jacks.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the failure of the pilot to follow the landing checklist and his failure to extend the landing gear.

## Findings

Occurrence #1: WHEELS UP LANDING  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

1. (C) CHECKLIST - NOT FOLLOWED - PILOT IN COMMAND
2. (C) GEAR EXTENSION - NOT PERFORMED - PILOT IN COMMAND

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	61
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Instrument Rating(s):</b>	None
<b>Other Aircraft Rating(s):</b>	None	<b>Instructor Rating(s):</b>	None
<b>Flight Time:</b>	2761 hours (Total, all aircraft), 528 hours (Total, this make and model), 2761 hours (Pilot In Command, all aircraft), 61 hours (Last 90 days, all aircraft), 12 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Piper	Registration:	N6606P
Model/Series:	PA-24-180 PA-24-180	Engines:	1 Reciprocating
Operator:	AIR FLITE	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	O-360
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Overcast / 4300 ft agl	Wind Speed/Gusts, Direction:	11 knots, 130°
Temperature:	18° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	FOND DU LAC, WI (FLD)	Destination:	(FCM)

## Airport Information

Airport:	FLYING CLOUD AIRPORT (FCM)	Runway Surface Type:	Asphalt
Runway Used:	27R	Runway Surface Condition:	Dry
Runway Length/Width:	3599 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None

Latitude, Longitude:

## Administrative Information

Investigator In Charge (IIC):	JOHN M BRANNEN	Adopted Date:	07/02/2001
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI99LA265
<b>Date &amp; Time:</b>	07/31/1999, 1100 CDT	<b>Registration:</b>	N310DE
<b>Aircraft:</b>	Cessna 310N	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot reported the flight was uneventful the left main landing gear 'broke' on touchdown. The airplane veered left where it contacted a taxiway information sign and the nose gear collapsed prior to the airplane coming to rest. The left main landing gear strut collapsed rearward damaging the left wing aft spar. Inspection of the left main gear revealed the upper and lower portions of the scissors link detached from each other allowing the lower portion of the strut to rotate within the upper portion of the strut. The bolt, washers, bushings, nut, and cotter pin remained attached to the upper link. There were three washers present near the head of the bolt. All three were painted white and had an outside diameter of 3/4 inch. There were four washer present at the castellated nut end of the bolt. None of these washers were painted and all of them had an outside diameter of 9/16 inch. This is the same outside diameter as the bushing and same inside diameter as the hole on the scissors link.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: maintenance personnel installed washers which were not large enough in diameter to prevent the retraction/extension scissors links from separating from each other.

## Findings

Occurrence #1: MAIN GEAR COLLAPSED  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

- Findings
1. (C) MISCELLANEOUS,BOLT/NUT/FASTENER/CLAMP/SPRING - IMPROPER
  2. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL
  3. (C) LANDING GEAR,NORMAL RETRACTION/EXTENSION ASSEMBLY - DISCONNECTED
- 

Occurrence #2: LOSS OF CONTROL - ON GROUND/WATER  
Phase of Operation: LANDING - ROLL

- Findings
4. DIRECTIONAL CONTROL - NOT POSSIBLE - PILOT IN COMMAND
- 

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: LANDING - ROLL

- Findings
5. OBJECT - AIRPORT SIGN/MARKER

## Pilot Information

Certificate:	Private	Age:	38
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	475 hours (Total, all aircraft), 170 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Cessna	Registration:	N310DE
Model/Series:	310N 310N	Engines:	2 Reciprocating
Operator:	BAHRAM AKRADI	Engine Manufacturer:	Continental
Operating Certificate(s) Held:	None	Engine Model/Series:	IO-470-VO
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	11 knots, 320°
Temperature:	26° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	(FCM)	Destination:	(FCM)

## Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Asphalt
Runway Used:	27	Runway Surface Condition:	Dry
Runway Length/Width:	3900 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:			

## Administrative Information

Investigator In Charge (IIC): PAMELA S SULLIVAN Adopted Date: 06/22/2000

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI99LA041
<b>Date &amp; Time:</b>	11/25/1998, 1839 CST	<b>Registration:</b>	N2988R
<b>Aircraft:</b>	Piper PA-28-R200	<b>Injuries:</b>	3 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

### Analysis

The pilot reported that she initiated the flare over the numbers of runway 27L. She reported the 'nose alignment drifted slightly left.' The left main gear touched down first and then the right main gear shortly after. The nose gear touched down 3 to 5 seconds after the right main gear. The airplane '...continued landing roll for less than 2 seconds after nose gear touched down before all steering was lost. Plane swerved hard left and initiated aircraft skidding with right side of aircraft turned slightly.' The right wingtip struck the VASI support stand, and the airplane spun 90 degrees clockwise before stopping. The pilot reported the VASI light fell on the right wing and collapsed the right main gear. The damage to the airplane included the right main gear was collapsed and punched through the wing spar.

### Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot misjudged the flare and did not maintain directional control during touchdown. A factor was the VASI lights.

### Findings

Occurrence #1: HARD LANDING  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

#### Findings

1. (C) FLARE - MISJUDGED - PILOT IN COMMAND
  2. (C) DIRECTIONAL CONTROL - NOT OBTAINED/MAINTAINED - PILOT IN COMMAND
- 

Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: LANDING - ROLL

#### Findings

3. (F) OBJECT - VASI LIGHT/SYSTEM



## Pilot Information

Certificate:	Private	Age:	40
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	242 hours (Total, all aircraft), 68 hours (Total, this make and model), 189 hours (Pilot In Command, all aircraft), 14 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Piper	Registration:	N2988R
Model/Series:	PA-28-R200 PA-28-R200	Engines:	1 Reciprocating
Operator:	KATHLEEN SPILMAN	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	IO-360-C1C
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	9 knots, 270°
Temperature:	7° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	LANSING, MI (IGQ)	Destination:	(FCM)

## Airport Information

Airport:	FLYING CLOUD AIRPORT (FCM)	Runway Surface Type:	Asphalt
Runway Used:	27	Runway Surface Condition:	Dry
Runway Length/Width:	3909 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:			

## Administrative Information

Investigator In Charge (IIC): JIM SILLIMAN Adopted Date: 07/02/1999

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI98LA334
<b>Date &amp; Time:</b>	09/08/1998, 1900 CDT	<b>Registration:</b>	N6269R
<b>Aircraft:</b>	Culver-Revolution MINI 500	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The kit-built helicopter was hover-taxiing for about ten minutes according to the pilot/builder. He said '...the engine stopped unexpectedly [and the helicopter] settled to the runway and rolled over.' The on-scene investigation revealed a silicon-type sealant had completely blocked the supply side of the fuel filter. The builder said he had used this material to seal the fuel tank filler neck's flange to the fuel tank. According to the manufacturer's instruction manual, the builder is to 'Place a 1/8-inch bead of MA300 from the adhesive kit around [the] hole circle through the centerline of [the mounting] holes.' MA300 is an epoxy-type glue/sealant that does not break down when contacted by gasoline. The silicon-type material dissolves when it comes in contact with gasoline, according to the helicopter's kit manufacturer.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a design change to the fuel tank filler neck sealant made by the owner/builder of the helicopter. Factors associated with this accident were an improper sealant material used by the owner/builder and an autorotation was not possible by the pilot due to the hover-taxis low altitude.

## Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL  
Phase of Operation: TAXI - AERIAL

### Findings

1. FUEL SYSTEM,FILTER - BLOCKED(TOTAL)
2. (C) MAINTENANCE,DESIGN CHANGE - PERFORMED - OWNER/BUILDER
3. (F) MATERIAL INADEQUATE,IMPROPER - OWNER/BUILDER
4. FUEL SYSTEM,FILTER - FOREIGN MATERIAL/SUBSTANCE
5. (F) SPIRAL - NOT POSSIBLE - PILOT IN COMMAND
6. FLUID,FUEL - STARVATION

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

### Findings

7. TERRAIN CONDITION - GROUND

Occurrence #3: ROLL OVER  
Phase of Operation: OTHER

## Pilot Information

Certificate:	Private	Age:	43
Airplane Rating(s):	None	Instrument Rating(s):	None
Other Aircraft Rating(s):	Helicopter	Instructor Rating(s):	None
Flight Time:	119 hours (Total, all aircraft), 9 hours (Total, this make and model), 59 hours (Pilot In Command, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Culver-Revolution	Registration:	N6269R
Model/Series:	MINI 500 MINI 500	Engines:	1 Reciprocating
Operator:	RANDY N. CULVER	Engine Manufacturer:	Rotax
Operating Certificate(s) Held:	None	Engine Model/Series:	582
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 1000 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	5 knots, 140°
Temperature:	20° C	Visibility	10 Miles
Precipitation and Obscuration:			
Departure Point:	(FCM)	Destination:	(FCM)

## Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Asphalt
Runway Used:	0	Runway Surface Condition:	Dry
Runway Length/Width:			

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:			

## Administrative Information

Investigator In Charge (IIC): FRANK S GATTOLIN Adopted Date: 05/19/1999

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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# National Transportation Safety Board Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI98LA092
<b>Date &amp; Time:</b>	02/08/1998, 1440 CST	<b>Registration:</b>	N18766
<b>Aircraft:</b>	Beech C-23	<b>Injuries:</b>	4 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

## Analysis

The pilot reported he touched down further down the runway than he intended and the airplane porpoised twice during touchdown. The pilot reported he elected to go-around after the second porpoise as he was running out of runway. He reported that during the go-around he retracted the flaps from full to neutral, and he applied full power and right rudder. The pilot reported the airplane entered a left yaw/roll during the go-around. The airplane then contacted a hangar, a chain link fence, and a ditch prior to spinning 180 degrees and sliding to a stop.

## Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's improper raising of flaps and not maintaining directional control of the aircraft during the go-around sequence.

## Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: GO-AROUND (VFR)

### Findings

- 1. (C) RAISING OF FLAPS - IMPROPER - PILOT IN COMMAND
- 2. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: GO-AROUND (VFR)

### Findings

- 3. OBJECT - HANGAR/AIRPORT BUILDING
- 4. OBJECT - FENCE

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

### Findings

- 5. TERRAIN CONDITION - DITCH

## Pilot Information

Certificate:	Private	Age:	44
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	225 hours (Total, all aircraft), 112 hours (Total, this make and model), 225 hours (Pilot In Command, all aircraft), 2 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Beech	Registration:	N18766
Model/Series:	C-23 C-23	Engines:	1 Reciprocating
Operator:	GREAT LAKES AIRCRAFT, INC.	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	None	Engine Model/Series:	O-360-A4K
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Broken / 2500 ft agl	Wind Speed/Gusts, Direction:	9 knots, 190°
Temperature:	3° C	Visibility	3 Miles
Precipitation and Obscuration:			
Departure Point:	(FCM)	Destination:	(FCM)

## Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Asphalt
Runway Used:	18	Runway Surface Condition:	Dry
Runway Length/Width:	2691 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	3 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:			

## Administrative Information

Investigator In Charge (IIC): PAMELA S SULLIVAN Adopted Date: 12/08/1998

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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# National Transportation Safety Board

## Aviation Accident Data Summary

<b>Location:</b>	EDEN PRAIRIE, MN	<b>Accident Number:</b>	CHI98LA042
<b>Date &amp; Time:</b>	11/20/1997, 1850 CST	<b>Registration:</b>	N252A
<b>Aircraft:</b>	Mooney M20K	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

### Analysis

The pilot was flying an ILS approach to runway 9R at Flying Cloud Airport, Eden Prairie, Minnesota. The weather was 300 feet overcast with a visibility of 1/2 mile in fog and mist. The pilot leveled off 'a few feet above decision height after flying the glideslope.' He said that he had trouble finding the runway lights due to the limited visibility. The pilot said that when he did see the lights, he was beyond the threshold of the runway and was not lined up properly with the center of the runway. The airplane touched down off the right edge of the runway striking several runway lights during the landing roll. Examination of the airplane revealed no anomalies.

### Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's improper decision to continue the approach beyond decision height, when he could not see the runway; and his attempt to land without being properly aligned on the runway. Factors relating to this accident were: darkness, fog and and runway lights.

### Findings

Occurrence #1: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: LANDING - ROLL

#### Findings

1. (F) LIGHT CONDITION - DARK NIGHT
2. (F) WEATHER CONDITION - FOG
3. (C) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
4. (F) OBJECT - RUNWAY LIGHT
5. (C) PROPER ALIGNMENT - NOT ATTAINED - PILOT IN COMMAND

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	54
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Instrument Rating(s):</b>	Airplane
<b>Other Aircraft Rating(s):</b>	None	<b>Instructor Rating(s):</b>	None
<b>Flight Time:</b>	1700 hours (Total, all aircraft), 1244 hours (Total, this make and model), 1680 hours (Pilot In Command, all aircraft), 93 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Mooney	Registration:	N252A
Model/Series:	M20K M20K	Engines:	1 Reciprocating
Operator:	WILLIAM & MARILYN BALDWIN	Engine Manufacturer:	Continental
Operating Certificate(s) Held:	None	Engine Model/Series:	TSIO-520-NB17
Flight Conducted Under:	Part 91: General Aviation - Personal		

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	FCM, 906 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Overcast / 300 ft agl	Wind Speed/Gusts, Direction:	5 knots, 210°
Temperature:	-5° C	Visibility	0.5 Miles
Precipitation and Obscuration:			
Departure Point:	BUFFALO, NY (9G0)	Destination:	

## Airport Information

Airport:	FLYING CLOUD (FCM)	Runway Surface Type:	Asphalt
Runway Used:	9R	Runway Surface Condition:	Dry
Runway Length/Width:	3909 ft / 75 ft		

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None

Latitude, Longitude:

## Administrative Information

Investigator In Charge (IIC):	DAVID C BOWLING	Adopted Date:	01/30/1998
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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**Appendix 3: California Study Aircraft Accident Locations**

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General Aviation Accident Locations – Figure F-4	3-1
General Aviation Accident Locations – Figure F-5	3-2
General Aviation Accident Locations – Figure F-6	3-3
General Aviation Accident Locations – Figure F-7	3-4

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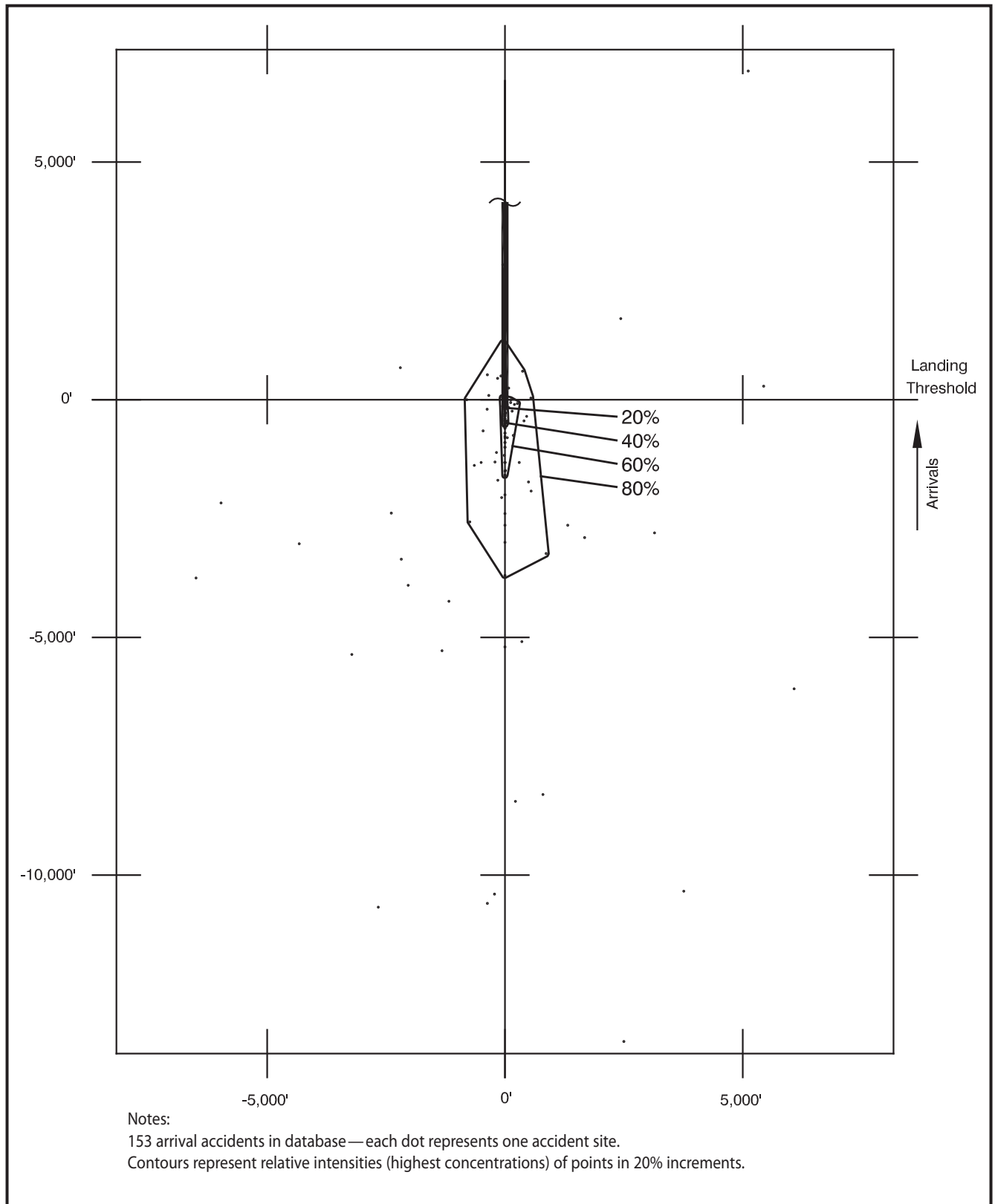


FIGURE F4

### General Aviation Accident Distribution Contours – Arrival Accidents on Runways of Less than 4,000 Feet

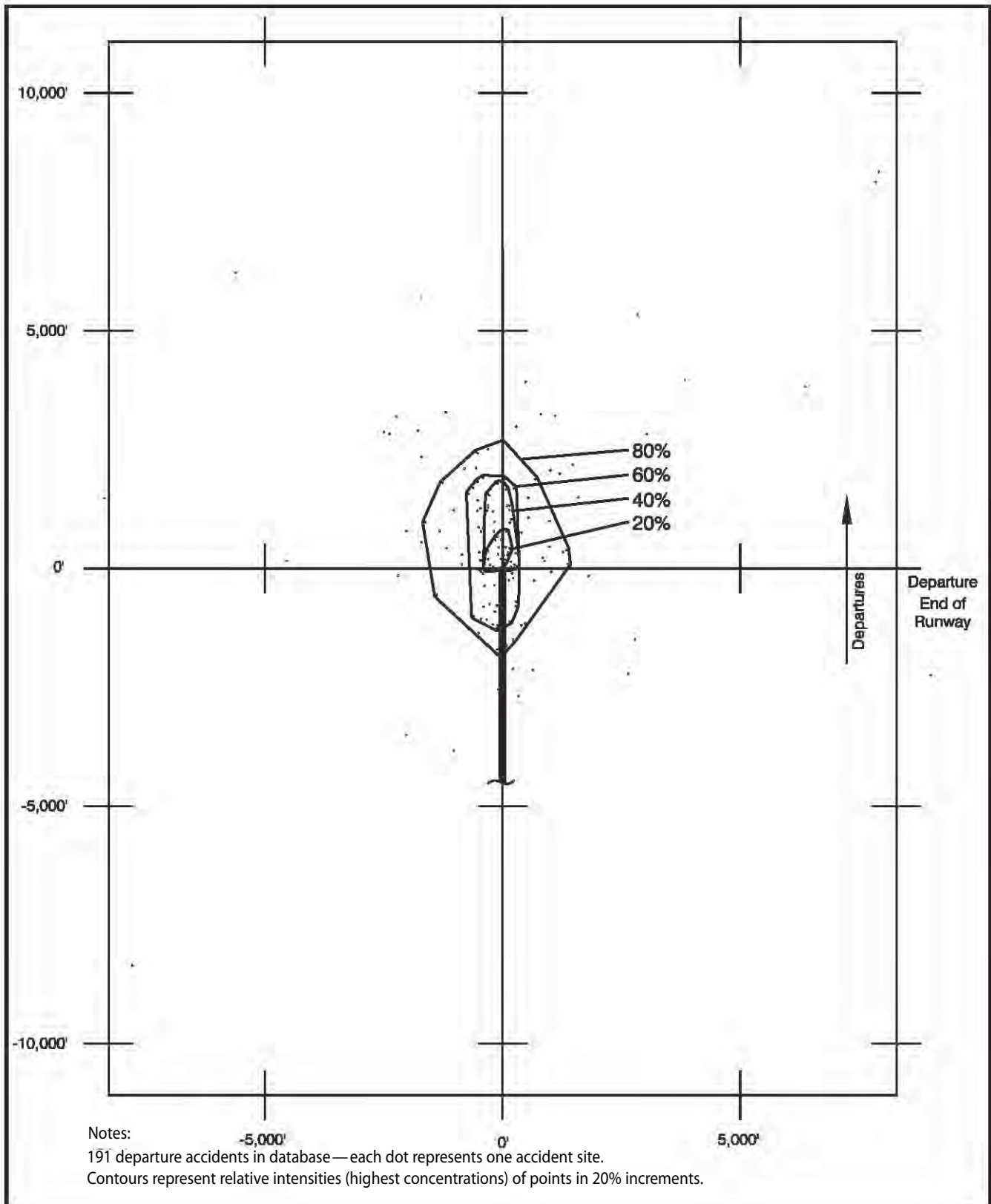


FIGURE F5

### General Aviation Accident Distribution Contours – Departure Accidents on Runways of Less than 4,000 Feet

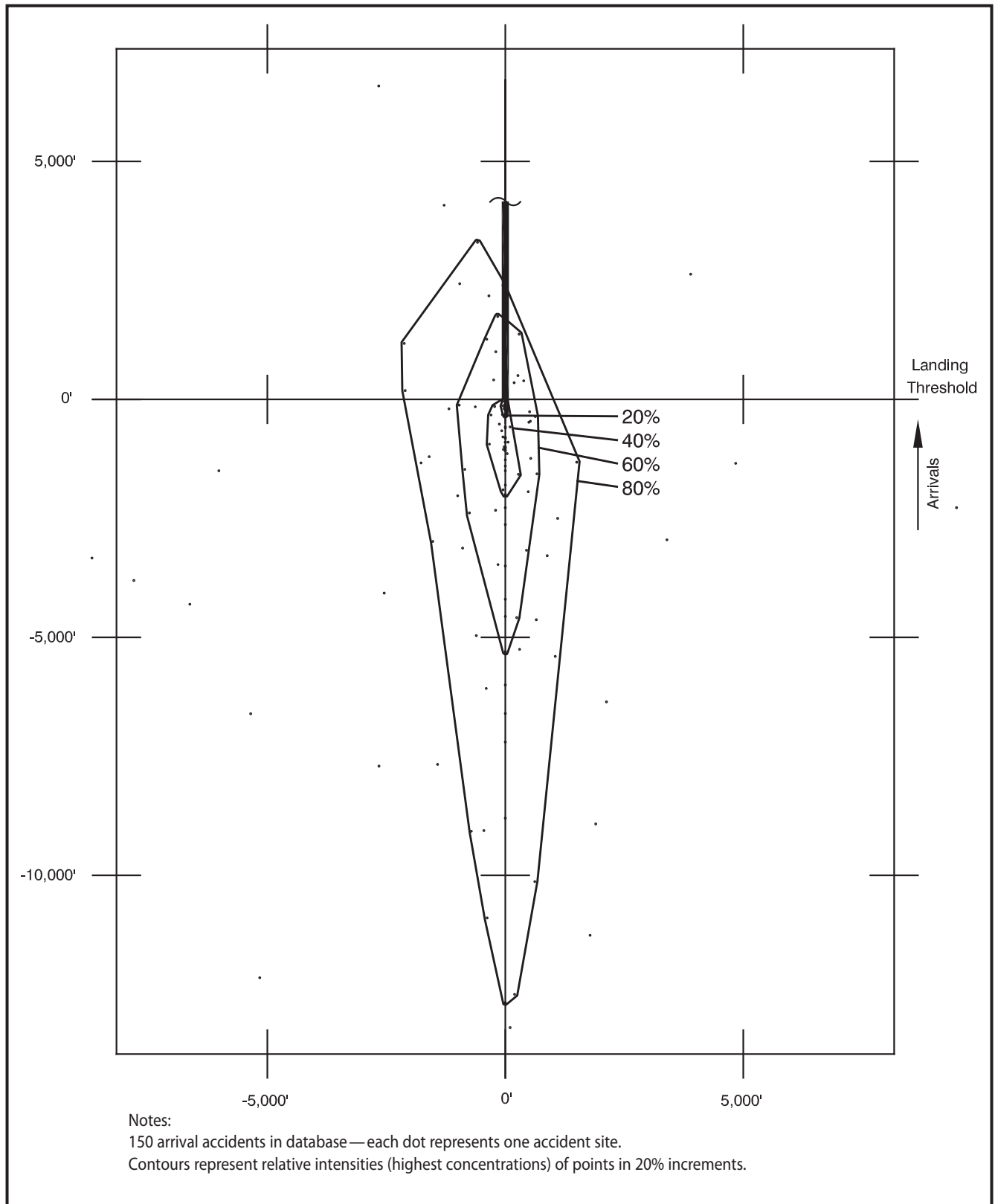


FIGURE F6

### General Aviation Accident Distribution Contours – Arrival Accidents on Runways of 4,000 Feet to 5,999 Feet

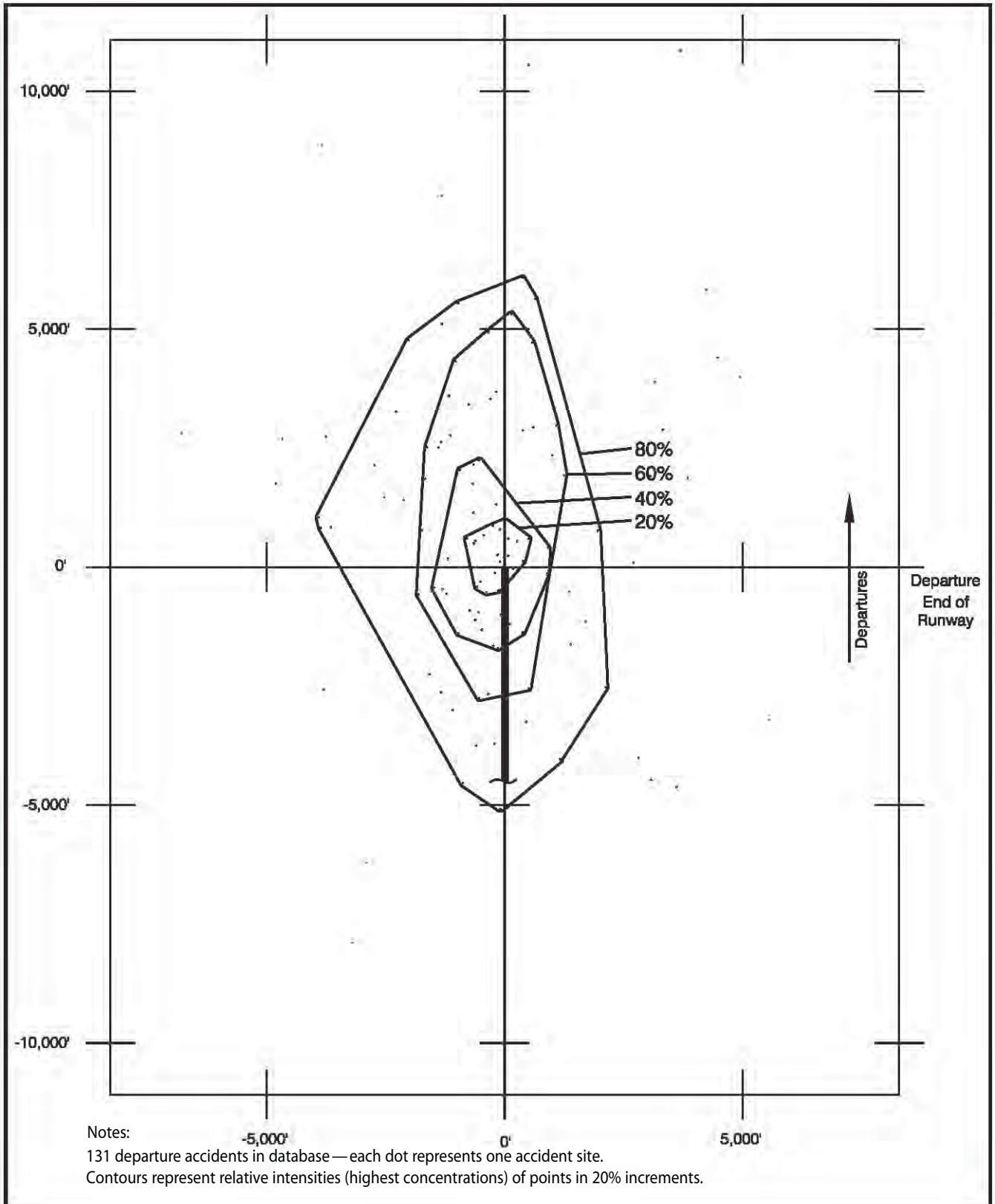


FIGURE F7

### General Aviation Accident Distribution Contours – Departure Accidents on Runways of 4,000 to 5,999 Feet



**Appendix 4: FCM Aircraft Activity Forecast Documentation**

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FCM Forecast Summary	4-1

Note: The complete *Minneapolis-St. Paul Reliever Airport: Activity Forecasts – Technical Report* that contains full forecast development documentation can be downloaded from the MAC website at:

<https://www.metroairports.org/General-Aviation/General-Aviation-Documents/MSP-Reliever-Technical-Report-10-30-2015.aspx>

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## 1. Introduction

This chapter summarizes the LTCP activity forecast for Flying Cloud Airport (FCM). The base year is represented by the twelve months ending June 2015 and forecasts were prepared for 2020, 2025, 2030, and 2035. The forecasts for the airport are unconstrained, except for runway length, and assume that the necessary facilities will be in place to accommodate demand. The chapter begins with a description of the forecast approach, followed by a discussion of the forecasts for based aircraft and aircraft operations, and then concludes with a set of alternative forecast scenarios.

The assumptions inherent in the following calculations are based on data provided by the MAC, federal and local sources, and professional experience. Forecasting, however, is not an exact science. Departures from forecast levels in the local and national economy and in the aviation industry would have a significant effect on the forecasts presented herein.

## 2. Historical Trends

Table 1 shows historical based aircraft and aircraft operations recorded at FCM from 1990 through 2015.

**Table 1: Historical Aviation Activity at Flying Cloud Airport**

<b>Year</b>	<b>Based Aircraft</b>	<b>Operations</b>
1990	485	227,410
1995	482	216,313
2000	485	186,078
2001	461	185,593
2002	473	176,408
2003	463	155,837
2004	456	159,648
2005	451	157,710
2006	447	144,178
2007	450	118,178
2008	413	119,139
2009	403	117,180
2010	403	94,984
2011	389	114,574
2012	403	84,773
2013	357	75,724
2014	363	73,634
2015	365	83,889(a)

(a) Twelve months ending June 2015. Includes operations when the control tower is not open.  
Source: MAC and FAA OPSNET.

The total number of aircraft based in Flying Cloud Airport remained steady between 1990 and 2000 and then declined to 365 in 2015. Aircraft operations fell more rapidly than based aircraft over the same period, indicating reduced utilization for those aircraft that remained based at FCM. However, there was an upturn between 2014 and 2015. A number of factors have contributed to the recent declines including the slowing economy, increased fuel prices and other operating costs, and reduced interest in recreational flying by younger people.

### 3. Forecast Approach

The Minneapolis-St. Paul metropolitan area is served by a system of airports. These airports provide a variety of roles and therefore both complement and compete with each other. Since these airports operate as a system, they were forecast as a system so that the interrelationships between the airports could be properly captured. The forecast focused on five of the airports in the MAC system – Flying Cloud, Anoka County (ANE), Crystal (MIC), Airlake (LVN), and St. Paul Downtown (STP) – but also incorporated the other MAC airports – Minneapolis-St. Paul International (MSP) and Lake Elmo (21D) into the analysis. The details of the forecast approach are provided in the main forecast report, *Minneapolis-St. Paul Reliever Airport: Activity Forecasts – Technical Report*, and are summarized below:

1. Identify Catchment Areas – Flying Cloud Airport is located in Hennepin County and most of the based aircraft owners reside in Hennepin County. Although many based aircraft owners use the airport that is closest, there is some overlap between the airport catchment areas. Jet and turboprop aircraft owners that require longer runways and more extensive maintenance and fueling facilities tend to gravitate towards airports such as St. Paul Downtown (STP) and FCM. Likewise, operators of small single engine piston aircraft often shy away from larger more commercial airports because of congestion and costs, even though these airports may be closer to their place of residence. Aircraft registration data from the Minnesota Department of Transportation (MnDOT) and the Metropolitan Airports Commission (MAC) was used to identify the percentage of FCM based aircraft owners that resided in each county.
2. Develop Socioeconomic Projections – Population forecasts from the Metropolitan Council (Met Council) and per capita income forecasts from Woods & Poole Economics (W&P) were used to develop hybrid income forecasts for each county in the metropolitan area. The income forecasts were used to estimate the share of based aircraft growth accounted for by each county.
3. Project the number of based aircraft registered in each county by aircraft category based on the county income forecasts and the FAA Aerospace forecast adjusted for Minneapolis-St. Paul trends.
4. Allocate the projected based aircraft to each MAC-airport according to the existing distribution pattern for each aircraft category (piston, turboprop, jet, helicopter, etc.).
5. Estimate the number of aircraft on waiting list that would be added assuming airport capacity is unconstrained. MAC records indicated, FCM had 8 aircraft on their hangar waiting list in 2015. Based on consultation with MAC staff, it was assumed that 50 percent of the aircraft owners and operators who signed up on the waiting list since 2012 would base their aircraft at FCM under unconstrained conditions.
6. Redistribute aircraft from the constrained MAC airports (MSP) to the remaining unconstrained airports based on the existing distribution patterns to the airports. Although MSP has sufficient airfield capacity to accommodate growth, the facilities that can accommodate based general aviation (GA) aircraft are limited.

7. Identify base year aircraft operations. Operations counts for Flying Cloud were initially obtained from the FAA Air Traffic Control Tower. The air traffic control tower at FCM does not operate 24 hours per day; therefore late night operations were estimated based on the MAC's noise monitoring data. To estimate operations by aircraft type, the FAA Traffic Flow Management System Counts (TFMSC) which provides aircraft information was used and supplemented with radar data from the MAC's noise monitoring office.
8. Project future year aircraft operations. In each aircraft category, operations per active aircraft were projected to increase at the same rate as the FAA forecast of hours flown per based aircraft, implicitly assuming that the number of operations per hours flown remain constant. The percentage of touch and go operations in each aircraft category was assumed to remain constant.

Forecasts include based aircraft and operations for each major category: single engine piston, multi-engine piston, turboprop, jets, helicopters, sport aircraft, experimental, and other. It was assumed that the share of each county's registered aircraft in every aircraft category based at all of the airports under study will remain constant.

#### 4. Forecast Results

Table 2 shows the forecast of based aircraft for Flying Cloud. The number of based aircraft at FCM is projected to increase slightly, from 365 aircraft in 2015 to 378 aircraft in 2035. The dominant aircraft in the fleet, piston engine aircraft, are projected to decline, consistent with the FAA Aerospace Forecast Fiscal Years 2015-2035. All other categories, including jets and turboprops, are expected to increase sufficiently to offset the decline in the piston category.

Table 3 shows the forecast of aircraft operations at FCM. Total aircraft operations at Flying Cloud are forecast to decrease slightly from 83,889 in 2015 to 81,516 in 2020, and then increase to 93,255 by 2035. Increases are projected in all categories except single-engine piston aircraft, for which the anticipated decrease in the based aircraft offsets slightly higher utilization forecasted by FAA. Jet and sport aircraft operations are expected to increase the fastest.

The percentage of operations occurring in July, the peak month at Flying Cloud Airport, was estimated from FAA air traffic control tower records. Average Day Peak Month (ADPM) operations were estimated by dividing by 31 days. Peak hour operations were obtained from the FAA Distributed Operations Network (OPSNET). The peak hour percentage in the peak month over the past four years has averaged 13.4 percent. As shown in Table 4, peak hour operations are projected to fluctuate between 42 and 48 operations.

**Table 2: Summary of Based Aircraft Forecast (Flying Cloud).**

<b>Year</b>	<b>Single Engine Piston</b>	<b>Multi-Engine Piston</b>	<b>Turboprop</b>	<b>Jets</b>	<b>Rotor</b>	<b>Sport</b>	<b>Experimental - Excluding Ultralights</b>	<b>Other</b>	<b>Total</b>
2015	256	29	25	17	11	4	22	1	365
2020	247	27	25	18	13	5	24	1	360
2025	240	27	26	21	15	6	26	1	362
2030	232	27	29	24	16	8	27	1	364
2035	229	28	33	31	18	9	29	1	378
<b>Average Annual Growth Rate</b>									
	-0.6%	-0.2%	1.4%	3.0%	2.5%	4.1%	1.4%	0.0%	0.2%

Source: Table 11 in Minneapolis-St. Paul Reliever Airport: Activity Forecasts – Technical Report, 2016.

**Table 3: Summary of Operations Forecast (Flying Cloud).**

<b>Year</b>	<b>Single Engine Piston</b>	<b>Multi-Engine Piston</b>	<b>Turboprop</b>	<b>Jets</b>	<b>Rotor</b>	<b>Sport</b>	<b>Experimental - Excluding Ultralights</b>	<b>Other</b>	<b>Total</b>
2014	51,464	3,924	6,904	7,292	1,348	422	4,405	-	75,759
2015	57,937	4,300	6,856	7,898	1,477	462	4,959	-	83,889
2020	53,198	3,902	7,010	9,132	1,805	601	5,868	-	81,516
2025	51,740	3,901	7,328	11,159	2,103	751	6,641	-	83,623
2030	50,640	4,018	8,176	12,844	2,258	1,037	7,095	-	86,068
2035	51,307	4,401	9,304	16,635	2,562	1,212	7,834	-	93,255
	<b>Average Annual Growth Rate</b>								
	-0.6%	0.1%	1.5%	3.8%	2.8%	4.9%	2.3%		0.5%

Source: Table 16 in Minneapolis-St. Paul Reliever Airport: Activity Forecasts – Technical Report, 2016.

**Table 4: Peak Activity Forecast (Flying Cloud).**

<b>Year</b>	<b>Annual Operations</b>	<b>Peak Month Operations</b>	<b>ADPM Operations</b>	<b>Peak Hour Operations</b>
2014	75,759	9,759	315	42
2015	83,889	10,031	324	44
2020	81,516	9,748	314	42
2025	83,623	10,000	323	43
2030	86,068	10,292	332	45
2035	93,255	11,151	360	48

Source: Table 21 in Minneapolis-St. Paul Reliever Airport: Activity Forecasts – Technical Report, 2016.

## **5 Scenarios**

General aviation activity has historically been difficult to forecast, since the relationships with economic growth and pricing factors are more tenuous than in other aviation sectors, such as commercial aviation. This uncertainty is likely to carry over into the near future, given the volatility of fuel prices and the continued shift in GA from personal use to business use. To address these uncertainties, and to identify the potential upper and lower bounds of future activity at the study airports, detailed high and low scenarios are presented. These scenarios use the same forecast approach that was used in the base case, but alter the assumptions to reflect either a more aggressive or more conservative outlook.

The high forecast scenario is based on the assumption that income would grow 0.5 percent per year faster than in the base case. All other assumptions are the same as in the base case. The low forecast scenario is based on the assumption that income would grow 0.5 percent more slowly each year than under the base case. Table 5 compares the total number of aircraft and operations under different scenarios for Flying Cloud Airport and also includes the operations forecast from the FAA's Terminal Area Forecast (TAF) for the airport.

Figure 1 provides a graphic comparison of the base, high and low operations forecasts, along with the TAF for the airport. As shown, the FCM LTCP forecasts are all higher than the TAF, but this is primarily because the LTCP forecasts use a more up-to-date base year number.

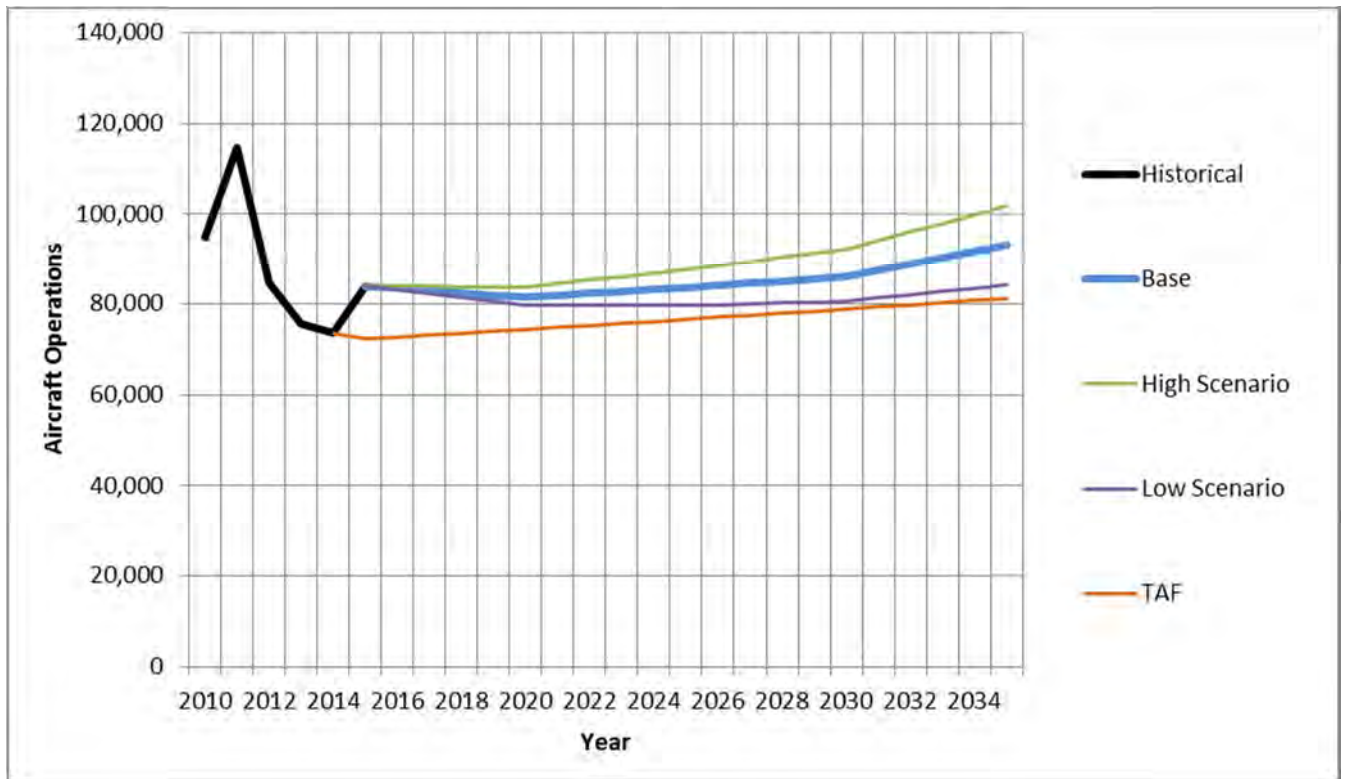


**Table 5: Forecast Comparison by Scenario – Flying Cloud Airport.**

Year	Total Based Aircraft			Total Number of Operations			
	Base Case	High Range	Low Range	Base Case	High Range	Low Range	TAF
2015	365	365	365	83,889	83,889	83,889	72,284
2020	360	369	352	81,516	83,772	79,776	74,411
2025	362	379	345	83,623	87,592	79,683	76,604
2030	364	387	342	86,068	92,185	80,617	78,886
2035	378	413	344	93,255	101,784	84,181	81,202
	<b>Average Annual Growth Rate</b>						
	0.2%	0.6%	-0.3%	0.5%	1.0%	0.0%	0.6%

Sources: Tables 26 and N.4 in Minneapolis-St. Paul Reliever Airport: Activity Forecasts – Technical Report, 2016.

**Figure 1: Forecast Comparison by Scenario – Flying Cloud Airport**



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**Appendix 5: Aircraft Accident Probability Risk Calculation Tables**

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**Flying Cloud Airport (FCM)  
Accident Probability Calculations by Runway End**

Runway End	Forecast Operations		FCM Accident Rate	Total Accident Locations	On-Airfield + RPZ				
	Total	/100,000			Accidents	%	Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	619	499	81%	0.1337	7	67.7368
28L	19,376	0.194		639	483	76%	0.1231	8	63.5134
10L	24,438	0.244		555	459	83%	0.1699	6	69.5038
28R	20,818	0.208		676	544	80%	0.1408	7	67.6158
10s	44,169	0.442		1,234	1,023	83%	0.3077	3	69.6671
28s	40,194	0.402		1,565	1,214	78%	0.2620	4	65.1905
18	7,517	0.075		662	533	81%	0.0509	20	67.6648
36	9,162	0.092		733	584	80%	0.0613	16	66.9400
All	101,042	1.010		4,235	3,391	80%	0.6799	1	67.2841

Runway End	Forecast Operations		FCM Accident Rate	Total Accident Locations	State Safety Zone A Beyond RPZ				
	Total	/100,000			Accidents	%	Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	619	8	1%	0.0021	467	1.0864
28L	19,376	0.194		639	37	6%	0.0094	106	4.8668
10L	24,438	0.244		555	44	8%	0.0163	61	6.6592
28R	20,818	0.208		676	44	7%	0.0114	88	5.4724
10s	44,169	0.442		1,234	47	4%	0.0141	71	3.2000
28s	40,194	0.402		1,565	152	10%	0.0328	30	8.1597
18	7,517	0.075		662	36	5%	0.0034	291	4.5679
36	9,162	0.092		733	35	5%	0.0037	272	4.0151
All	101,042	1.010		4,235	278	7%	0.0557	18	5.5168

Runway End	Forecast Operations		FCM Accident Rate	Total Accident Locations	State Safety Zone B				
	Total	/100,000			Accidents	%	Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	619	12	2%	0.0032	311	1.6296
28L	19,376	0.194		639	11	2%	0.0028	357	1.4469
10L	24,438	0.244		555	4	1%	0.0015	676	0.6054
28R	20,818	0.208		676	4	1%	0.0010	966	0.4975
10s	44,169	0.442		1,234	19	2%	0.0057	175	1.2936
28s	40,194	0.402		1,565	17	1%	0.0037	273	0.9126
18	7,517	0.075		662	8	1%	0.0008	1,311	1.0151
36	9,162	0.092		733	9	1%	0.0009	1,057	1.0325
All	101,042	1.010		4,235	59	1%	0.0118	85	1.1708

Runway End	Forecast Operations		FCM Accident Rate	Total Accident Locations	Off Airport Beyond Safety Zones				
	Total	/100,000			Accidents	%	Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	619	100	16%	0.0268	37	13.5801
28L	19,376	0.194		639	108	17%	0.0275	36	14.2058
10L	24,438	0.244		555	48	9%	0.0178	56	7.2646
28R	20,818	0.208		676	84	12%	0.0217	46	10.4473
10s	44,169	0.442		1,234	145	12%	0.0436	23	9.8723
28s	40,194	0.402		1,565	182	12%	0.0393	25	9.7702
18	7,517	0.075		662	85	13%	0.0081	123	10.7852
36	9,162	0.092		733	105	14%	0.0110	91	12.0454
All	101,042	1.010		4,235	507	12%	0.1017	10	10.0612

Runway End	Forecast Operations		FCM Accident Rate	Total Accident Locations	Total				
	Total	/100,000			Accidents	%	Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	619	619	100%	0.1658	6	84.0329
28L	19,376	0.194		639	639	100%	0.1628	6	84.0329
10L	24,438	0.244		555	555	100%	0.2054	5	84.0329
28R	20,818	0.208		676	676	100%	0.1749	6	84.0329
10s	44,169	0.442		1,234	1,234	100%	0.3712	3	84.0329
28s	40,194	0.402		1,565	1,565	100%	0.3378	3	84.0329
18	7,517	0.075		662	662	100%	0.0632	16	84.0329
36	9,162	0.092		733	733	100%	0.0770	13	84.0329
All	101,042	1.010		4,235	4,235	100%	0.8491	1	84.0329

**Flying Cloud Airport (FCM)  
Accident Probability Calculations by Runway End Occupant Areas**

Runway End	Forecast Operations		FCM Accident Rate	Occupant Area Accident Locations			Total Accident Locations	SSZ A Beyond RPZ Occupant Areas		
	Total	/100,000		SSZ A	SSZ B	Total		Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	2	4	6	619	0.0005	1,866	0.2716
28L	19,376	0.194		2	5	7	639	0.0005	1,962	0.2631
10L	24,438	0.244		0	1	1	555	0.0000	---	0.0000
28R	20,818	0.208		1	2	3	676	0.0003	3,862	0.1244
10s	44,169	0.442		2	8	10	1,234	0.0006	1,663	0.1362
28s	40,194	0.402		5	9	14	1,565	0.0011	927	0.2684
18	7,517	0.075		0	0	0	662	0.0000	---	0.0000
36	9,162	0.092		0	0	0	733	0.0000	---	0.0000
All	101,042	1.010		7	20	27	4,235	0.0014	712	0.1389

Runway End	Forecast Operations		FCM Accident Rate	Occupant Area Accident Locations			Total Accident Locations	SSZ B Beyond RPZ Occupant Areas		
	Total	/100,000		SSZ A	SSZ B	Total		Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	2	4	6	619	0.0011	933	0.5432
28L	19,376	0.194		2	5	7	639	0.0013	785	0.6577
10L	24,438	0.244		0	1	1	555	0.0004	2,704	0.1513
28R	20,818	0.208		1	2	3	676	0.0005	1,931	0.2487
10s	44,169	0.442		2	8	10	1,234	0.0024	416	0.5447
28s	40,194	0.402		5	9	14	1,565	0.0019	515	0.4831
18	7,517	0.075		0	0	0	662	0.0000	---	0.0000
36	9,162	0.092		0	0	0	733	0.0000	---	0.0000
All	101,042	1.010		7	20	27	4,235	0.0040	249	0.3969

Runway End	Forecast Operations		FCM Accident Rate	Occupant Area Accident Locations			Total Accident Locations	SSZ A Beyond RPZ + SSZ B Occupant Areas		
	Total	/100,000		SSZ A	SSZ B	Total		Probability	Years Between	Per 10m
10R	19,731	0.197	0.840	2	4	6	619	0.0016	622	0.8148
28L	19,376	0.194		2	5	7	639	0.0018	561	0.9207
10L	24,438	0.244		0	1	1	555	0.0004	2,704	0.1513
28R	20,818	0.208		1	2	3	676	0.0008	1,287	0.3731
10s	44,169	0.442		2	8	10	1,234	0.0030	333	0.6808
28s	40,194	0.402		5	9	14	1,565	0.0030	331	0.7516
18	7,517	0.075		0	0	0	662	0.0000	---	0.0000
36	9,162	0.092		0	0	0	733	0.0000	---	0.0000
All	101,042	1.010		7	20	27	4,235	0.0054	185	0.5358

**Appendix 6: Economic Impact Analysis Detail Tables**

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**Table 3-3A  
Commercial Development Economic Impact Results With Low and High Range Details**

<b>Commercial Development Scenario</b>	<b>Acres</b>	<b>Building SF</b>	<b>Value/SF</b>	<b>Total Commercial Value</b>	<b>Annual Real Estate Tax Value</b>
<b><u>JAZB Scenario Case 1</u></b>					
Low Range	15.8	190,879	\$153	\$29,221,190	\$70,705
High Range	15.8	327,004	\$154	\$50,273,830	\$124,738
<b><u>State Model Scenario Case 1</u></b>					
Low Range	2.4	13,322	\$150	\$1,998,285	\$8,233
High Range	2.4	13,322	\$150	\$1,998,285	\$8,233
<b><u>Differential Case 1</u></b>					
<i>Low Range</i>	<i>13.4</i>	<i>177,557</i>	<i>\$3</i>	<i>\$27,222,905</i>	<i>\$62,472</i>
<i>High Range</i>	<i>13.4</i>	<i>313,682</i>	<i>\$4</i>	<i>\$48,275,545</i>	<i>\$116,505</i>
<b><u>JAZB Scenario Case 2</u></b>					
Low Range	26.9	335,934	\$152	\$50,979,440	\$209,477
High Range	26.9	568,762	\$152	\$86,537,530	\$355,923
<b><u>State Model Scenario Case 2</u></b>					
Low Range	13.5	73,707	\$150	\$11,056,084	\$45,551
High Range	13.5	73,707	\$150	\$11,056,084	\$45,551
<b><u>Differential Case 2</u></b>					
<i>Low Range</i>	<i>13.4</i>	<i>262,227</i>	<i>\$2</i>	<i>\$39,923,356</i>	<i>\$163,926</i>
<i>High Range</i>	<i>13.4</i>	<i>495,055</i>	<i>\$2</i>	<i>\$75,481,446</i>	<i>\$310,372</i>

Notes:

Includes office, commercial, and industrial development

Case 1 assumes residential development on the MAC-owned undefined parcel

Case 2 assumes office development on MAC-owned undefined parcel

Low range assumes floor-to-area ratio for single-story building

High range considers assumes floor-to-area ratio for multi-story building

Building SF based on floor-to-area ratios assigned by City of Eden Prairie

Value per SF of development ranged from \$80/SF to \$200/SF; includes industrial land use

Annual real estate tax value assigned by City of Eden Prairie

Source: Eden Prairie analysis

**Table 3-4A  
 Combined Residential and Commercial Economic Impact Results With Low and High Range Details**

<b>Development Scenario</b>	<b>Total Development Value</b>	<b>Total Annual Real Estate Tax Value</b>	<b>20-Year Value</b>
<b><u>JAZB Scenario Case 1</u></b>			
Low Range	\$46,156,230	\$126,931	\$48,694,853
High Range	\$67,208,870	\$180,964	\$70,828,153
<b><u>State Model Scenario Case 1</u></b>			
Low Range	\$3,925,758	\$14,632	\$4,218,405
High Range	\$3,925,758	\$14,632	\$4,218,405
<b><u>Differential Case 1</u></b>			
<i>Low Range</i>	<i>\$42,230,472</i>	<i>\$112,299</i>	<i>\$44,476,448</i>
<i>High Range</i>	<i>\$63,283,112</i>	<i>\$166,332</i>	<i>\$66,609,748</i>
<b><u>JAZB Scenario Case 2</u></b>			
Low Range	\$57,463,032	\$231,003	\$62,083,096
High Range	\$93,021,122	\$377,449	\$100,570,106
<b><u>State Model Scenario Case 2</u></b>			
Low Range	\$11,583,668	\$47,303	\$12,529,722
High Range	\$11,583,668	\$47,303	\$12,529,722
<b><u>Differential Case 2</u></b>			
<i>Low Range</i>	<i>\$45,879,364</i>	<i>\$183,701</i>	<i>\$49,553,374</i>
<i>High Range</i>	<i>\$81,437,454</i>	<i>\$330,147</i>	<i>\$88,040,384</i>

Notes:

Scenario 1 assumes residential development on the MAC-owned undefined parcel

Scenario 2 assumes office development on the MAC-owned undefined parcel

20-year value sums one-time development value plus recurring annual real estate tax value

Source: Eden Prairie analysis

**Table 3-5A  
Impacts to Employment Potential Results With Low and High Range Details**

Development Scenario	Employment Potential
<b><u>JAZB Scenario Case 1</u></b>	
Low Range	476
High Range	805
<b><u>State Model Scenario Case 1</u></b>	
Low Range	37
High Range	37
<b><u>Differential Case 1</u></b>	
<i>Low Range</i>	439
<i>High Range</i>	768
<b><u>JAZB Scenario Case 2</u></b>	
Low Range	875
High Range	1,470
<b><u>State Model Scenario Case 2</u></b>	
Low Range	203
High Range	203
<b><u>Differential Case 2</u></b>	
<i>Low Range</i>	673
<i>High Range</i>	1,268
Notes:	
Scenario 1 assumes residential development on the MAC-owned undefined parcel	
Scenario 2 assumes office development on the MAC-owned undefined parcel	
Employment potential for JAZB Scenario estimated by Eden Prairie	
Employment potential for State Model Scenario based on site density restrictions	

Source: Eden Prairie analysis

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**Appendix 7: FCM Zoning Ordinance Language and Exhibits**

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**DRAFT**  
**01/18/2018**

**Flying Cloud Airport  
Zoning Ordinance**

Adopted \_\_\_\_\_, 201~~8~~

Adopted by the  
Flying Cloud Airport Joint Airport Zoning Board

Contact Person:  
Flying Cloud Joint Airport Zoning Board  
c/o JAZB Secretary  
Metropolitan Airports Commission  
6040 28<sup>th</sup> Avenue South  
Minneapolis, Minnesota 55450

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**FLYING CLOUD AIRPORT  
ZONING ORDINANCE  
ADOPTED BY THE  
FLYING CLOUD AIRPORT 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 FLYING CLOUD 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; REFERRING TO THE FLYING CLOUD AIRPORT ZONING MAP; PROVIDING FOR ENFORCEMENT; ESTABLISHING A BOARD OF ADJUSTMENT; AND IMPOSING PENALTIES.

THEREFORE, IT IS HEREBY ORDAINED BY THE FLYING CLOUD AIRPORT JOINT AIRPORT ZONING BOARD PURSUANT TO THE AUTHORITY CONFERRED BY MINNESOTA STATUTES §§ 360.061 – 360.074, THAT THE FLYING CLOUD AIRPORT ZONING ORDINANCE BE EFFECTIVE AS FOLLOWS:

**SECTION I. PURPOSE AND AUTHORITY**

The FLYING CLOUD Airport Joint Airport Zoning Board, created and established by joint action of the Metropolitan Airports Commission and the Cities of Eden Prairie, ~~Bloomington~~, Shakopee, and Chanhassen, 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 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 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 Airport.

- 31 **C.** For the protection of the public health, safety, order, convenience, prosperity, and general  
32 welfare, and for the promotion of the most appropriate use of land, it is necessary to prevent  
33 the creation or establishment of Airport Hazards.
- 34 **D.** The social and economic costs of disrupting land uses around the Airport, however, often  
35 outweigh the benefits of a reduction in Airport Hazards requiring a balance between the social  
36 and economic costs to surrounding communities and the benefits of strict regulation.
- 37 **E.** The prevention of these Airport Hazards should be accomplished, to the extent legally  
38 possible, by the exercise of the police power without compensation.
- 39 **F.** Preventing the creation or establishment of Airport Hazards and eliminating, removing,  
40 altering, mitigating, or marking and lighting of existing Airport Hazards are public purposes for  
41 which political subdivisions may raise and expend public funds, levy assessments against land,  
42 and acquire land and property interests therein.

43 **SECTION II. TITLE AND SHORT TITLE**

44 This ordinance shall be known as the "Flying Cloud Airport Zoning Ordinance" or the "FCM Zoning  
45 Ordinance."

46 **SECTION III. DEFINITIONS AND RULES OF CONSTRUCTION**

47 **A. Definitions.** As used in this Flying Cloud Airport Zoning Ordinance, unless otherwise  
48 expressly stated, or unless the context clearly indicates a different meaning, the words and  
49 phrases in the following list of definitions shall have the meanings indicated. All words and  
50 phrases not defined shall have their common meaning.

51 **1. Above-ground Fuel Tank.** "Above-ground Fuel Tank" means a container, vessel, or  
52 other enclosure designed to contain or dispense fuel that is located above the ground  
53 surface, that is not contained within a building or structure, and that is not part of or  
54 connected to a boat, motor vehicle, or rail car.

55 **2. Airport.** "Airport" means Flying Cloud Airport located in Hennepin County, Minnesota.

56 **3. Airport Boundary.** "Airport Boundary" means the boundary shown on Exhibit A –  
57 Airport Boundary, attached hereto and made a part hereof.

- 58           **4. Airport Hazard.** "Airport Hazard" means any Structure, Tree, or use of land that  
59           obstructs the airspace required for, or is otherwise hazardous to, the flight of aircraft in  
60           landing or taking off at the Airport; and any use of land that is hazardous to Persons or  
61           property because of its proximity to the Airport.
- 62           **5. Airport Zoning Permit.** "Airport Zoning Permit" means zoning permits as required  
63           under Section IX.
- 64           **6. Airspace Surfaces.** "Airspace Surfaces" means the surfaces established in  
65           Section IV.A.
- 66           **7. Airspace Zones.** "Airspace Zones" means the land use zones established in  
67           Section IV.A.
- 68           **8. Board of Adjustment.** "Board of Adjustment" means the body established in  
69           Section XIII.A.
- 70           **9. Bluff.** "Bluff" means a steep cliff, embankment, hill, or outcropping along a river or  
71           stream, with an average slope of eighteen (18) percent or greater measured over a  
72           horizontal distance of fifty (50) feet or more, and that rises at least twenty-five (25) feet  
73           above the ordinary high water mark of the river or stream.
- 74           **10. Commissioner.** "Commissioner" means the Commissioner of the Minnesota  
75           Department of Transportation or, if either the position of Commissioner or the Minnesota  
76           Department of Transportation shall no longer exist or serve its present functions, such  
77           successor state official or officials or entity or entities as shall either singularly or  
78           collectively perform or serve such functions.
- 79           **11. Dwelling.** "Dwelling" means any building or portion thereof designed or used as a  
80           residence or sleeping place of one or more Persons.
- 81           **12. Effective Date.** "Effective Date" means the effective date set forth in Section XIX.
- 82           **13. Permitted Residential Areas.** "Permitted Residential Areas" means the areas listed  
83           on Exhibit B – ~~Legal Descriptions of~~ Parcels in Permitted Residential Areas and shown on  
84           Exhibit C – Map of Permitted Residential Areas, both attached hereto and made a part  
85           hereof, all of which have been designated based on the following criteria/findings  
86           related to each listed neighborhood:  
87           a.    Low accident probability;

- 88           b. Aircraft accident and site characteristics;
- 89           c. Adjacency to large open areas;
- 90           d. Economic effects of residential use restrictions and/or designation of existing
- 91           residential uses as non-conforming; and
- 92           l. Other material factors deemed relevant by the governmental unit in distinguishing
- 93           the area in question as a Permitted Residential Area.

94       **14. FAA.** "FAA" means the Federal Aviation Administration or, if the Federal Aviation  
95       Administration shall no longer exist or serve its present functions, such successor federal  
96       entity or entities as shall either singularly or collectively perform or serve such functions.

97       **15. FAA 7460 Obstruction Evaluation.** Established FAA process for conducting  
98       aeronautical studies conducted under the provisions of Title 14 CFR, Part 77 (for  
99       proposed construction or alteration) or Federal Aviation Act of 1958 (for existing  
100       structures), or any successor to this process.

101       **16. FCM Zoning Map.** "FCM Zoning Map" means the Flying Cloud Airport Zoning Map as  
102       defined in Section VI.C.

103       **17. Fuel.** "Fuel" means any petroleum product, including natural gas, used to produce heat  
104       or power by burning.

105       **18. Lot.** [For JAZB Ordinance: "Lot" means a designated parcel, tract, or area of land  
106       established by plat or subdivision, or otherwise permitted by law.] [For Eden Prairie  
107       Ordinance: "Lot" means one unit of a recorded plat, subdivision, or registered land  
108       survey, or a recorded parcel described by metes and bounds.]

109       **19. Low Density Residential Structure.** "Low Density Residential Structure" means a  
110       single-family or two-family home.

111       **20. Low Density Residential Lot.** "Low Density Residential Lot" means a single Lot  
112       located in an area which is zoned for single-family, —two-family residences, or  
113       multifamily-residential use and in which the predominant land use is such type of  
114       residences.

115       **21. 21.Nonconforming Use.** "Nonconforming Use" means any pre-existing Structure or  
116       use of land which is inconsistent with the provisions of this FCM Zoning Ordinance or an  
117       amendment hereto.

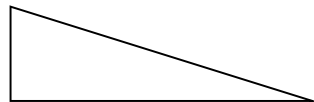
- 118       **22. *Nursing Home.*** "Nursing Home" means a facility or that part of a  
119       facility which provides nursing care to five or more persons. "Nursing home" does not  
120       include a facility or that part of a facility which is a hospital, a hospital with approved  
121       swing beds as defined in section 144.562, clinic, doctor's office, diagnostic or treatment  
122       center, or a residential program licensed pursuant to sections 245A.01 to 245A.16 or  
123       252.28.
- 124       **23. *Person.*** "Person" means any individual, firm, partnership, corporation, company,  
125       association, joint stock association, or body politic, and includes a trustee, receiver,  
126       assignee, administrator, executor, guardian, or other representative.
- 127       **24. *Planned.*** "Planned" means proposed future Airport developments and improvements  
128       indicated on a planning document having the approval of the FAA, the Minnesota  
129       Department of Transportation, Office of Aeronautics, and the Metropolitan Airports  
130       Commission.
- 131       **25. *Precision Instrument Runway.*** "Precision Instrument Runway" means a Runway  
132       having an existing instrument approach procedure utilizing an instrument landing system  
133       (ILS), or a precision approach radar (PAR), and a Runway for which a precision  
134       instrument approach procedure is Planned.
- 135       **26. *Runway.*** "Runway" means any existing or ~~Planned-planned~~ paved surface of the  
136       Airport which is specifically designated and used or ~~Planned-planned~~ to be used for the  
137       landing and/or taking off of aircraft. The individual Runways at the Airport are defined  
138       in this FCM Zoning Ordinance based on the compass heading of landing aircraft.
- 139       **27. *Runway 10R-28L.*** "Runway 10R-28L" means the 5,000-foot runway. Runway 10R is a  
140       Precision Instrument Runway and Runway 28L is a Non-precision Runway. Both the  
141       Runway 10R and 28L ends are within the City of Eden Prairie.
- 142       **28. *Runway 10L-28R.*** "Runway 10L-28R" means the 3,900-foot Non-precision Runway at  
143       the Airport whose 10L and 28R ends are within the City of Eden Prairie.
- 144       **29. *Runway 18-36.*** "Runway 18-36" means the 2,691-foot runway ~~(planned for extension~~  
145       ~~to 2,800 feet).~~ Runway 18 is a Visual Runway (planned future Non-Precision) and  
146       Runway 36 is a Non-Precision Runway. Both the Runway 18 and 36 Ends are within the  
147       City of Eden Prairie.

148 **30. Runway Protection Zone.** "Runway Protection Zone" means a zone mandated by  
149 FAA regulations that is longitudinally centered on the extended centerline at each end of  
150 Runways 10R-28L, 10L-28R, 18-36, whose inner edge is at the same width and  
151 elevation as, and coincides with, the end of the Primary Surfaces for Runway ~~s 10L-28R~~  
152 ~~and~~ 10R; starts at a width of 500 feet for Runway 28L and 250 feet for Runways 10L-  
153 28R and 18-36; and that extends outward a horizontal distance of 1,000 feet expanding  
154 uniformly to a width of 700 feet for Runways ~~10L-28R and~~ 28L; extends outward a  
155 horizontal distance of 1,000 feet expanding uniformly to a width of 450 feet for Runways  
156 10L-28R and 18-36; extends outward a horizontal distance of 2,500 feet expanding  
157 uniformly to a width of 1,750 feet for Runway 10R. -

158 **31. Safety Zones.** "Safety Zones" means the land use zones established in Section V.A.

159 **32. School.** "School" means any private or public educational institution for people in  
160 kindergarten through grade twelve (12) and any private or public day care or pre-school  
161 facility that enrolls more than fifty (50) children.

162 **33. Slope.** "Slope" means an incline from the horizontal expressed in an arithmetic ratio of  
163 horizontal magnitude to vertical magnitude.



Slope = 3:1 = 3 ft. horizontal to 1 ft. vertical

164 **34. Structure.** "Structure" means anything anchored, attached, built, constructed, erected,  
165 gathered, located, placed, or piled on the ground or in or over a water body, whether  
166 temporary or permanent, moveable or immovable, including antennae, buildings,  
167 canopies, cranes, decks, derricks, docks, edifices, equipment, fences, overhead  
168 transmission lines, patios, piers, piles, ponds, posts, roadways, signs, smokestacks,  
169 towers, utility poles, wires, and anything attached to any of the foregoing either  
170 temporarily or permanently.

171 **35. Tree.** "Tree" means any object of natural growth.

172 **36. Zoning Administrator.** "Zoning Administrator" means the public official in each  
173 affected municipality and at the Metropolitan Airports Commission as set forth in  
174 Section XII.B.

175 **B. Rules Of Construction.** In the construction of this FCM Zoning Ordinance, the following  
176 rules shall be observed and applied, except where the context clearly indicates otherwise.

177 **1. Computing Time.** In computing the period of time within which an act may or must  
178 be done, the first calendar day from which the designated period of time begins to run  
179 shall not be included. The last day of the period shall be included, unless it is a  
180 Saturday, a Sunday, or a legal holiday, in which case the period shall run until the end  
181 of the next day which is not a Saturday, Sunday, or legal holiday.

182 **2. Conflicts Between Ordinance Provisions.** If a provision of this FCM Zoning  
183 Ordinance conflicts with any other provision of this FCM Zoning Ordinance, the more  
184 restrictive provision shall prevail.

185 **3. Height.** "Height" shall be expressed as elevation in feet above Mean Sea Level, North  
186 American Vertical Datum, 1988 Adjustment, except in reference to maximum  
187 construction height without an Airport Zoning Permit when it shall be expressed as  
188 distance in feet above curb level or above natural grade, as the context and  
189 Section IX.B.1. require, or as distance in feet above ground shown on the Maximum  
190 Construction Heights Without Permit Plates in the FCM Zoning Map.

191 **4. Including, Not Limited To.** The word "including" means including but not limited to.

192 **5. Land To Include Water Surfaces And Bodies.** The word "land" shall include water  
193 bodies and surfaces for the purpose of establishing Airspace Zones and Safety Zones.

194 **6. May, Permissive.** The word "may" is permissive.

195 **7. Shall, Mandatory.** The word "shall" is mandatory and not discretionary.

196 **8. Singular And Plural.** The singular shall include the plural, and the plural the singular.

197 **9. Tense.** The present tense shall include the future.

#### 198 **SECTION IV. AIRSPACE OBSTRUCTION ZONING**

199 **A. Airspace Surfaces And Zones.** In order to carry out the purpose of this FCM Zoning  
200 Ordinance as set forth in Section I., the following Airspace Surfaces and Airspace Zones are  
201 hereby established, subject to the airspace zoning limits in Section VI.A.



- 202           **1. Primary Surface.** An imaginary surface longitudinally centered on each Runway  
203 extending two hundred (200) feet beyond each end of Runways 10L-28R, 10R-28L, 18-  
204 36, and having a width of five hundred (500) feet for Runways 10L-28R and 18-36 and  
205 one thousand (1,000) feet for Runway 10R-28L. The elevation of any point on the  
206 Primary Surface is the same as the elevation of the nearest point on the Runway  
207 centerline.
- 208           **2. Primary Zone.** All that land which lies directly under a Primary Surface.
- 209           **3. Horizontal Surface.** An imaginary surface that is one thousand fifty-six (1,056) feet  
210 above mean sea level, the perimeter of which is constructed by swinging arcs of  
211 specified radii from the center of each end of the Primary Surface of each Runway and  
212 connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is  
213 five thousand (5,000) feet for Runways 18-36 and 10L-28R and ten thousand (10,000)  
214 feet for Runways ~~10L-28R~~ and 10R-28L.
- 215           **4. Horizontal Zone.** All that land which lies directly under the Horizontal Surface.
- 216           **5. Conical Surface.** An imaginary surface extending upward and outward from the  
217 periphery of the Horizontal Surface at a Slope of twenty (20) to one (1) for a horizontal  
218 distance of four thousand (4,000) feet as measured radially outward from the periphery  
219 of the Horizontal Surface.
- 220           **6. Conical Zone.** All that land which lies directly under the Conical Surface.
- 221           **7. Precision Instrument Approach Surface.** An imaginary surface longitudinally  
222 centered on the extended centerline at the end of Runway 10R. The inner edge of this  
223 surface is at the same width and elevation as, and coincides with, the end of the  
224 Primary Surface. This surface inclines upward and outward at a Slope of fifty (50) to  
225 one (1) for a horizontal distance of ten thousand (10,000) feet expanding uniformly to a  
226 width of four thousand (4,000) feet, then continues upward and outward for an  
227 additional horizontal distance of forty thousand (40,000) feet at a Slope of forty (40) to  
228 one (1) expanding uniformly to an ultimate width of sixteen thousand (16,000) feet.
- 229           **8. Precision Instrument Approach Zone.** All that land which lies directly under a  
230 Precision Instrument Approach Surface.

231 **9. Approach Surface.** An imaginary surface longitudinally centered on the extended  
232 centerline at each end of Runways 10L-28R, 28L and 18-36. The inner edge of this  
233 surface is at the same width and elevation as, and coincides with, the end of the  
234 Primary Surface. For Runways ~~10L-28R,~~ 28L, this surface inclines upward and outward  
235 at a Slope of thirty-four (34) to one (1) for a horizontal distance of ten thousand  
236 (10,000) feet expanding uniformly to a width of three thousand five hundred (3,500)  
237 feet. For Runways 10L-28R and 18-36, this surface inclines upward and outward at a  
238 Slope of twenty (20) to one (1) for a horizontal distance of five thousand (5,000) feet  
239 expanding uniformly to a width of ~~or onetwo~~ thousand ~~two hundred and fifty~~  
240 (~~1,250,000~~) feet ~~for Runway 18 and two thousand (2,000) feet for Runway 36.~~

241 **10. Approach Zone.** All that land which lies directly under an Approach Surface.

242 **11. Transitional Surface.** An imaginary surface extending upward and outward at right  
243 angles to the centerline and extended centerline of Runways 10L-28R, 10R-28L, 18-36  
244 at a Slope of seven (7) to one (1) from both sides of each Primary Surface and from  
245 both sides of each Precision Instrument Approach Surface for 10R and the Approach  
246 Surfaces of 10L-28R, 28L, and 18-36 until it intersects the Horizontal Surface or the  
247 Conical Surface.

248 **12. Transitional Zone.** All that land which lies directly under a Transitional Surface.

249 **B. Height Restrictions:** Except as otherwise provided in this FCM Zoning Ordinance, and  
250 except as necessary and incidental to Airport operations, the following height restrictions shall  
251 apply. Where a Lot is beneath more than one Airspace Surface, the height of the more  
252 restrictive (lower) Airspace Surface shall control.

253 **1. Structures.** No new Structure shall be constructed or established; and no existing  
254 Structure shall be altered, changed, rebuilt, repaired, or replaced in any Airspace Zone  
255 so as to project above any Airspace Surface. Nor shall any equipment used to  
256 accomplish any of the foregoing activities be allowed to project above any Airspace  
257 Surface. —, except upon analysis as part of an FAA 7460 Obstruction Evaluation and  
258 determination by FAA that the structure or equipment would not be a hazard to air  
259 navigation and would not require changes to airport or aircraft operations.

260           **2. Trees.** No Tree shall be allowed to grow or be altered, repaired, replaced, or replanted  
261 in any Airspace Zone so as to project above any Airspace Surface. Nor shall any  
262 equipment used to accomplish any of the foregoing activities be allowed to project  
263 above any Airspace Surface, except upon analysis as part of an FAA 7460 Obstruction  
264 Evaluation and determination by FAA that the tree or equipment would not be a hazard  
265 to air navigation and would not require changes to airport or aircraft operations.-

266           a. Public Nuisance; Order. If the whole or any part of any Tree shall be determined to  
267 be an Airport Hazard by the FAA, or any successor entity, after proper  
268 investigation, ~~the~~ the Metropolitan Airports Commission’s Executive Director or his  
269 designee may issue an order in writing for the owner or owners, agent or occupant  
270 of the property upon which such hazardous tree is located, to forthwith cause such  
271 hazardous tree, or portion thereof if the removal of a portion will remove the  
272 hazard, to be taken down and removed.

273           b. Notice. Said order is to be mailed to the last known address of the owner, agent or  
274 occupant and shall be accompanied by a notice setting forth said Executive  
275 Director’s authority to remove such hazardous Tree at such owner’s, agent’s or  
276 occupant’s expense in the event such owner, agent or occupant fails to comply  
277 with or file a notice of appeal from said order within ten (10) days of mailing. The  
278 notice shall include instructions for filing a notice of appeal from said order.

279           c. Removal. If within ten (10) days after said order has been mailed, as above  
280 provided for, the owner or owners, agent or occupant of the property upon which  
281 such hazardous Tree is located neglects or refuses to comply with said order, or  
282 has failed to file a notice of appeal from said order with said Executive Director,  
283 then said Executive Director or his designee(s) may enter upon said premises and  
284 take down or remove said tree or portion thereof declared to be hazardous, and to  
285 do any and all things which in his opinion may be necessary for the protection of  
286 life, limb or property.

287           d. Assessment of Expense. If, after the notice hereinbefore provided for has been  
288 given, the owner, agent or occupant has failed to remove such hazardous tree or  
289 portion thereof, and it becomes necessary for the Metropolitan Airports  
290 Commission to remove same, said Executive Director or his designee shall mail a  
291 statement of the expense of such removal to the owner, agent or occupant of the  
292 property from which such tree or portion thereof has been removed, and if within

293 thirty (30) days therefrom the owner, agent or occupant has not remitted to the  
294 Commission for the expense incurred by the Commission in said removal, the  
295 Executive Director or his designee may forthwith recover the amount of such  
296 expense from the owner or owners of said property in any civil court of competent  
297 jurisdiction, in the manner provided by law.

298 **SECTION V. LAND USE SAFETY ZONING**

299 **A. Safety Zones.** In order to carry out the purpose of this FCM Zoning Ordinance, as set forth  
300 in Section I., the following Safety Zones are hereby established, subject to the safety zoning  
301 limits in Section VI.B.

302 **1. Safety Zone A.** All land in that portion of the Precision Instrument Approach Zones of  
303 Runways 10R and the Approach Zones of 10L-28R, 18-36, and 28L, beginning at, and  
304 coinciding with, the end of the Primary Surfaces for Runways 10R, ~~10L-28R~~; and that  
305 starts at a width of 500 feet and ~~that~~ extends outward a horizontal distance of 1,000  
306 feet expanding uniformly to a width of 700 feet for Runways ~~10L, 28L and 28R starting~~  
307 ~~at a width of 500 feet for Runway 28L~~; and that starts at a width of 1,000 feet extends  
308 outward a horizontal distance of 2,500 feet expanding uniformly to a width of 1,750 feet  
309 for Runway 10R; and that starts at a width of 250 feet and extends outward a horizontal  
310 distance of 1,000 feet expanding uniformly to a width of 450 feet for Runways 18-36  
311 and 10L-28R (which is coincident with the Runway Protection Zone).

312 **2. Safety Zone B.** All land in that portion of the Precision Instrument Approach Zone of  
313 Runway 10R and Approach Zone of Runway 28L beginning at and coinciding with the  
314 Primary Surface of the Runway at a width of 1,000 feet, extending outward a distance  
315 of five thousand (5,000) feet and expanding uniformly to an ultimate width of two  
316 thousand five hundred (2,500) feet, less the area encompassing ~~State~~ Safety Zone A  
317 (RPZ); and is all land in that portion of the Approach Zone of Runway 10L ~~and Runway~~  
318 28R beginning at and coinciding with the Primary Surface of the Runway at a width of  
319 500 feet, extending outward a distance of three thousand nine hundred (3,900) feet and  
320 expanding uniformly to an ultimate width of one thousand six hundred seventy (1,670)  
321 feet less the area encompassing ~~State~~ Safety Zone A (RPZ); and is all land in that  
322 portion of the Approach Zone of Runways 18-36 beginning at and coinciding with the

323 end of the Primary Surface of the Runway at a width of 500 feet, extending outward a  
324 distance of two thousand ~~eight-six-hundred ninety one hundred~~(2,800691) feet and  
325 expanding uniformly to an ultimate width of one thousand three hundred ~~forty-seven~~  
326 (1,30740) feet less the area encompassing ~~State~~Safety Zone A (RPZ).

327 **3. Safety Zone C.** All land enclosed within the perimeter of the Horizontal Zone, except  
328 that land within Safety Zone A and Safety Zone B.

329 **B. Land Use Restrictions**

330 **1. General Restrictions.** Subject at all times to the height restrictions set forth in  
331 Section IV.B., no use shall be made of any land in any of the Safety Zones that creates  
332 or causes interference with the operations of radio or electronic facilities on the Airport  
333 or with radio or electronic communications between Airport and aircraft, makes it  
334 difficult for pilots to distinguish between Airport lights and other lights, results in glare in  
335 the eyes of pilots using the Airport, impairs visibility in the vicinity of the Airport, or  
336 otherwise endangers the landing, taking off, or maneuvering of aircraft.

337 **2. Safety Zone A Restrictions.** Subject at all times to the height restrictions set forth in  
338 Section IV.B. and to the general restrictions contained in Section V.B.1., areas  
339 designated as Safety Zone A for each end of Runways 10R-28L, 10L-28R, 18-36 shall  
340 contain no Structures or Trees, except Structures related to Airport operations or air  
341 navigation as allowed in a Runway Protection Zone by Federal laws and regulations or  
342 by FAA advisory circulars shall be permitted.

343 **3. Safety Zone B Restrictions.** Subject at all times to the height restrictions in  
344 Section IV.B. and to the general restrictions in Section V.B.1., all land uses shall be  
345 permitted in Safety Zone B for each end of Runways 10R-28L, 10L-28R, 18-36, except  
346 for the following uses which shall be specifically prohibited: amphitheaters,  
347 campgrounds, churches, fuel storage tank farms and Above-ground Fuel Tanks, gasoline  
348 stations, hospitals, Nursing Homes, residential uses (including low, medium, and high  
349 density residential uses), Schools, stadiums, theaters, trailer courts, and ponds or other  
350 uses that might attract waterfowl or other birds such as putrescible waste disposal  
351 operations, wastewater treatment facilities and associated settling ponds, and dredge  
352 spoil containment areas; provided, however, the prohibition on ponds or other uses that  
353 might attract waterfowl or other birds shall not apply to areas below an elevation of

354 eight hundred sixty five (865) feet above mean sea level along any Bluff of the  
355 Minnesota River.

356 In Safety Zone B for each end of Runways 10R-28L, 10L-28R, 36-18, a minimum of 20%  
357 of the total Zone B acreage or 20 acres, whichever is greater, shall be maintained as  
358 contiguous open space.

359 **4. Safety Zone C Restrictions.** No land use in Safety Zone C shall violate the height  
360 restrictions set forth in Section IV.B. or the general restrictions contained in  
361 Section V.B.1.

362 **5. Permitted Residential Areas**

363 a. Property located in the permitted Residential Areas shall be subject to the height  
364 restrictions of Section IV.B. and the general restrictions of Section V.B.1. but shall  
365 not be subject to the Safety Zone A restrictions of Section V.B.2. or the Safety  
366 Zone B restrictions of Section V.B.3. In addition, such Structure, Lot, or use shall  
367 be deemed a conforming use that shall not be prohibited under this FCM Zoning  
368 Ordinance.

369 b. In Safety Zone B in Permitted Residential Areas, existing low, medium, and high  
370 density residential uses may be improved and expanded, and new low, medium,  
371 and high density residential uses may be developed, all subject to the height  
372 restrictions of Section IV.B. and the general restrictions of Section V.B.1.

373 c. Land uses in Permitted Residential Areas that violate any of the following  
374 restrictions are prohibited as safety hazards and must be acquired, altered, or  
375 removed at public expense, provided such expense shall not be the responsibility  
376 of any of the cities adopting this ordinance:

377 i. any Structure which a Person customarily uses as a principal residence and  
378 which is located entirely inside Safety Zone A within 1,000 feet of the end of  
379 a Primary Zone;

380 ii. any Structure which a Person customarily uses as a principal residence and  
381 which is located entirely within Safety Zones A or B and which penetrates a  
382 Precision Instrument Approach Surface;

383 iii. any land use in Safety Zone A or B which violates any of the following  
384 standards:

- 385 (1) the land use must not create or cause interference with the operation  
386 of radio or electronic facilities on the Airport or with radio or electronic  
387 communications between the Airport and aircraft;  
388 (2) the land use must not make it difficult for pilots to distinguish between  
389 Airport lights and other lights; or  
390 (3) the land use must not result in glare in the eyes of pilots using the  
391 Airport or impair visibility in the vicinity of the Airport;  
392 iv. any isolated Low Density Residential Lot on which any Structure, if built,  
393 would be prohibited by Section V.B.5.c., subsections i., ii., or iii.; and  
394 v. any other land use that the Commissioner determines, pursuant to Minnesota  
395 Rules 8800.2400, subp. 6.E.(5)(e), constitutes a material danger to the  
396 landing, taking off, or maneuvering of aircraft or to the safety of Persons on  
397 the ground.

398 **SECTION VI. AIRPORT ZONING LIMITS AND FCM ZONING MAP**

399 **A. Airspace Zoning Limits.** No Airspace Zone shall extend more than two miles from the  
400 Airport Boundary under the Precision Instrument Approach Surfaces or more than one and  
401 one-half miles from the Airport Boundary outside the Precision Instrument Approach Surfaces.  
402 Exhibit D – Airport Boundary and Airspace Zoning Limits and Exhibit E – Airport Boundary and  
403 Airspace Contours, attached hereto and made a part hereof, show these limits.

404 **B. Safety Zoning Limits.** The Safety Zoning Limits shall not extend beyond one (1) mile from  
405 the airport boundary. Safety Zone B will define the extent of the zoning limits in areas where  
406 Safety Zone B extends beyond one (1) mile from the airport boundary. Exhibit F – Airport  
407 Boundary and Safety Zoning Limits, attached hereto and made a part hereof, shows these  
408 limits.

409 **C. FCM Zoning Map.** The locations and boundaries of the Airspace Surfaces, Airspace Zones,  
410 ~~and Safety Zones,~~ and the ~~M~~maximum ~~C~~construction ~~H~~heights without an Airport Zoning  
411 Permit established by this FCM Zoning Ordinance are set forth on the Flying Cloud Airport  
412 Zoning Map consisting of ~~seventy-nine~~one-hundred and two (~~1072~~) plates – Airspace Zones,  
413 Plates ~~A-A-1~~ to ~~A-A-24F6~~; Safety Zones, Plates ~~SZ-SZ-A1~~ to ~~SZ-SZ-F624~~; and Maximum  
414 Construction Heights Without Permit, Plates ~~MCH-MCH-A1~~ to ~~MCH-MCH-F624~~ prepared by

415 the Metropolitan Airports Commission, attached hereto and made a part hereof. These  
416 plates, together with such amendments thereto as may from time to time be made, and all  
417 notations, references, elevations, heights, data, surface and zone boundaries, and other  
418 information thereon, shall be and the same are hereby adopted as part of this FCM Zoning  
419 Ordinance.

420 **SECTION VII. NONCONFORMING USES**

421 **A. FCM Zoning Ordinance.** The provisions of this FCM Zoning Ordinance shall not be  
422 construed to require the removal, lowering, other change, or alteration of any Structure, or  
423 otherwise interfere with the continuance of any Nonconforming Use in existence but not  
424 conforming to the provisions of this FCM Zoning Ordinance on the Effective Date. Nothing  
425 herein contained shall require any change in the construction, alteration, or intended use of  
426 any Structure, the construction or alteration of which was begun prior to the Effective Date,  
427 and was diligently prosecuted and completed within two (2) years of the Effective Date.

428 **SECTION VIII. AIRPORT ZONING PERMITS**

429 **A. Permit Required.** The following activities shall not take place on a Lot in any Airspace Zone  
430 or Safety Zone unless an Airport Zoning Permit shall have been granted therefore by the  
431 Zoning Administrator for the jurisdiction in which the Lot is located.

432 **1. Existing Structures.** Except as specifically provided in Section IX.B., no existing  
433 Structure shall be altered, changed, rebuilt, repaired, or replaced.

434 **2. New Structures.** Except as specifically provided in Section IX.B., no Structure shall be  
435 newly constructed or otherwise established.

436 **3. Nonconforming Structures.** No nonconforming Structure shall be altered, changed,  
437 rebuilt, repaired, or replaced.

438 **5. Nonconforming Use.** No Nonconforming Use shall be changed or converted to  
439 another Nonconforming Use.



440 **B. Exception To Permit Requirement.**

441 **1. Maximum Construction Height Without A Permit.** No Airport Zoning Permit shall  
442 be required for an existing Structure to be altered, changed, rebuilt, repaired, or  
443 replaced on a Lot or for a new Structure to be constructed or otherwise established on a  
444 Lot, if the highest point on the Structure or on any equipment used to accomplish any of  
445 the foregoing activities, whichever is higher, measured in feet from curb level or from  
446 natural grade at a point ten (10) feet away from the front center of the Structure,  
447 whichever is lower, does not exceed the maximum construction height above ground  
448 without an Airport Zoning Permit shown for the Lot on the applicable Maximum  
449 Construction Heights Without Permit Plate in the FCM Zoning Map. The permitting  
450 process will require an FAA 7460 Obstruction Evaluation for all structures with proposed  
451 heights in excess of the maximum allowable construction height with-out a permit.

452 **2. No Violation Of Height Or Land Use Restriction Permitted.** Nothing in this  
453 Section IX.B. shall be construed as permitting or intending to permit a violation or a  
454 greater violation of any provision of this FCM Zoning Ordinance.

455 **C. Permit Application.** An Airport Zoning Permit application for activities on a Lot shall be  
456 made in the manner and on the form established by the Zoning Administrator of the  
457 jurisdiction in which the Lot is located as designated in Section XII.B.

458 **D. Permit Standard.** An Airport Zoning Permit shall be granted unless the Zoning  
459 Administrator determines that granting the permit (1) would allow a conforming Structure or  
460 use to violate any provision of this FCM Zoning Ordinance or (2) would permit a  
461 nonconforming Structure or a Nonconforming Use to become a greater violation of any  
462 provision of this FCM Zoning Ordinance. Any Airport Zoning Permit granted may be granted  
463 subject to any reasonable conditions that the Zoning Administrator may deem necessary to  
464 effectuate the purpose of this FCM Zoning Ordinance. In making any determination, the  
465 Zoning Administrator need not give public notice of, or hold a public hearing on, the Airport  
466 Zoning Permit application or the determination.

467 **E. Abandoned Or Deteriorated Nonconforming Uses.** Whenever a Zoning Administrator  
468 determines that a nonconforming Structure has been abandoned or more than eighty percent  
469 (80%) torn down, deteriorated, or decayed, no Airport Zoning Permit shall be granted that

470 would allow such Structure to exceed the height restrictions of Section IV.B. or otherwise  
471 violate any provision of this FCM Zoning Ordinance. Whether application is made for an  
472 Airport Zoning Permit or not, a Zoning Administrator<sup>7</sup> may order the owner of a  
473 nonconforming Structure, at the owner's expense, to lower, remove, reconstruct, or equip the  
474 same in the manner necessary to conform to the provisions of this FCM Zoning Ordinance.  
475 Prior to issuing such an order, the city Zoning Administrator shall consult with the  
476 Metropolitan Airports Commission and obtain its consent to the proposed order. Further<sup>2</sup> prior  
477 to the issuance of any such order<sup>2</sup>, the affected City and the Metropolitan Airports Commission  
478 shall enter into an agreement as to which party is responsible for issuance and enforcement  
479 of the order. In the event the owner of the nonconforming Structure shall neglect or refuse to  
480 comply with such order for ten (10) days after receipt of written notice of such order, the  
481 Zoning Administrator may, by appropriate legal action, proceed to have the nonconforming  
482 Structure lowered, removed, reconstructed, or equipped and assess the cost and expense  
483 thereof against the land on which the Structure is, or was, located. Unless such an  
484 assessment is paid within ninety (90) days from the service of notice thereof on the owner of  
485 the land, the sum shall bear interest at the rate of eight percent (8%) per annum from the  
486 date the cost and expense is incurred until paid, and shall be collected in the same manner as  
487 are general taxes, all as authorized by Minnesota Statutes § 360.067.

## 488 **SECTION IX. VARIANCES**

489 **A. FAA 7460 Obstruction Evaluation.** Any proposed structure with a height in excess of the  
490 maximum allowable building height without a permit that has been analyzed by the FAA as  
491 part of a 7460 Obstruction Evaluation and has been determined by the FAA not to be a  
492 hazard to air navigation and not requiring changes to airport or aircraft operations will not  
493 require a variance.

494 **B. Variance Application.** Any Person desiring to construct or establish a new Structure; to  
495 alter, change, rebuild, repair, or replace an existing Structure, to allow a Tree to grow higher;  
496 to alter, repair, replace, or replant a Tree, or to use his or her property in violation of any  
497 provision of this FCM Zoning Ordinance may apply to the Board of Adjustment for a variance  
498 from such provision. A variance application shall be made by sending the application on the  
499 form provided by the Board of Adjustment by certified United States Mail to (1) the members

500 of the Board of Adjustment and (2) the Board of Adjustment at the mailing address specified  
501 in Section XIII.C. The applicant shall also mail a copy of the application by regular United  
502 States Mail to the Zoning Administrator of the jurisdiction in which the Structure or property is  
503 located, as designated in Section XII.B. The Board of Adjustment may charge a fee for  
504 processing the application.

505 **C. Failure Of Board To Act.** If the Board of Adjustment fails to grant or deny the variance  
506 within four (4) months after the last Board member receives the variance application, the  
507 variance shall be deemed to be granted by the Board of Adjustment, but not yet effective.  
508 When the variance is granted by reason of the failure of the Board of Adjustment to act on  
509 the variance, the Person receiving the variance shall send notice that the variance has been  
510 granted by certified United States Mail to (1) the Board of Adjustment at the mailing address  
511 specified in Section XIII.C. and (2) the Commissioner. The applicant shall include a copy of  
512 the original application for the variance with the notice to the Commissioner. The variance  
513 shall be effective sixty (60) days after this notice is received by the Commissioner, subject to  
514 any action taken by the Commissioner pursuant to Minnesota Statutes § 360.063, subd. 6.a.

515 **D. Variance Standard.** A variance shall be granted where it is found that a literal application  
516 or enforcement of the provisions of this FCM Zoning Ordinance would result in practical  
517 difficulty or unnecessary hardship and relief granted would not be contrary to the public  
518 interest but do substantial justice and be in accordance with the spirit of this FCM Zoning  
519 Ordinance and Minnesota Statutes Chapter 360. Any variance granted may be granted  
520 subject to any reasonable conditions that the Board of Adjustment, or the Commissioner  
521 acting under Section XI.B., may deem necessary to effectuate the purpose of this FCM Zoning  
522 Ordinance.

## 523 **SECTION X. HAZARD MARKING AND LIGHTING**

524 **A. Nonconforming Uses.** The Metropolitan Airports Commission may require the owner of any  
525 nonconforming Structure to permit the installation, operation, and maintenance thereon of  
526 such markers and lights as shall be deemed necessary by the Metropolitan Airports  
527 Commission to indicate to the operators of aircraft in the vicinity of the Airport the presence  
528 of such Airport Hazards. Such markers and lights shall be installed, operated, and maintained  
529 at the expense of the Metropolitan Airports Commission.

530 **B. Permits And Variances.** Any Airport Zoning Permit or variance granted by a Zoning  
531 Administrator or the Board of Adjustment may, if such action is deemed advisable to  
532 effectuate the purpose of this FCM Zoning Ordinance and be reasonable in the circumstances,  
533 be granted subject to a condition that the owner of the Structure in question, at the owner’s  
534 expense, install, operate, and maintain thereon such markers and lights as may be necessary  
535 to indicate to pilots the presence of an Airport Hazard.

536 **SECTION XI. ZONING ADMINISTRATOR**

537 **A. Duties.** It shall be the duty of each Zoning Administrator to administer and enforce the  
538 provisions of this FCM Zoning Ordinance. Applications for Airport Zoning Permits shall be  
539 made to a Zoning Administrator as provided herein. A Zoning Administrator may charge a fee  
540 for processing the application. Airport Zoning Permit applications shall be considered and  
541 acted upon by the Zoning Administrator in accordance with the provisions of this FCM Zoning  
542 Ordinance and within the timelines established by Minnesota Statutes § 15.99, as it may be  
543 amended. The Zoning Administrator shall remind each applicant that it is the responsibility of  
544 the applicant to record any conditions of an Airport Zoning Permit, if required by law.

545 **B. Designated Zoning Administrators.** For the purpose of this FCM Zoning Ordinance, the  
546 Zoning Administrator shall be the official entitled as follows: the Eden Prairie Zoning  
547 Administrator for lands located in the City of Eden Prairie; the Shakopee Zoning Administrator  
548 for lands located in the City of Shakopee; and the Chanhassen Zoning Administrator for lands  
549 located in the City of Chanhassen. In the event that one (1) or more of the above described  
550 Zoning Administrators does not administer this FCM Zoning Ordinance, the Flying Cloud  
551 Airport Joint Airport Zoning Board hereby appoints the Executive Director, Metropolitan  
552 Airports Commission, (or his or her designee) to administer this FCM Zoning Ordinance in the  
553 municipality or municipalities. If any official position designated above as a Zoning  
554 Administrator ceases to exist or to perform or serve its present function, the successor  
555 position as designated by the applicable entity shall become the Zoning Administrator for that  
556 entity and shall perform or serve such functions.

557 **SECTION XII. BOARD OF ADJUSTMENT**

558 **A. Establishment Of Board And Selection Of Chair.** There is hereby established a Board of  
559 Adjustment that shall consist of five (5) members appointed by the Metropolitan Airports  
560 Commission, and each shall serve for a term of three (3) years and until a successor is duly  
561 appointed and qualified. Of the members first appointed, one (1) shall be appointed for a  
562 term of one (1) year, two (2) for a term of two (2) years, and two (2) for a term of three (3)  
563 years. Upon their appointment, the members shall select a chair to act at the pleasure of the  
564 Board of Adjustment. Members shall be removable by the Metropolitan Airports Commission  
565 for cause, upon written charges, after a public hearing.

566 **B. Board Powers.** The Board of Adjustment shall have the power to hear and decide appeals  
567 from any order, requirement, decision, or determination made by any Zoning Administrator or  
568 the Metropolitan Airports Commission’s Executive Director in the enforcement of this FCM  
569 Zoning Ordinance and to hear and grant or deny variances.

570 **C. Board Procedures**

571 **1. Rules, Meetings, And Records.** The Board of Adjustment shall adopt rules for its  
572 governance and procedure in harmony with the provisions of this FCM Zoning  
573 Ordinance. Meetings of the Board of Adjustment shall be held at the call of the chair  
574 and at such other times as the Board of Adjustment may determine. The chair, or in his  
575 or her absence the acting chair, may administer oaths and compel the attendance of  
576 witnesses. All hearings of the Board of Adjustment shall be public. The Board of  
577 Adjustment shall keep minutes of its proceedings showing the vote of each member  
578 upon each question or, if absent or failing to vote, indicating such fact, and shall keep  
579 records of its examinations and other official actions, all of which shall immediately be  
580 filed in the offices of the Executive Director, Metropolitan Airports Commission, and the  
581 Zoning Administrator of the jurisdiction in which the affected Structure or Lot is located.

582 **2. Written Findings And Conclusions.** The Board of Adjustment shall make written  
583 findings of fact and conclusions of law giving the facts upon which it acted and its legal  
584 conclusions from such facts in affirming, modifying, or reversing an order, requirement,  
585 decision, or determination of a Zoning Administrator or the Metropolitan Airports  
586 Commission’s Executive Director and in granting or denying a variance.

587 **3. Majority Vote Required.** The concurring vote of a majority of the members of the  
588 Board of Adjustment shall be sufficient to affirm, modify, or reverse an order,  
589 requirement, decision, or determination of a Zoning Administrator or the Metropolitan  
590 Airports Commission’s Executive Director, to decide to grant or deny a variance, or to  
591 act on any other matter upon which the Board of Adjustment is required to pass under  
592 this FCM Zoning Ordinance.

593 **4. Mailing Address.** The mailing address for the Board of Adjustment is:

594 FCM Zoning Ordinance Board of Adjustment  
595 c/o Executive Director  
596 Metropolitan Airports Commission  
597 6040 28<sup>th</sup> Avenue South  
598 Minneapolis, MN 55450

599 **SECTION XIII. APPEALS**

600 **A. Who May Appeal.** Any Person aggrieved, or any taxpayer affected by any order,  
601 requirement, decision, or determination of a Zoning Administrator made in administration of  
602 this FCM Zoning Ordinance may appeal to the Board of Adjustment. Such appeals may also  
603 be made by any governing body of a municipality or county, or any joint airport zoning board,  
604 which is of the opinion that an order, requirement, decision, or determination of a Zoning  
605 Administrator is an improper application of this FCM Zoning Ordinance as it concerns such  
606 governing body or board.

607 **B. Commencement Of Appeals.** All appeals hereunder must be commenced within thirty (30)  
608 days of a Zoning Administrator’s decision by filing with the Zoning Administrator a notice of  
609 appeal specifying the grounds thereof. The Zoning Administrator shall forthwith transmit to  
610 the Board of Adjustment the notice of appeal and all papers constituting the record upon  
611 which the order, requirement, decision, or determination appealed from was taken.

612 **C. Stay Of Proceedings.** An appeal shall stay all proceedings in furtherance of the order,  
613 requirement, decision, or determination appealed from, unless the Zoning Administrator  
614 certifies to the Board of Adjustment, after the notice of appeal has been filed with it, that by  
615 reason of the facts stated in the certificate a stay would, in the Zoning Administrator’s  
616 opinion, cause imminent peril to life or property. In such case, proceedings shall not be

617 stayed except by order of the Board of Adjustment on notice to the Zoning Administrator and  
618 on due cause shown.

619 **D. Appeal Procedures.** The Board of Adjustment shall fix a reasonable time for hearing an  
620 appeal, give public notice and due notice to the parties in interest, and decide the same  
621 within a reasonable time. At the hearing, any party may appear in Person, by agent, or by  
622 attorney.

623 **E. Decision.** The Board of Adjustment may, in conformity with the provisions of this FCM  
624 Zoning Ordinance, affirm or reverse, in whole or in part, or modify the order, requirement,  
625 decision, or determination appealed from and may make such order, requirement, decision, or  
626 determination, as may be appropriate under the circumstances and, to that end, shall have all  
627 the powers of a Zoning Administrator.

628 **SECTION XIV. JUDICIAL REVIEW**

629 Any Person aggrieved, or any taxpayer affected by, any decision of the Board of Adjustment or any  
630 action of the Commissioner, or any governing body of a municipality or county, or -any joint airport  
631 zoning board, ~~or order of the Commissioner~~ which is of the opinion that an order, requirement,  
632 decision, or determination of the Board of Adjustment or action of the Commissioner is illegal, may  
633 seek judicial review as provided in Minnesota Statutes § 360.072. The petitioner must exhaust the  
634 remedies provided in this FCM Zoning Ordinance before availing himself or herself of the right to  
635 seek judicial review as provided by this Section XV.

636 **SECTION XV. PENALTIES AND OTHER REMEDIES**

637 Every Person who violates any provision of this FCM Zoning Ordinance, any zoning approval granted  
638 hereunder, any condition of any zoning approval granted hereunder, or any order, requirement,  
639 decision, or determination of a Zoning Administrator or the Board of Adjustment shall be guilty of a  
640 misdemeanor and shall be punished by a fine, imprisonment, or both of not more than the fine and  
641 imprisonment established for misdemeanors by state law. Each day a violation continues to exist  
642 shall constitute a separate offense for purpose of the penalties and remedies specified in this  
643 section. This FCM Zoning Ordinance may also be enforced through such proceedings for injunctive  
644 relief and other relief as may be proper under Minnesota Statutes § 360.073, as it may be  
645 amended, and other applicable law.

646 **SECTION XVI. RELATION TO OTHER LAWS, REGULATIONS, AND RULES**

647 **A. Compliance Required.** In addition to the requirements of this FCM Zoning Ordinance, all  
648 Structures, Trees, and uses shall comply with all other applicable city, local, regional, state, or  
649 federal laws, regulations, and rules, including Minnesota Statutes §§ 360.81-360.91 –  
650 Regulation Of Structure Heights, Minnesota Rules 8800.1100 – Regulation Of Structure  
651 Heights, and 14 Code of Federal Regulations Part 77 – Objects Affecting Navigable Airspace.

652 **B. Conflicts With Other Regulations.** Where a conflict exists between any provision of this  
653 FCM Zoning Ordinance and any city, local, regional, state, or federal law, regulation, or rule  
654 applicable to the same area, whether the conflict be with respect to the height of Structures  
655 or Trees, the use of land, or any other matter, the more stringent law, regulation, or rule shall  
656 govern and prevail.

657 **C. Current Versions And Citations.** All references to city, local, regional, state, and federal  
658 laws, regulations, and rules in this FCM Zoning Ordinance are intended to refer to the most  
659 current version and citation. If such references are no longer valid due to repeal or  
660 renumbering, the new laws, regulations, or rules intended to replace those cited, regardless  
661 of the citation, shall govern.

662 **SECTION XVII. SEVERABILITY**

663 **A. Effect Of Taking.** In any case in which the provisions of this FCM Zoning Ordinance,  
664 although generally reasonable, are held by a court to interfere with the use or enjoyment of a  
665 particular Structure, Lot , or Tree to such an extent, or to be so onerous in their application to  
666 such a Structure, Lot, or Tree, as to constitute a taking or deprivation of that property in  
667 violation of the constitution of this state or the constitution of the United States, such holding  
668 shall not affect the application of this FCM Zoning Ordinance as to other Structures, Lots, and  
669 Trees, and, to this end, the provisions of this FCM Zoning Ordinance are declared to be  
670 severable.

671 **B. Validity Of Remaining Provisions.** Should any section or provision of this FCM Zoning  
672 Ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not  
673 affect the validity of this FCM Zoning Ordinance as a whole or any part thereof other than the  
674 parts so declared to be unconstitutional or invalid.



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679 **SECTION XVIII. EFFECTIVE DATE**

680 This FCM Zoning Ordinance shall take effect on the \_\_\_\_ day of \_\_\_\_, 201~~8~~9. Copies thereof shall  
681 be filed with the Commissioner and the Registers of Deeds for Hennepin County, Minnesota.

682  
683 Passed and adopted after public hearings by the Flying Cloud Airport Joint Airport Zoning Board this  
684 day of \_\_\_\_, 201~~8~~9.

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691 I hereby certify that this is a complete, true, and correct copy of the *Flying Cloud Airport Zoning*  
692 *Ordinance* as adopted by the Flying Cloud Airport Joint Airport Zoning Board on \_\_\_\_, 201~~8~~9.

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\_\_\_\_\_  
~~Jenn Felger~~Shelly Cambridge, Secretary  
Flying Cloud Airport Joint Airport Zoning Board

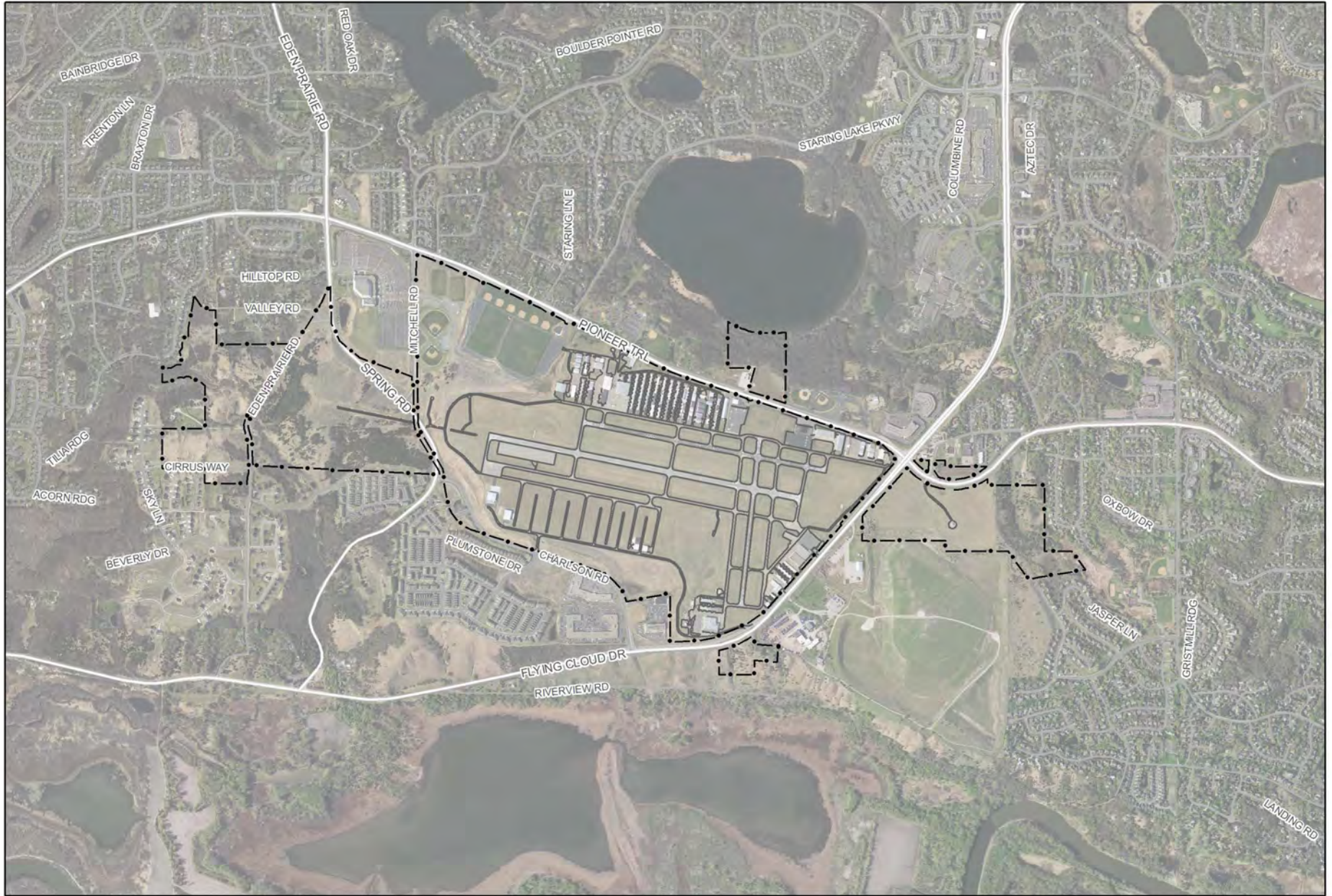
Date: \_\_\_\_, 201~~8~~9


703 Subscribed and sworn to before me this \_\_\_\_ day of \_\_\_\_, 201~~8~~9 by ~~Je~~Shelly Cambridge  
704 ~~Felger~~, Secretary of the Flying Cloud Airport Joint Airport Zoning Board.

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706  
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\_\_\_\_\_  
Notary Public

# FCM Zoning Ordinance Exhibit A - Airport Boundary



 FCM Property Line  
FCM Zoning Ordinance Update

0 1,550 3,100  
Feet

**EXHIBIT B: PARCELS IN PERMITTED RESIDENTIAL AREAS**

PIN	BLDG NUM	STREETNAME	CITY	ZIP	LEGAL DESCRIPTION	USE DESC
053-2011622430008	16555	HILLTOP RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
053-2011622430009	16403	VALLEY RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
053-2011622430010	16501	VALLEY RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
053-2011622430026	9281	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430027	9293	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430028	9305	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430029	9317	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430030	9329	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430031	9341	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430032	9353	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430033	9365	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430034	9377	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430035	9389	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430036	16580	VALLEY RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430057	16697	STIRRUP LA	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430058	9300	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430062	9332	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430063	9346	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
053-2011622430064	9360	SHETLAND RD	EDEN PRAIRIE	55347	RILEY CREEK RIDGE	Residential
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053-2011622440028	16333	VALLEY RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
053-2011622440029	16301	VALLEY RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
053-2011622440030	16275	VALLEY RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
053-2011622440031	16199	VALLEY RD	EDEN PRAIRIE	55347	EDEN HEIGHTS	Residential
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053-2611622230021	9747	WOODRIDGE DR	EDEN PRAIRIE	55347	THE TREE FARM	Residential
053-2611622230022	9763	WOODRIDGE DR	EDEN PRAIRIE	55347	THE TREE FARM	Residential
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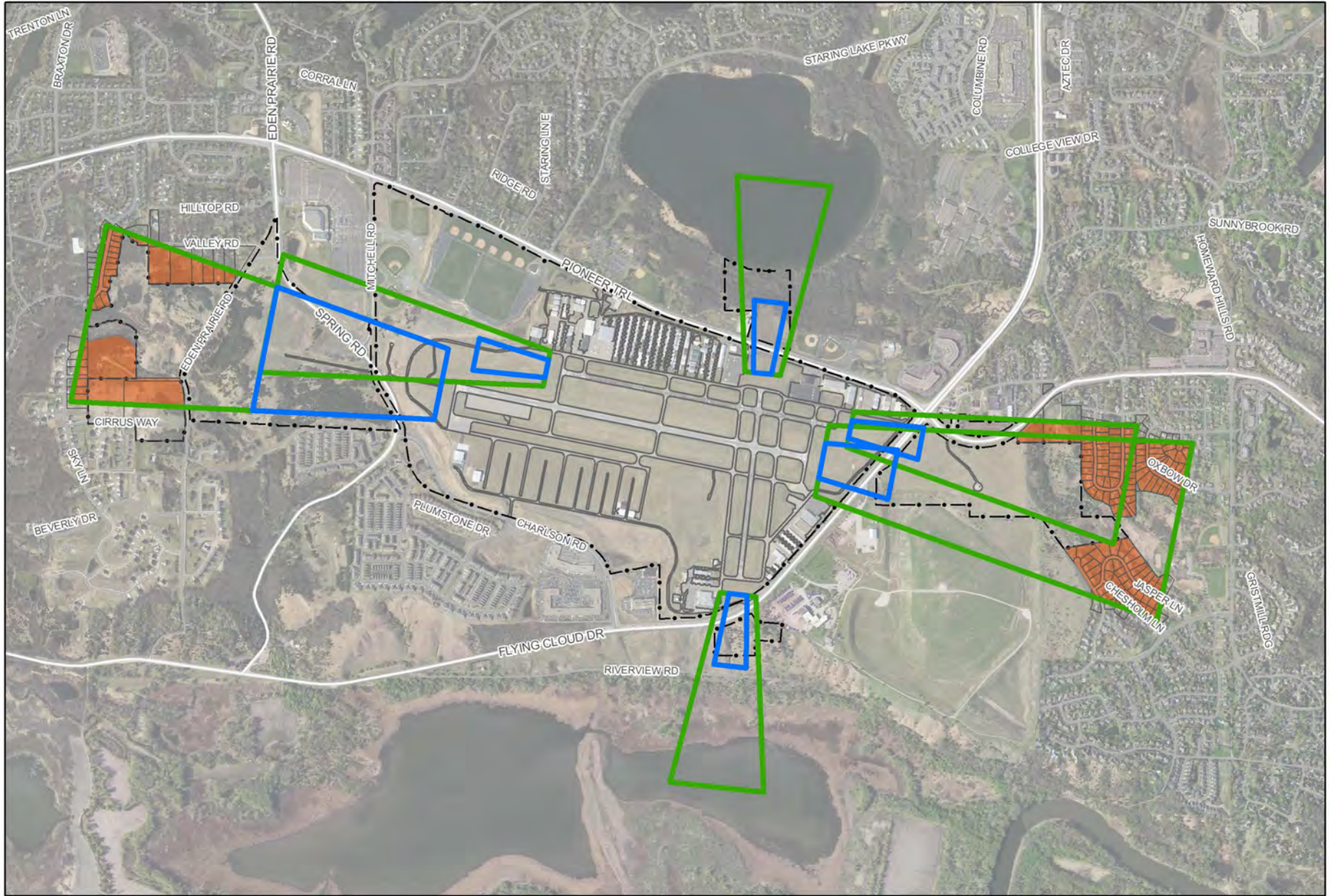
**EXHIBIT B: PARCELS IN PERMITTED RESIDENTIAL AREAS**

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053-2611622240066	12246	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240067	12266	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240068	12286	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240069	12306	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240070	12326	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240072	12213	TRAVOIS RD	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240073	12193	TRAVOIS RD	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240074	12173	TRAVOIS RD	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
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053-2611622240076	9742	PALLISADES CIR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240077	9755	PALLISADES CIR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240078	9745	PALLISADES CIR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622240079	9735	PALLISADES CIR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622310009	12135	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622310010	12155	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622310011	12175	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
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053-2611622310014	12235	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
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053-2611622310025	12186	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
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053-2611622310029	12255	OXBOW DR	EDEN PRAIRIE	55347	HILLSBOROUGH 2ND ADDN	Residential
053-2611622320002	9827	WOODRIDGE DR	EDEN PRAIRIE	55347	THE TREE FARM	Residential
053-2611622320003	9843	WOODRIDGE DR	EDEN PRAIRIE	55347	THE TREE FARM	Residential
053-2611622320004	9839	JEDLICKA CT	EDEN PRAIRIE	55347	THE TREE FARM	Residential
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053-2611622320017	9804	TREE FARM RD	EDEN PRAIRIE	55347	THE TREE FARM	Residential
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053-2611622320025	10003	KIERSTEN PL	EDEN PRAIRIE	55347	NORTH BLUFF 2ND ADDN	Residential
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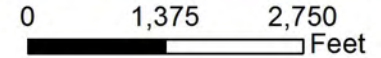
**EXHIBIT B: PARCELS IN PERMITTED RESIDENTIAL AREAS**

<b>PIN</b>	<b>BLDG NUM</b>	<b>STREETNAME</b>	<b>CITY</b>	<b>ZIP</b>	<b>LEGAL DESCRIPTION</b>	<b>USE DESC</b>
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053-2611622330033	10088	KIERSTEN PL	EDEN PRAIRIE	55347	NORTH BLUFF 2ND ADDN	Residential
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053-2911622210071	9547	SKY LA	EDEN PRAIRIE	55347	THE RIDGE AT RILEY CREEK 2ND ADDN	Residential
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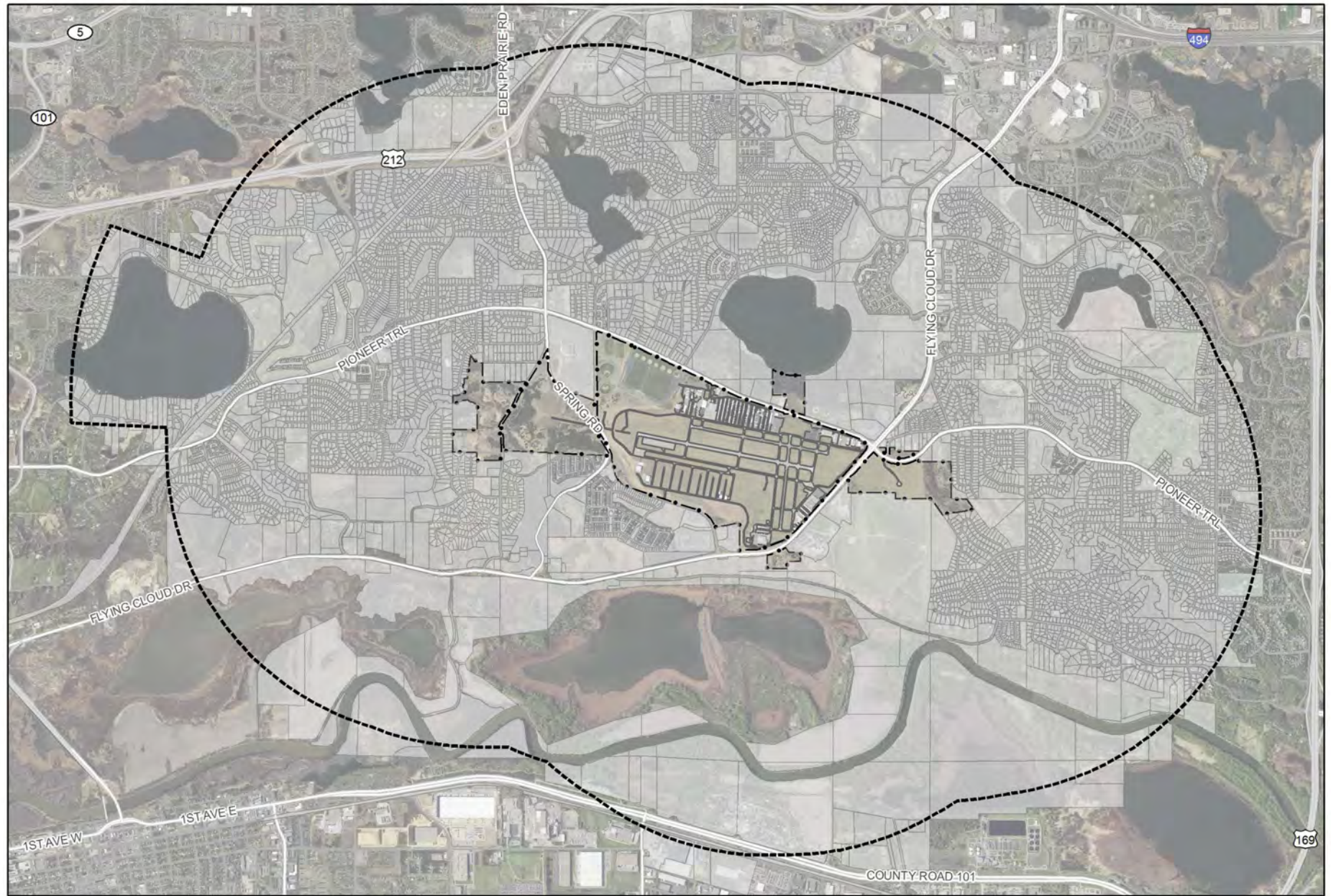
# FCM Zoning Ordinance Exhibit C - Permitted Residential Areas






FCM Property Line
  JAZB Zone A
  JAZB Zone B
  Parcel Boundary
  Permitted Residential

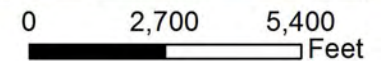


# FCM Zoning Ordinance Exhibit D - Airport Boundary and Airspace Zoning Limits

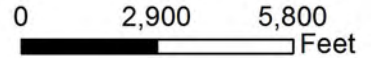
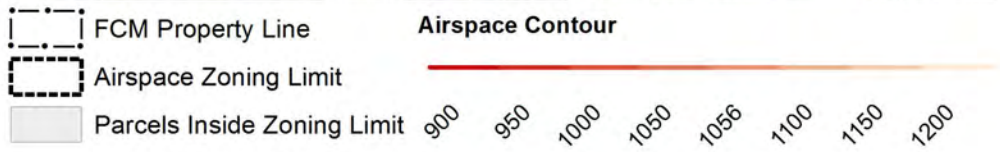
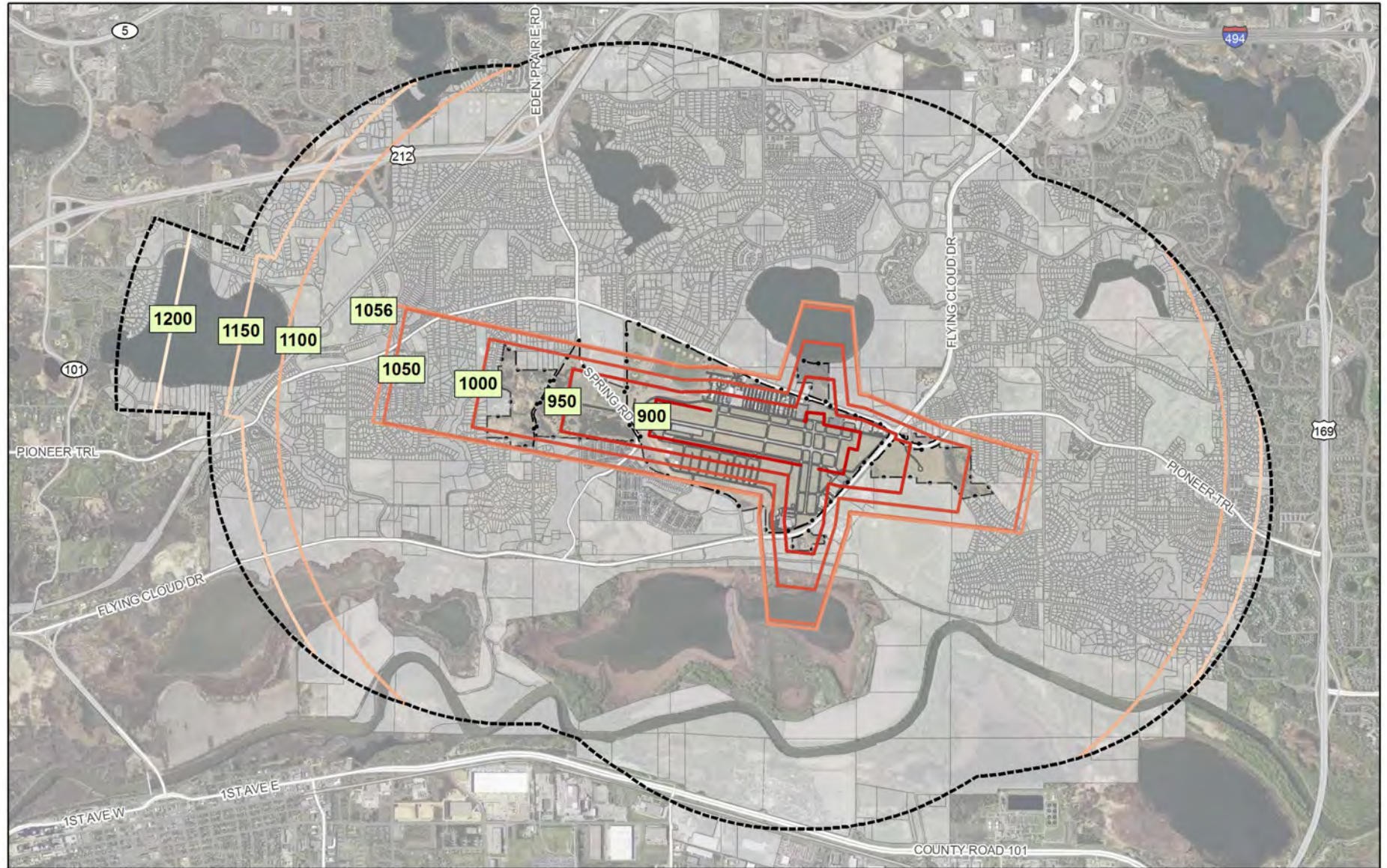


 FCM Property Line  Airspace Zoning Limit  Parcels Inside Zoning Limit

FCM Zoning Ordinance Update



# FCM Zoning Ordinance Exhibit E - Airport Boundary and Airspace Contours



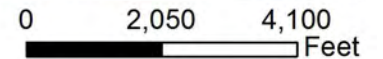


# FCM Zoning Ordinance Exhibit F - Airport Boundary and Safety Zoning Limit



FCM Property Line    Safety Zoning Limit

FCM Zoning Ordinance Update

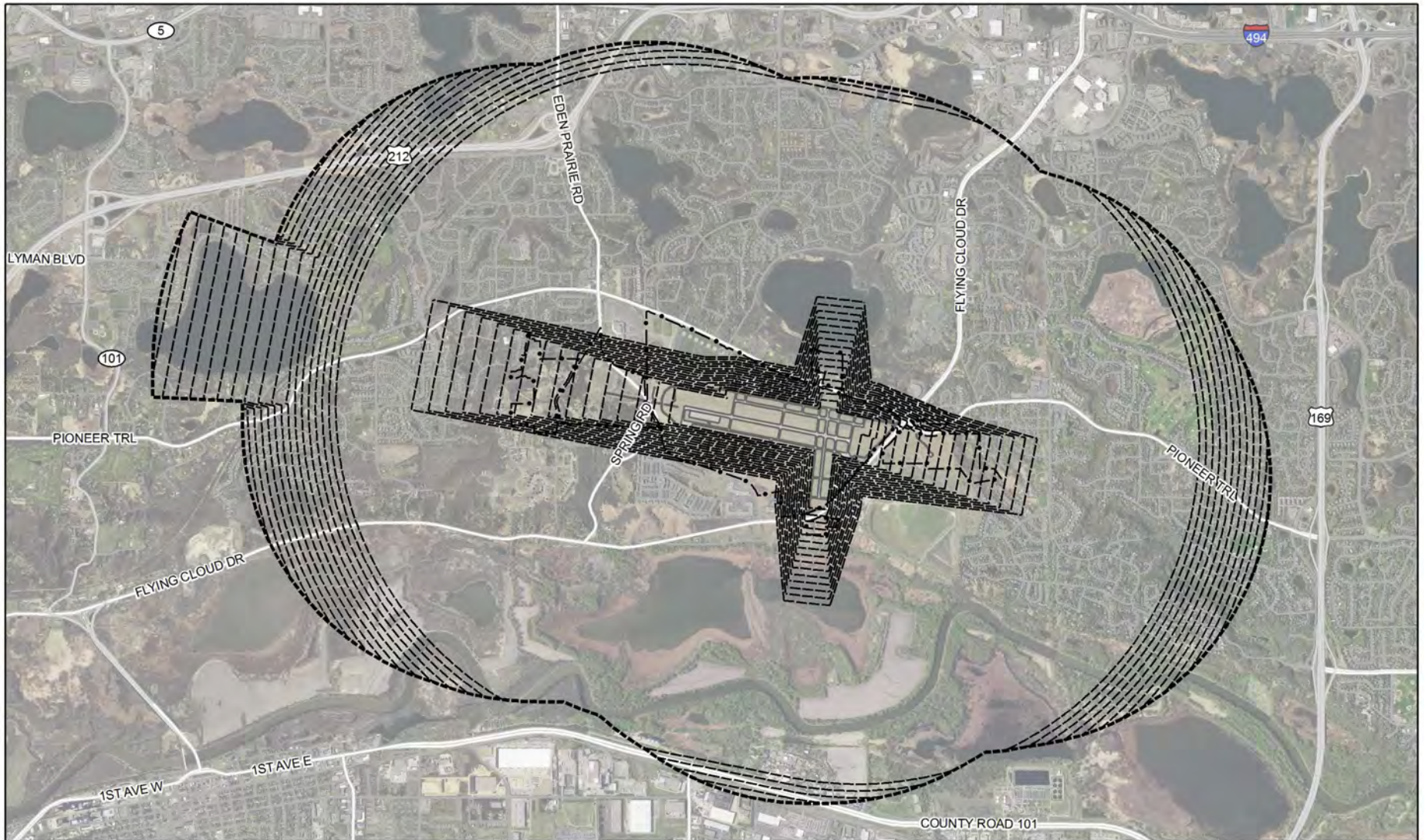


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**Appendix 8: FCM Airspace Zoning Grid Maps**




<b>Content</b>	<b>Page</b>
FCM Airspace Zones Within Zoning Limits - Index	8-1
FCM Airspace Zones Within Zoning Limits – Grid Maps A1 through F6	8-2

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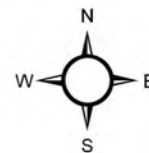


## FCM Airspace Zones Within Zoning Limits

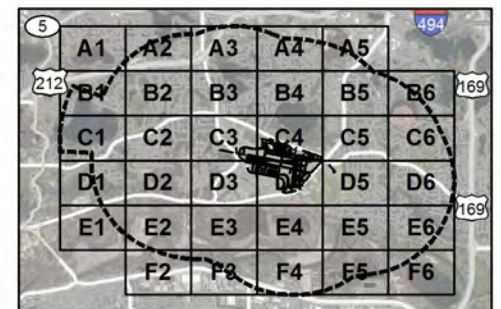
### A - Index Sheet

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

FCM Zoning Ordinance Update






0 3,200 6,400 Feet



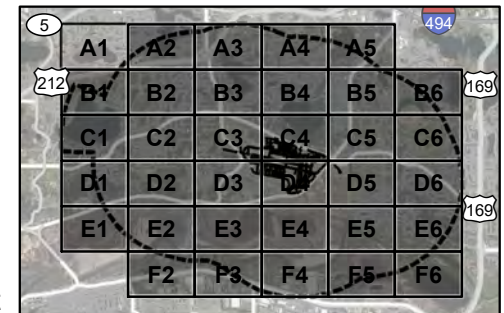
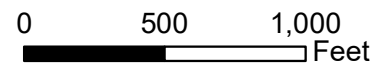
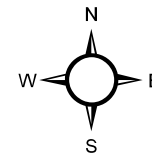


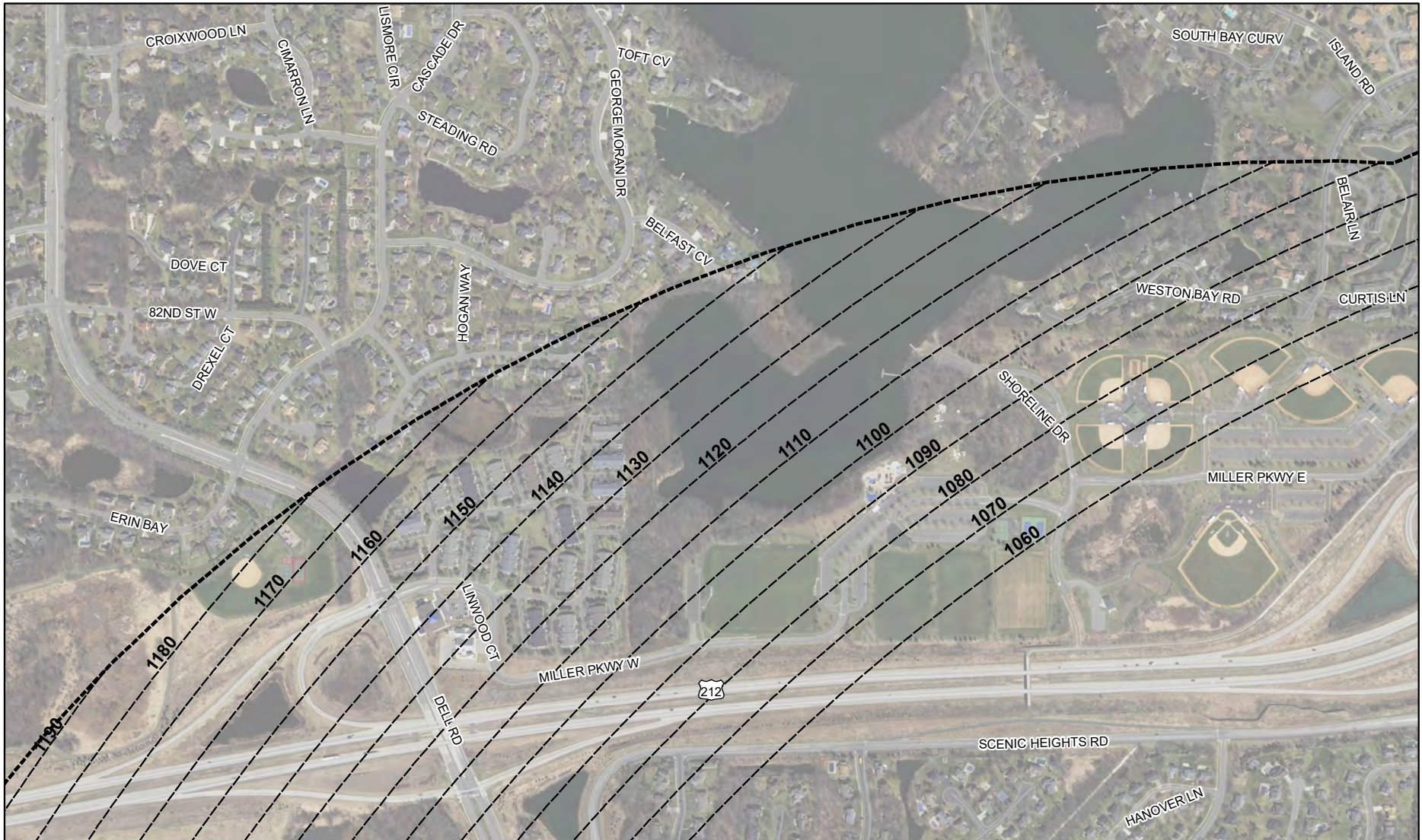
## FCM Airspace Zones Within Zoning Limits

### A - A1

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



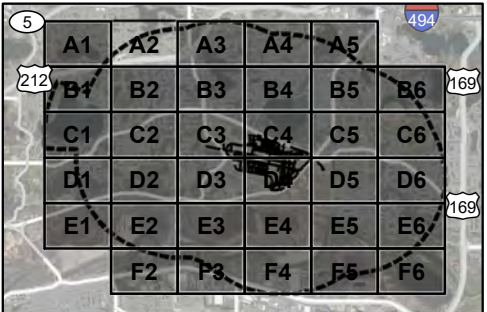
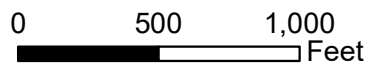
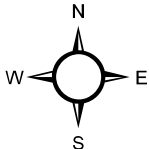


# FCM Airspace Zones Within Zoning Limits

## A - A2

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



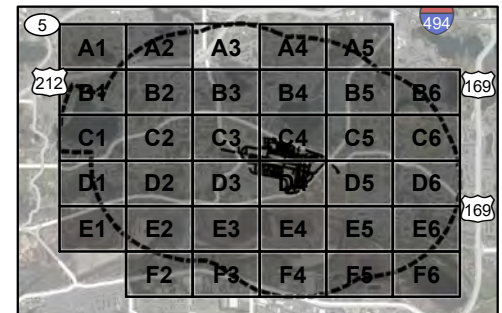
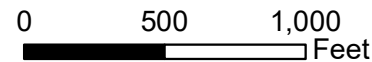
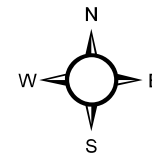


## FCM Airspace Zones Within Zoning Limits

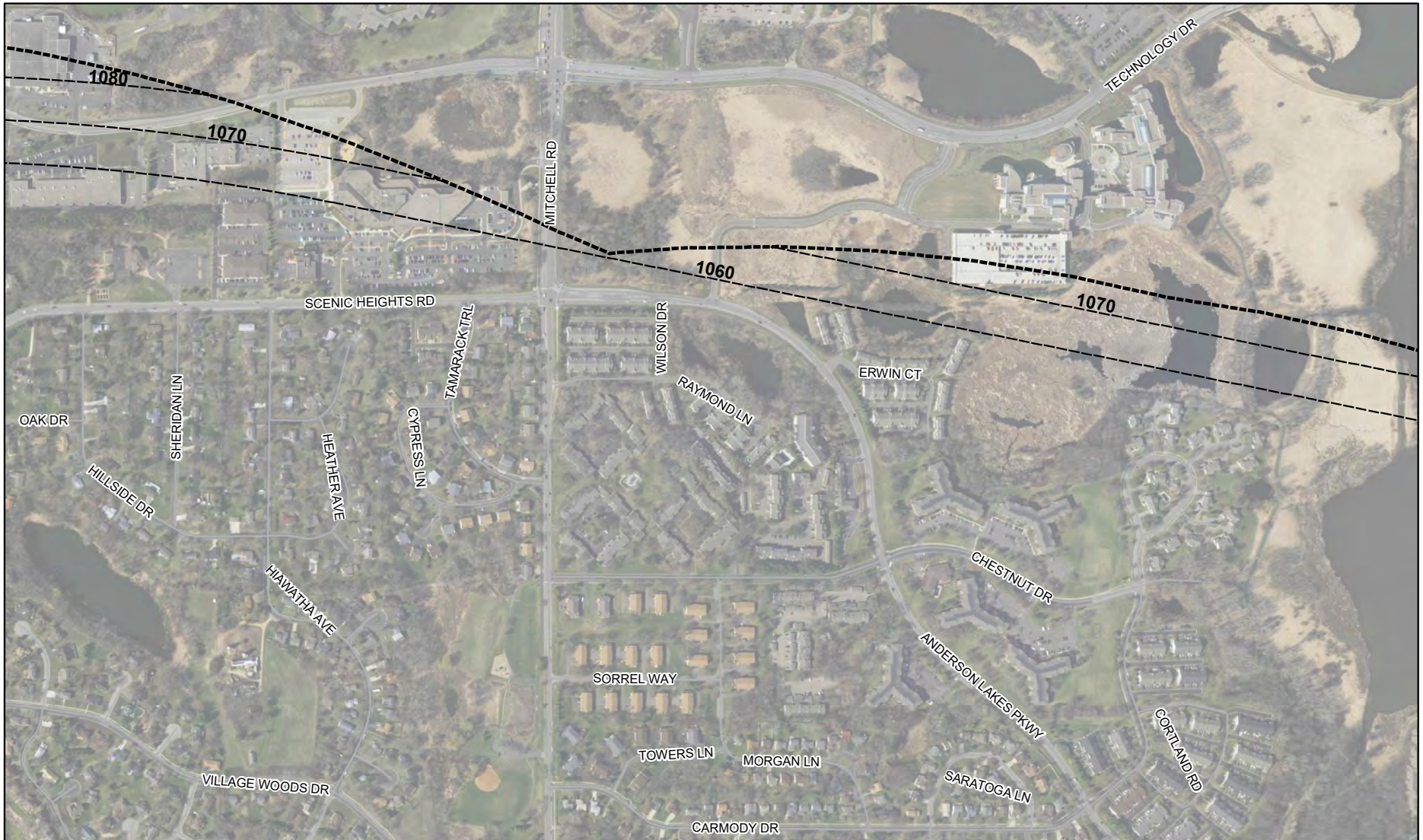
### A - A3

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

FCM Zoning Ordinance Update








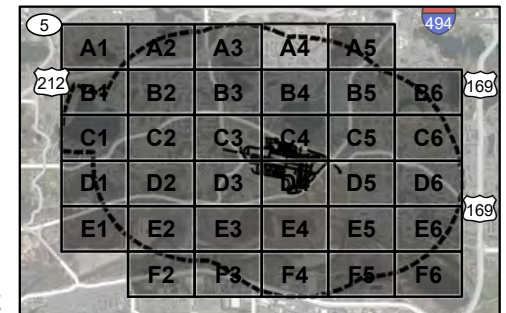
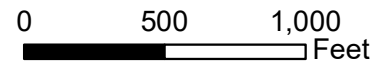
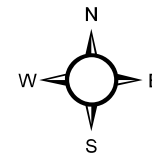


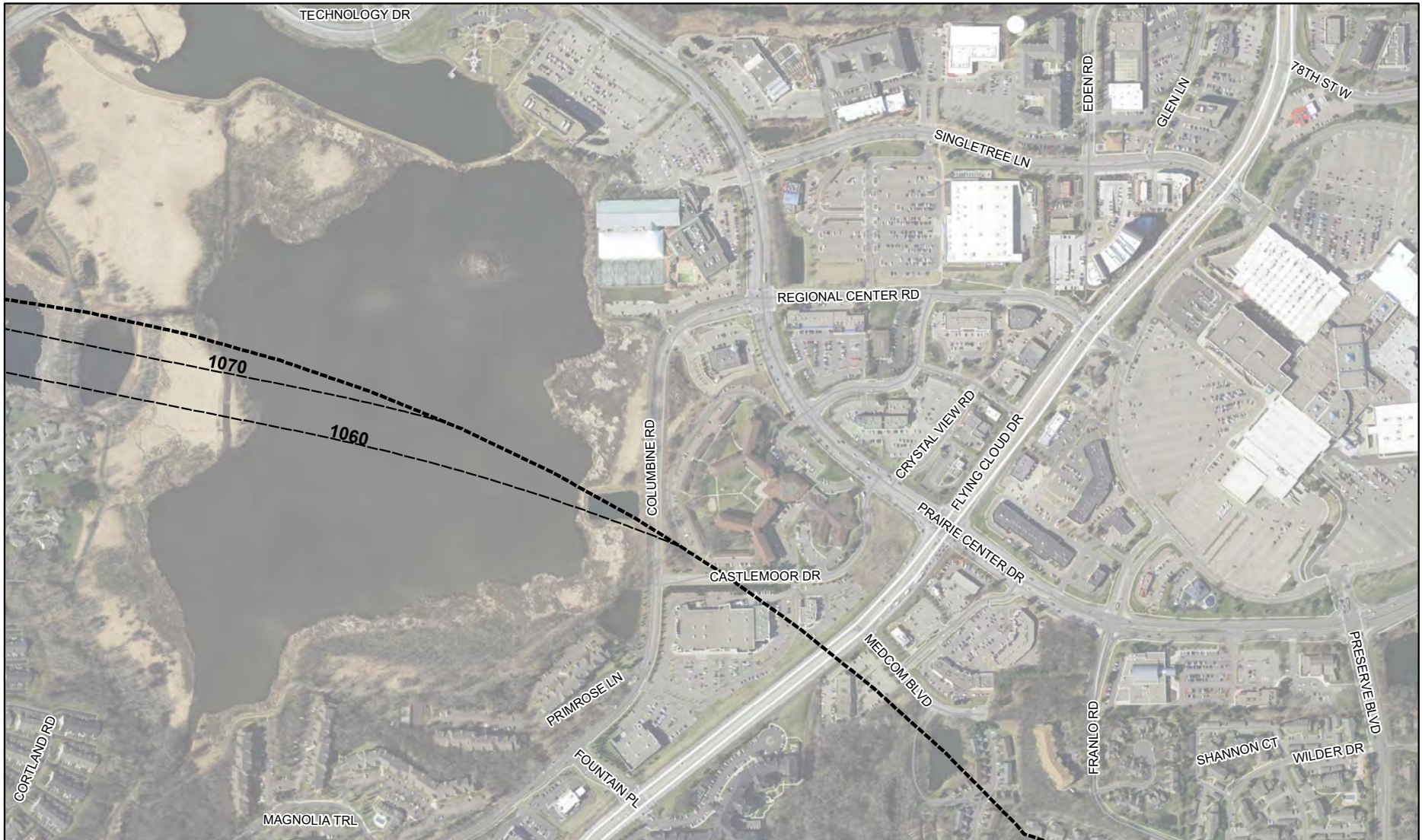
## FCM Airspace Zones Within Zoning Limits

### A - A4

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



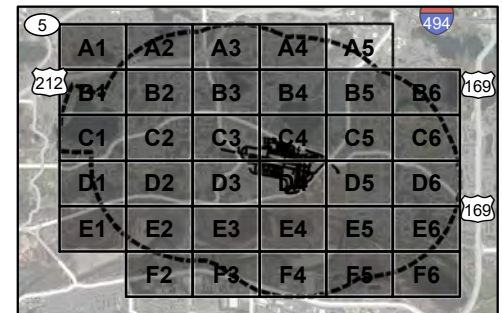
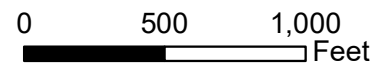
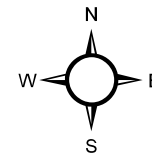


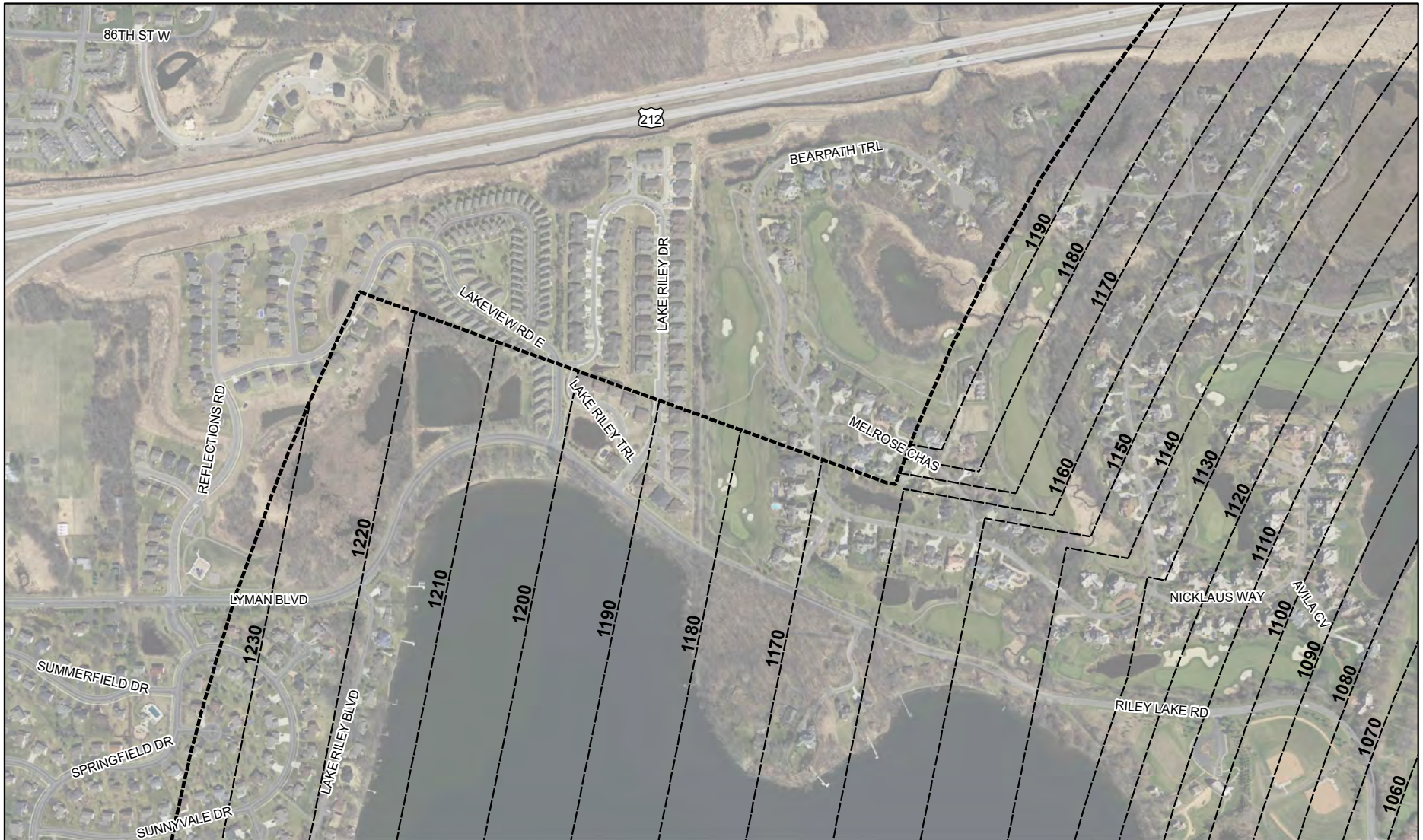
## FCM Airspace Zones Within Zoning Limits

### A - A5

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



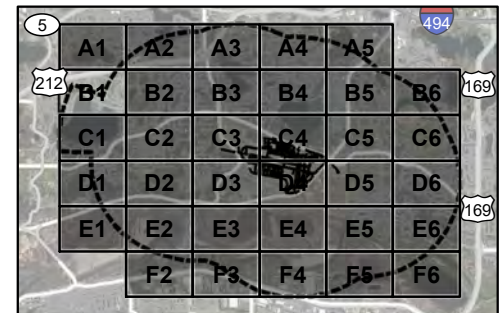
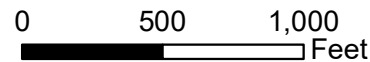
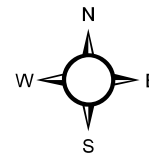


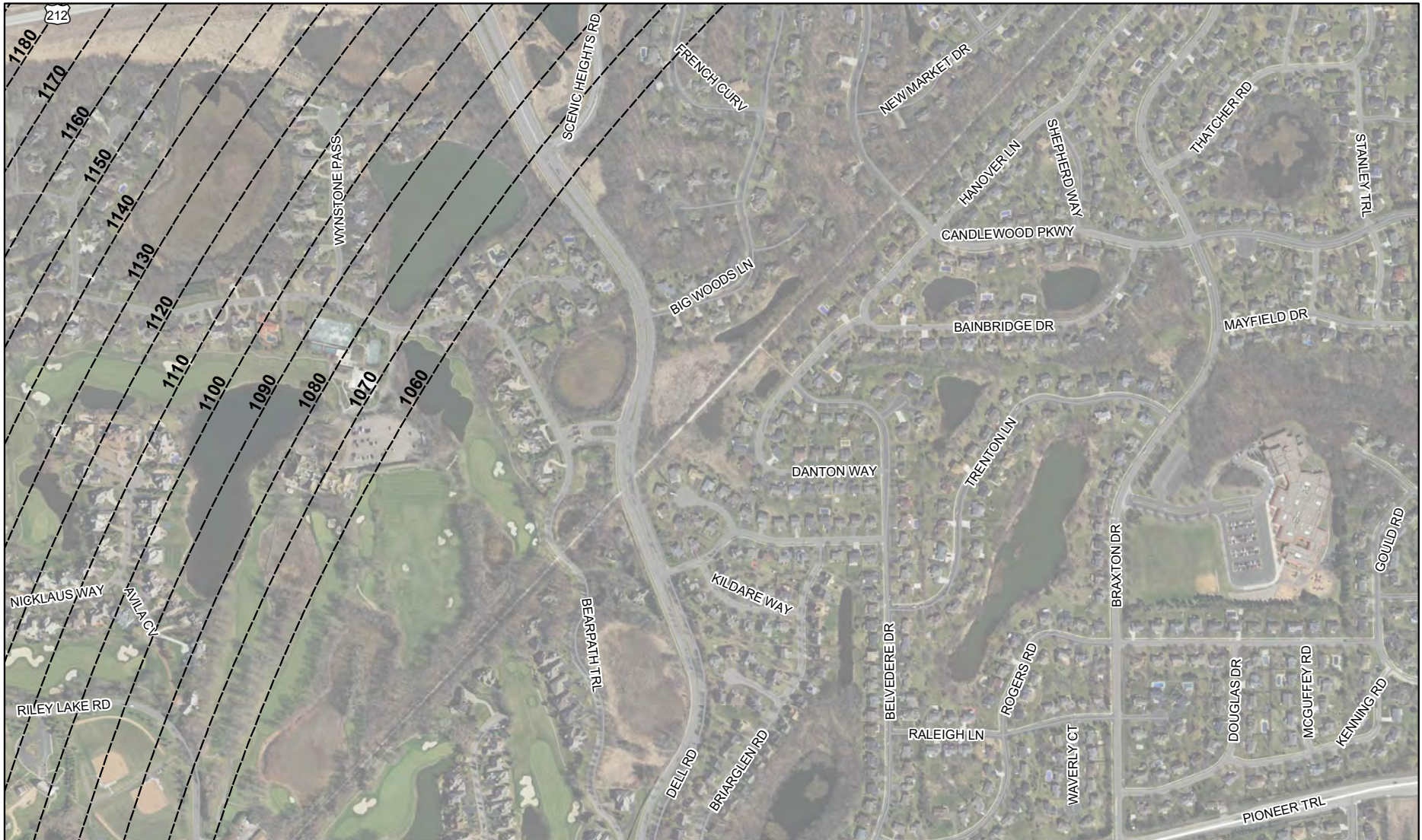
## FCM Airspace Zones Within Zoning Limits

**A - B1**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



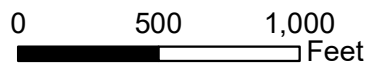
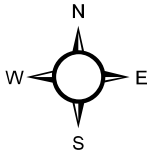


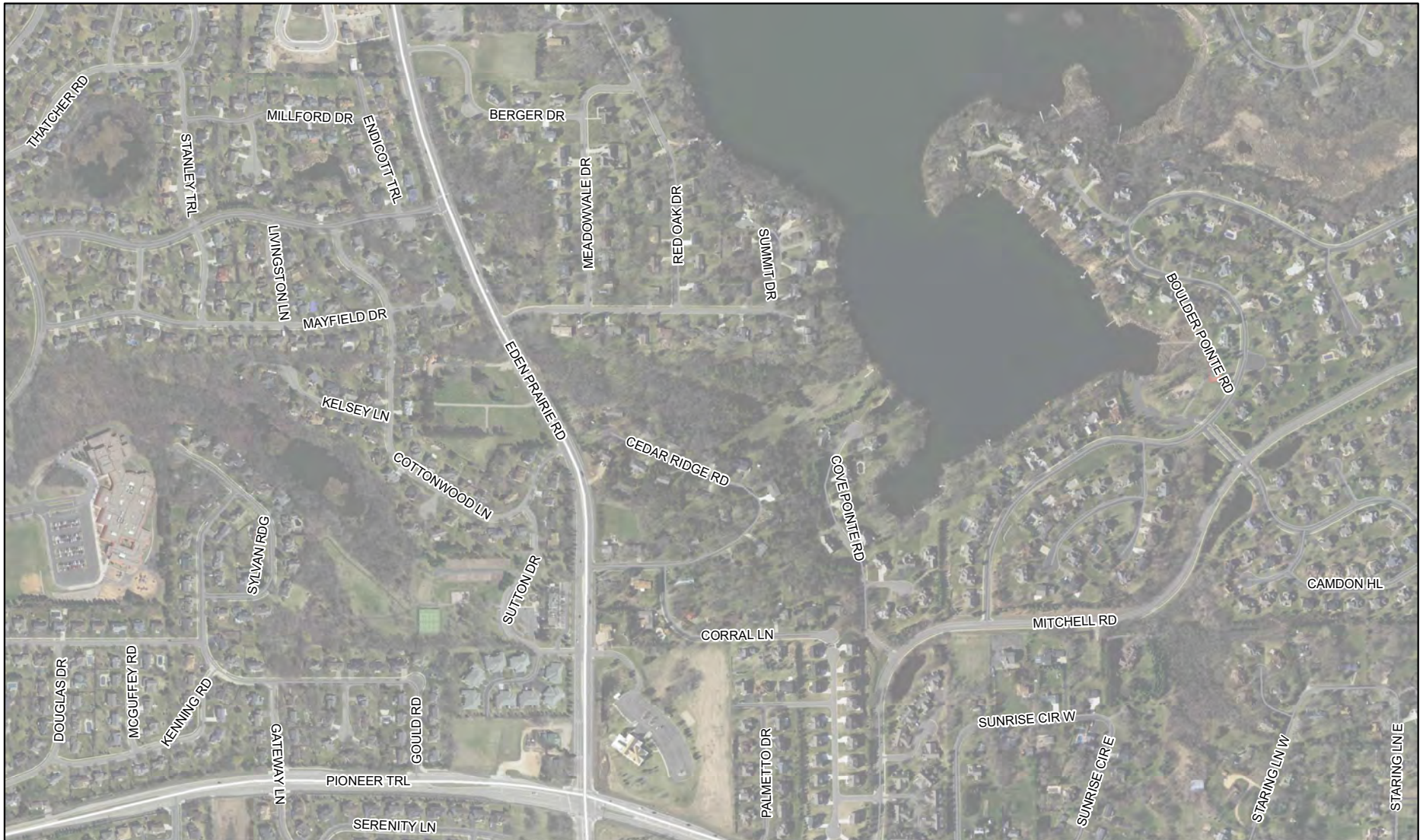
# FCM Airspace Zones Within Zoning Limits

## A - B2

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



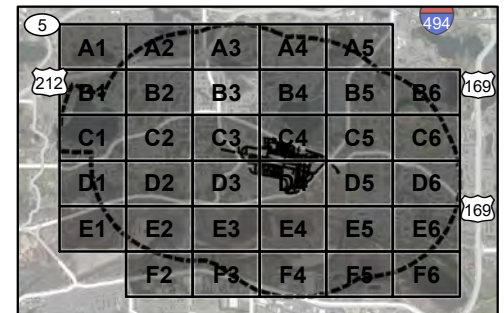
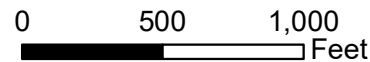
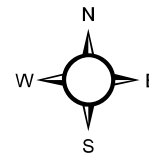


## FCM Airspace Zones Within Zoning Limits

### A - B3

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



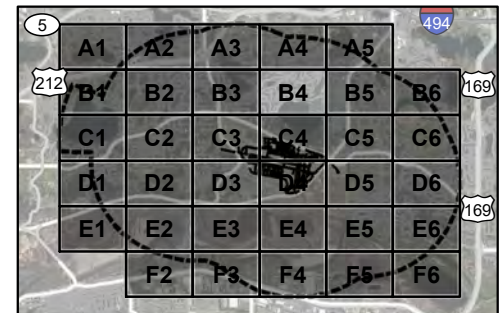
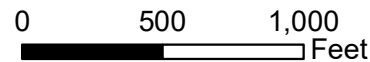
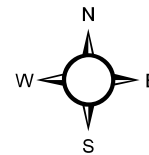


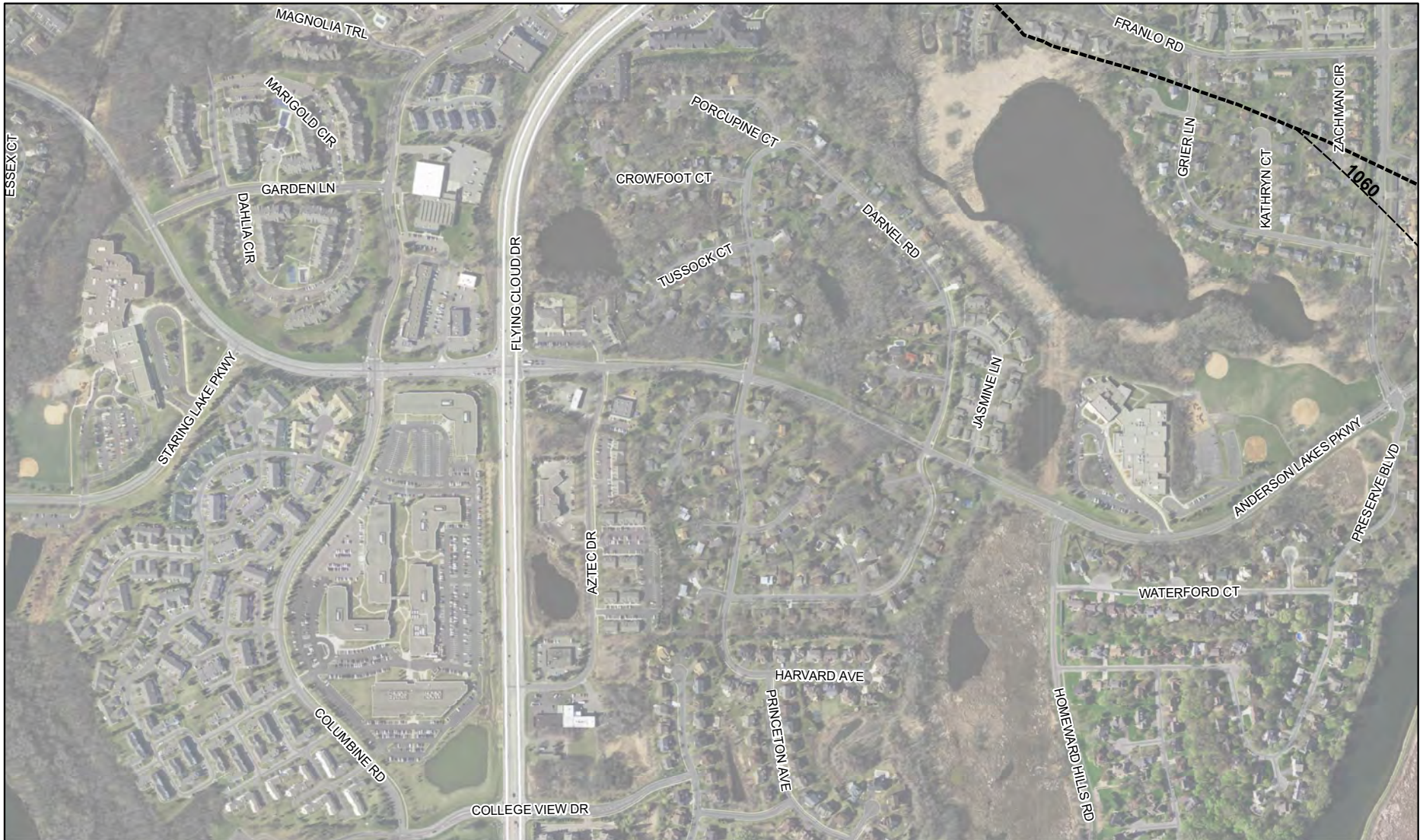
## FCM Airspace Zones Within Zoning Limits

### A - B4

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



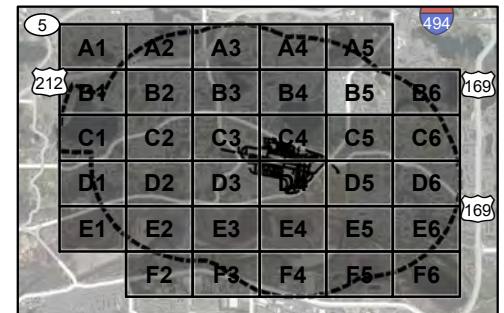
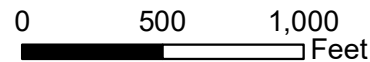
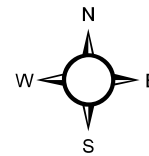


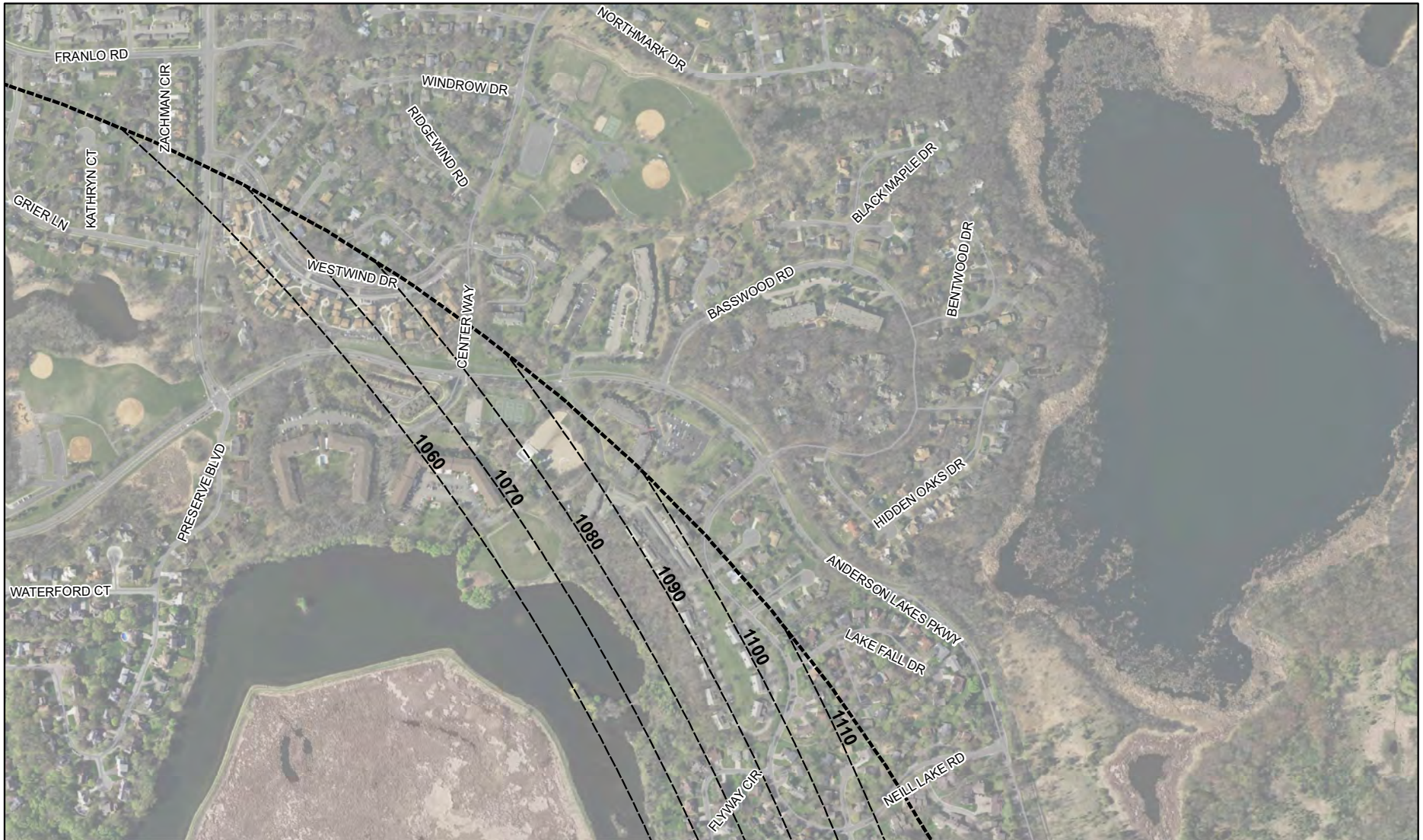
## FCM Airspace Zones Within Zoning Limits

### A - B5

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



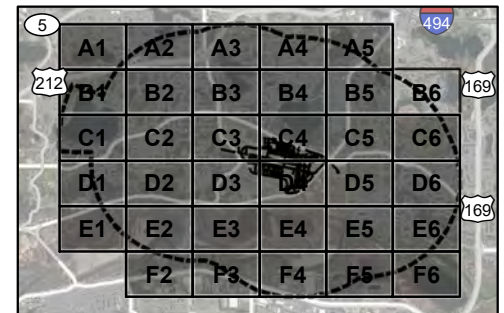
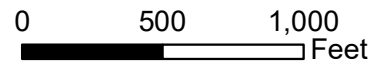
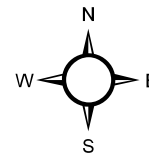


## FCM Airspace Zones Within Zoning Limits

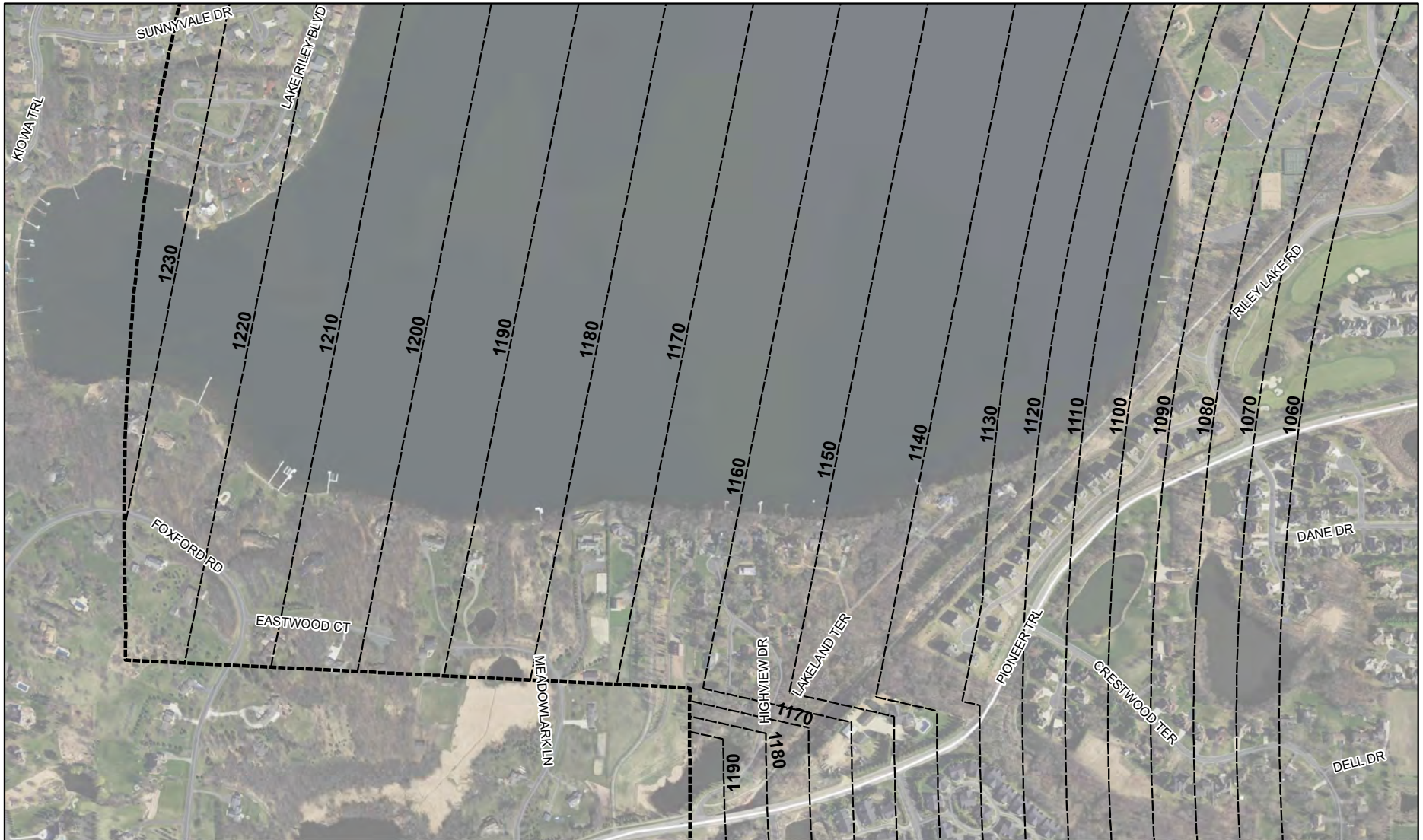
### A - B6

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

FCM Zoning Ordinance Update








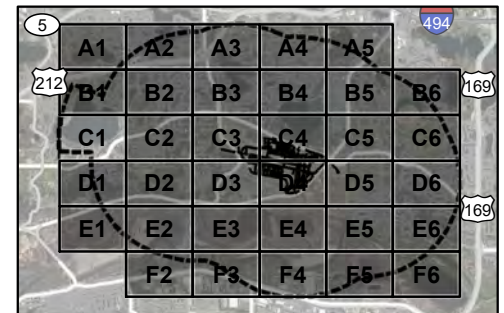
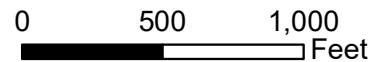
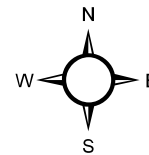


## FCM Airspace Zones Within Zoning Limits

A - C1

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



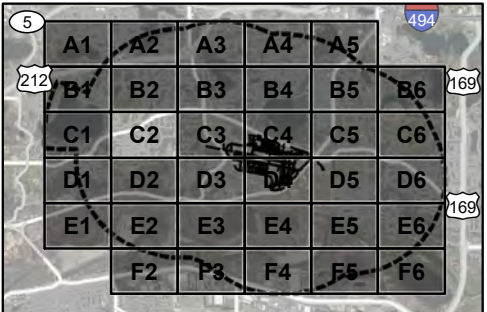
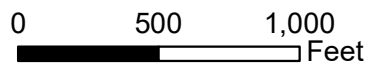
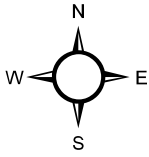


# FCM Airspace Zones Within Zoning Limits

## A - C2

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



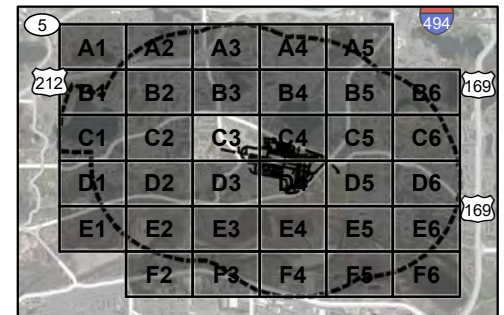
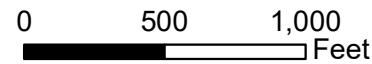
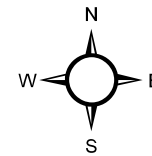


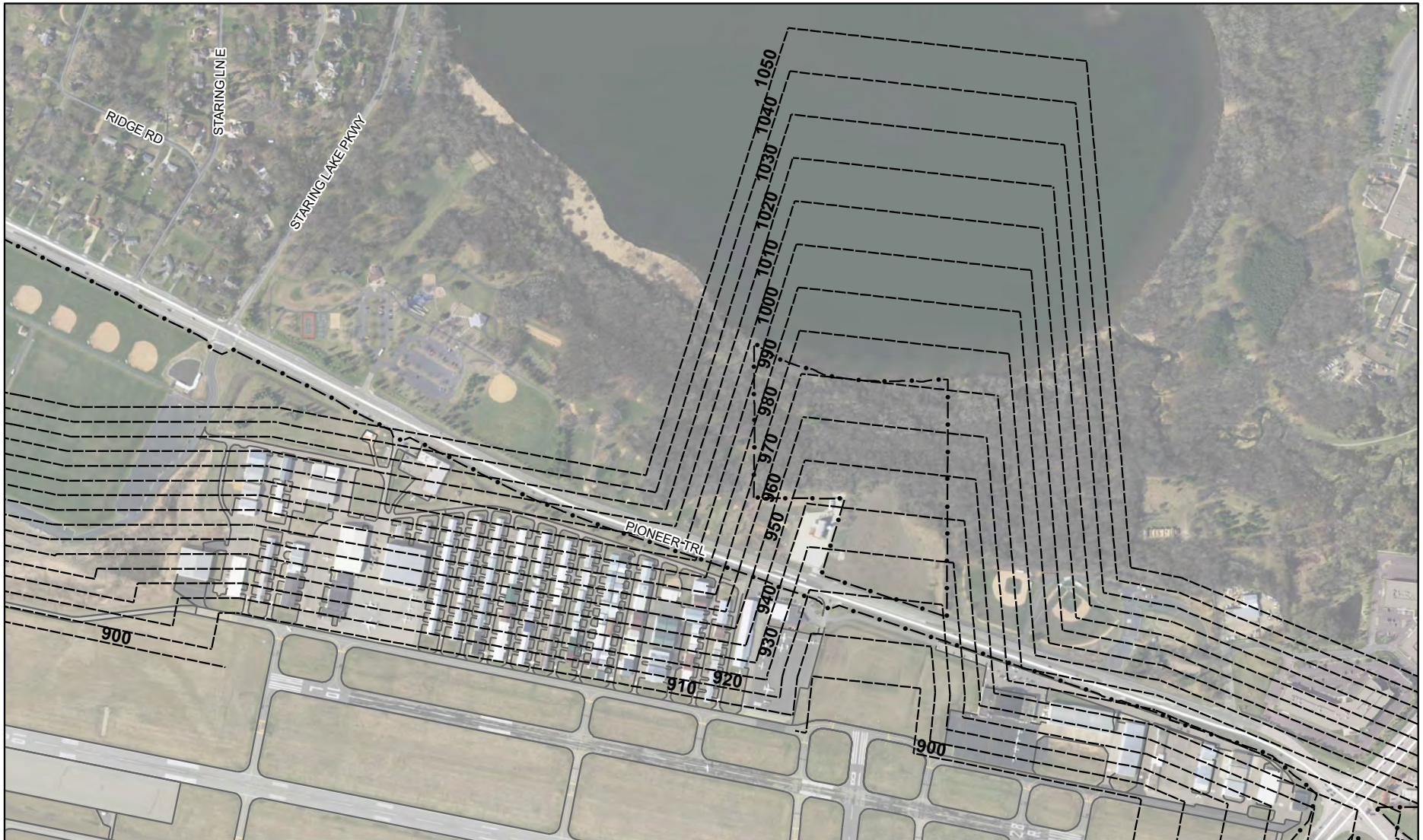
## FCM Airspace Zones Within Zoning Limits

### A - C3

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



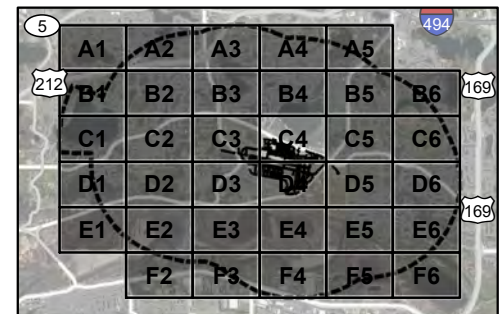
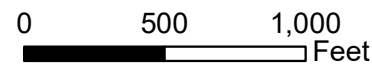
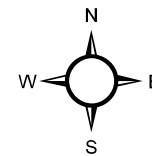


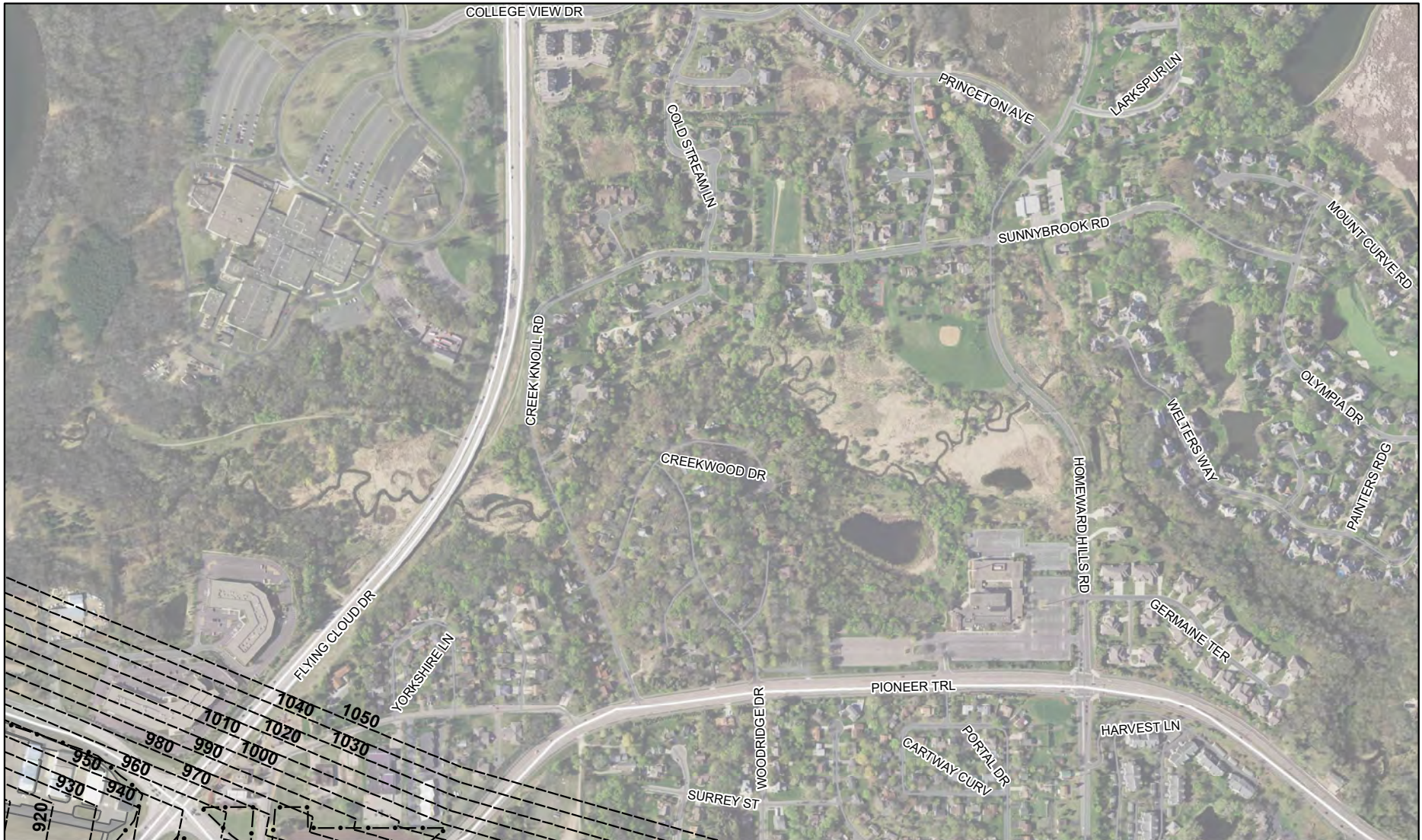
## FCM Airspace Zones Within Zoning Limits

### A - C4

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



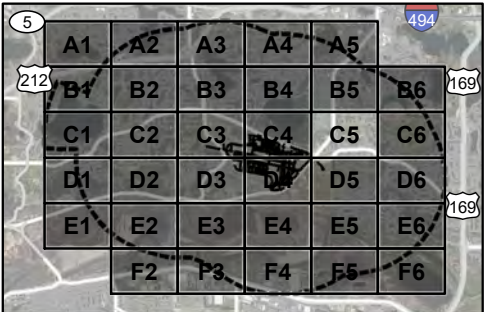
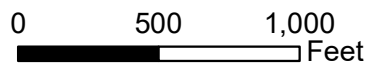
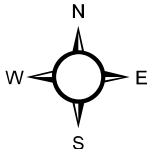


# FCM Airspace Zones Within Zoning Limits

A - C5

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



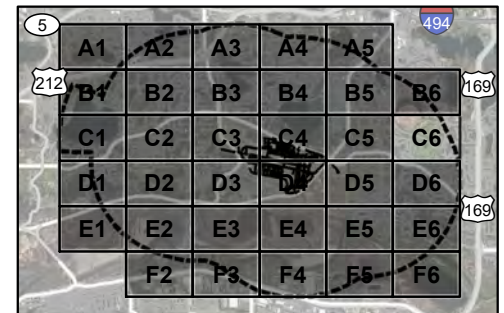
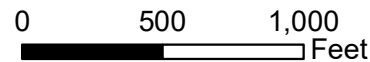
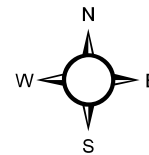


## FCM Airspace Zones Within Zoning Limits

### A - C6

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



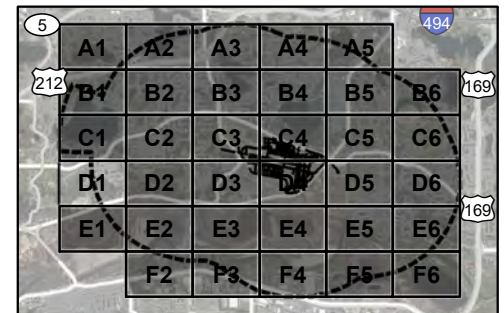
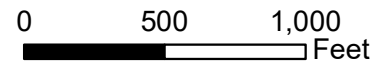
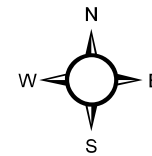


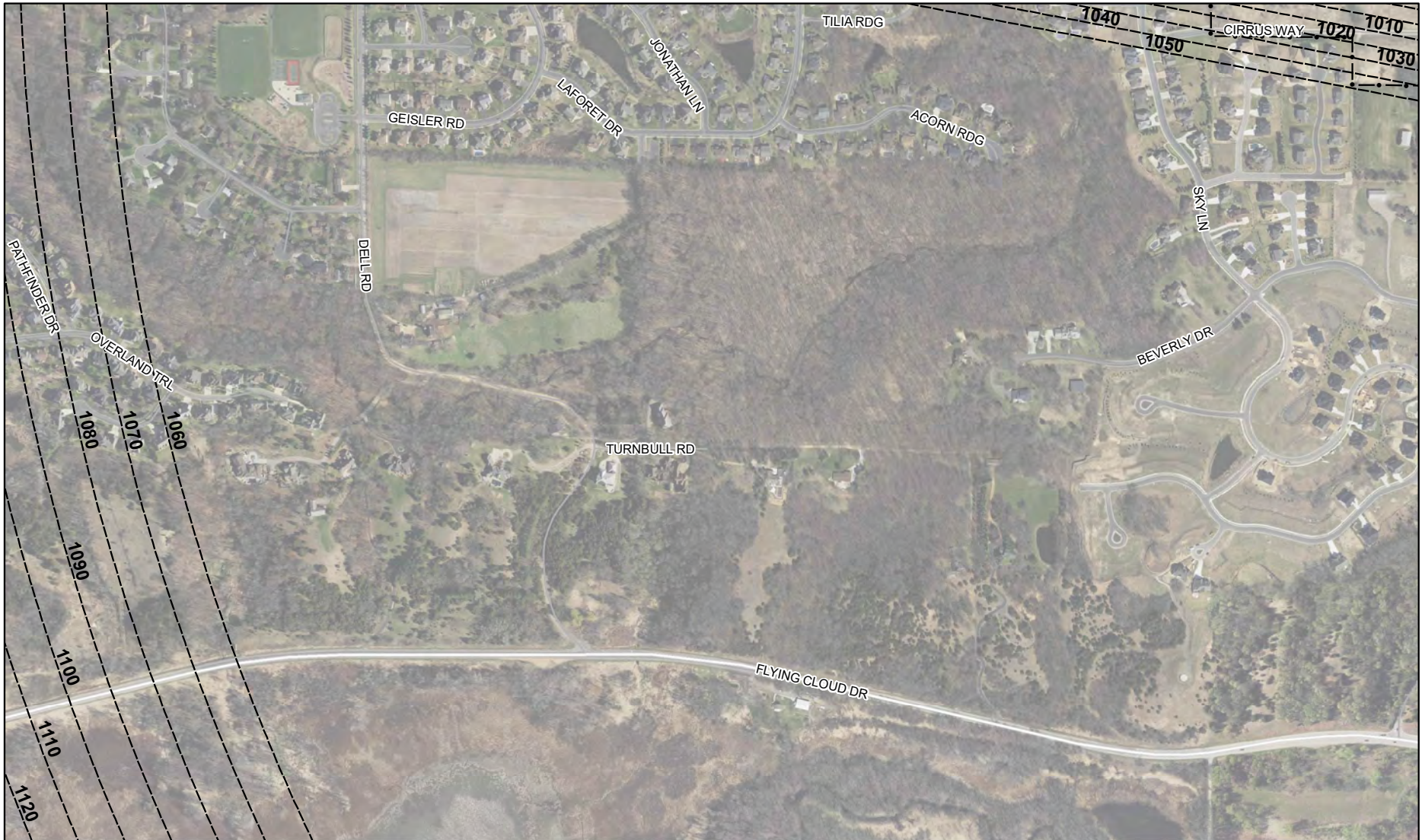
## FCM Airspace Zones Within Zoning Limits

### A - D1

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



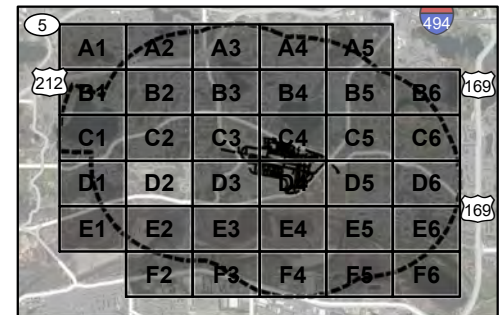
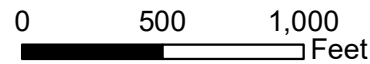
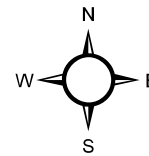


## FCM Airspace Zones Within Zoning Limits

### A - D2

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

FCM Zoning Ordinance Update








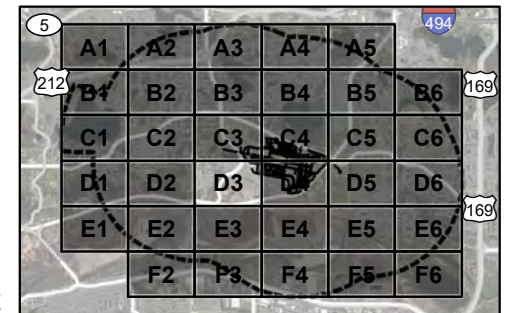
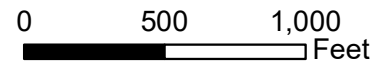
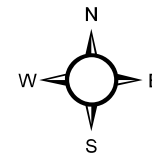


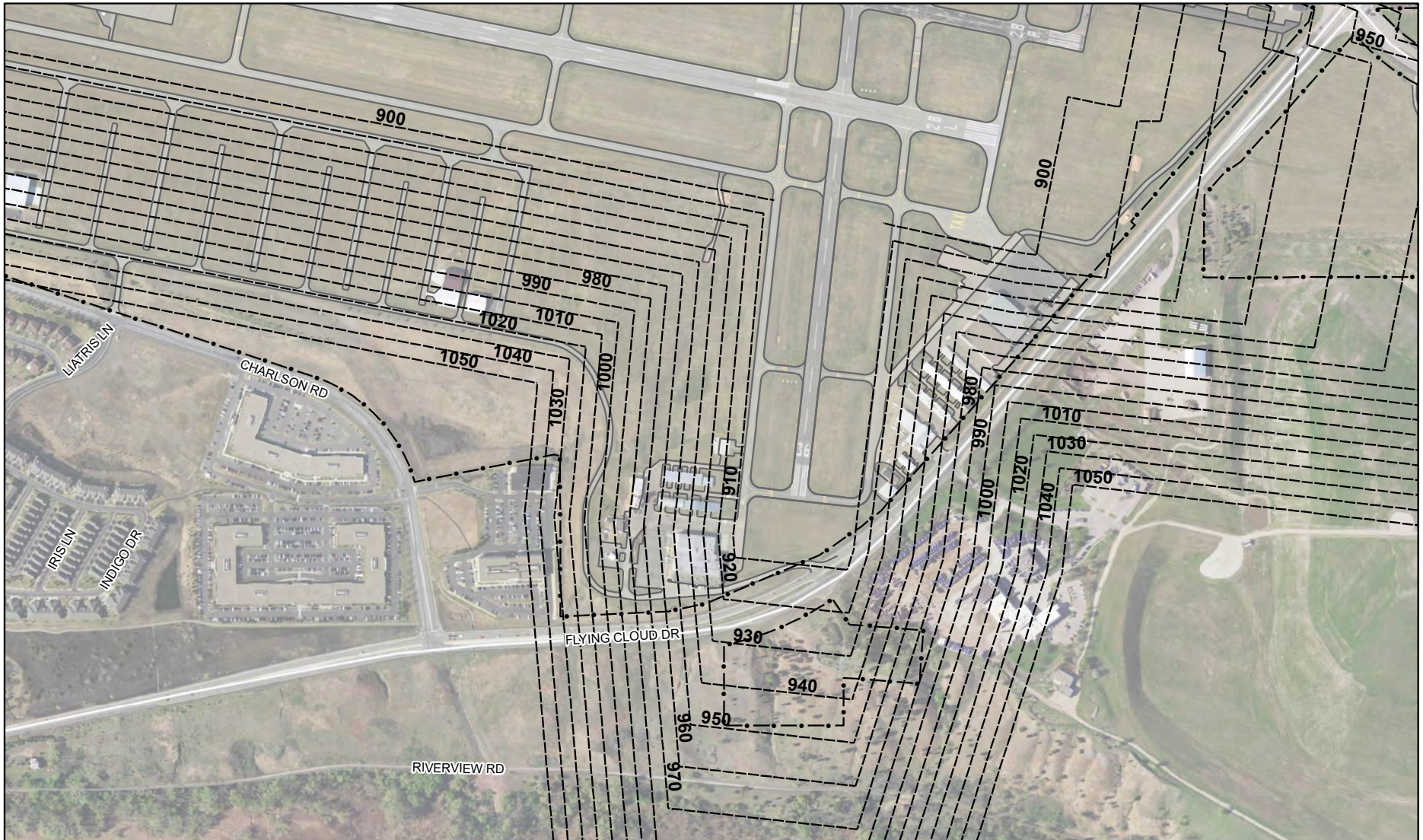
## FCM Airspace Zones Within Zoning Limits

### A - D3

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



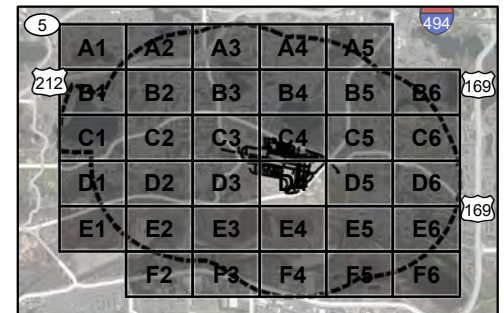
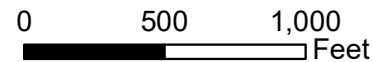
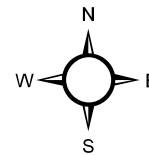


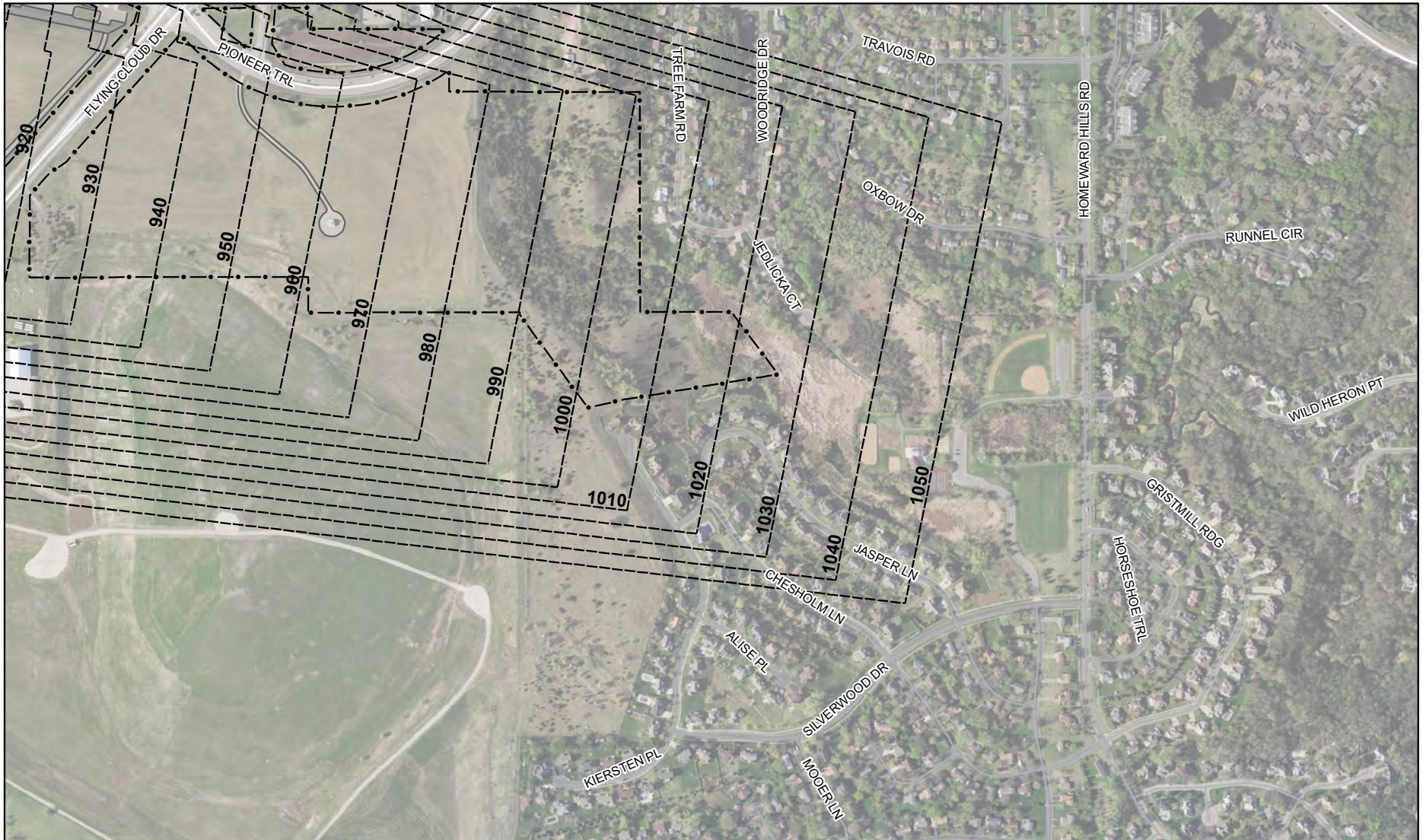
## FCM Airspace Zones Within Zoning Limits

### A - D4

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



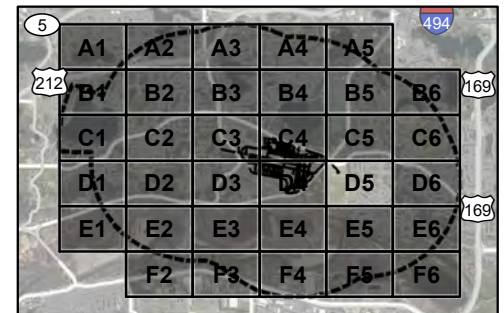
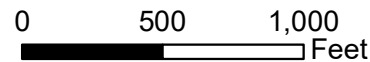
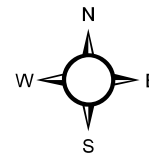


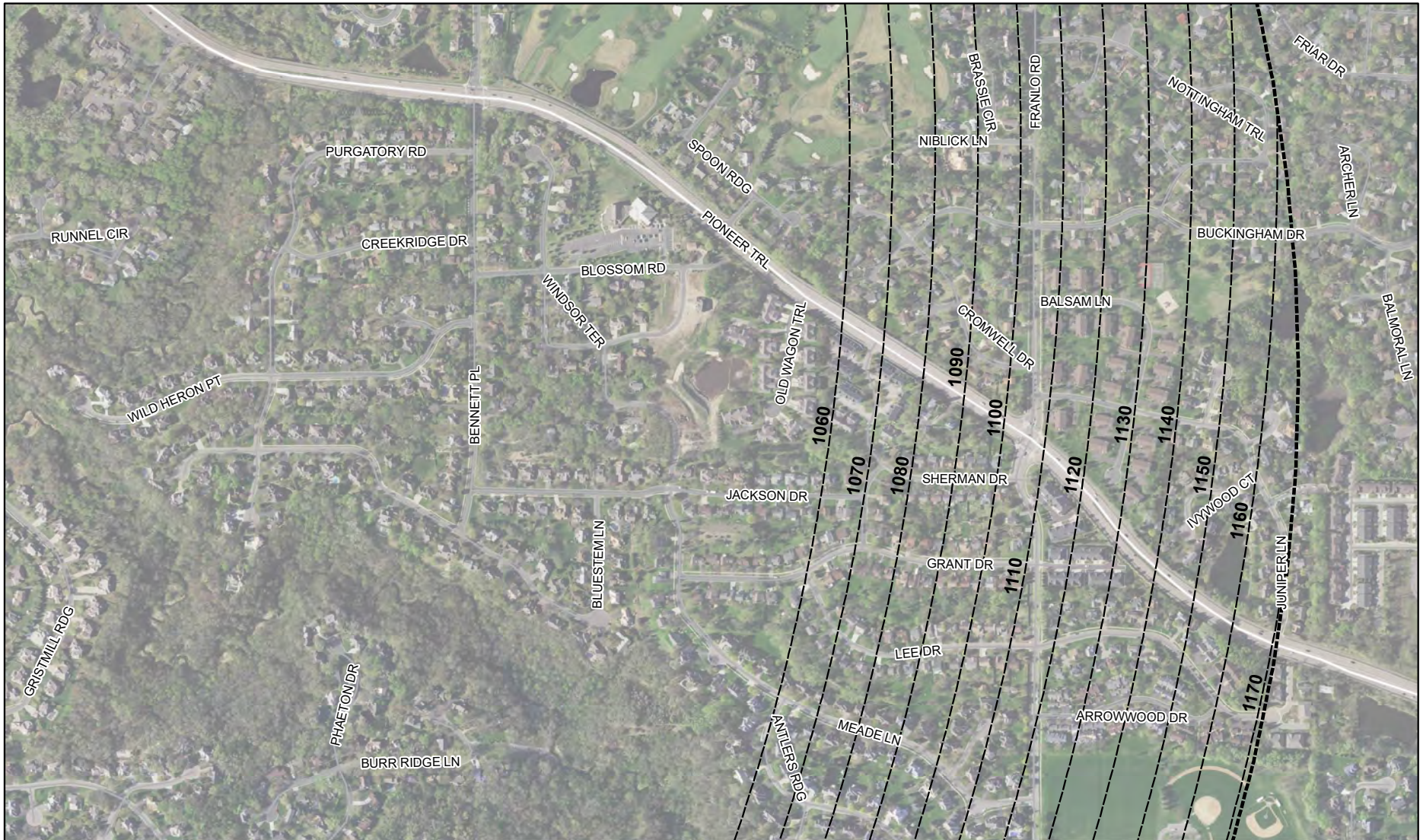
## FCM Airspace Zones Within Zoning Limits

### A - D5

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



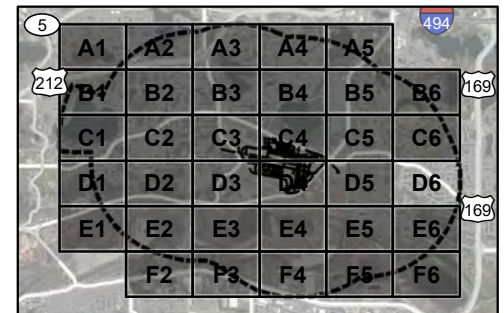
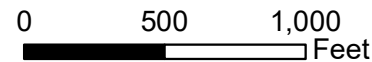
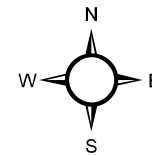


## FCM Airspace Zones Within Zoning Limits

**A - D6**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



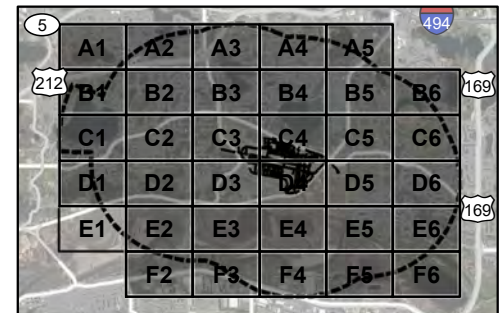
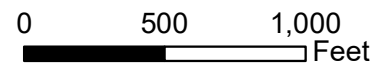
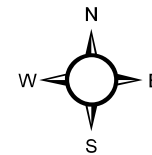


## FCM Airspace Zones Within Zoning Limits

**A - E1**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



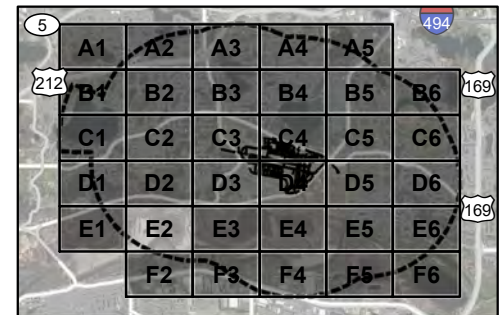
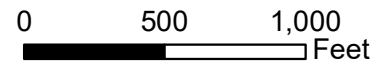
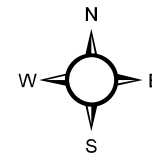


## FCM Airspace Zones Within Zoning Limits

**A - E2**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update

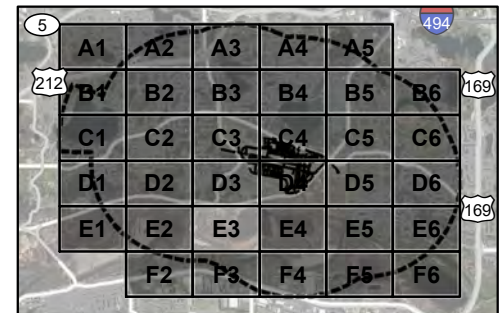
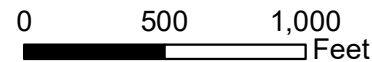
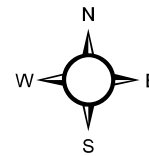




## FCM Airspace Zones Within Zoning Limits

**A - E3**




-  FCM Property Line
  -  Airspace Zoning Limit
  -  Part 77 Contours
- FCM Zoning Ordinance Update



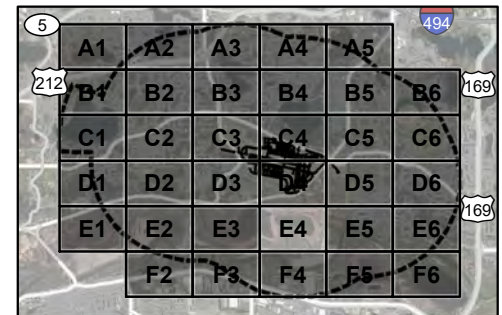
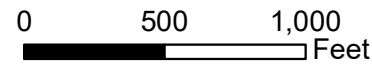
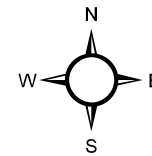


## FCM Airspace Zones Within Zoning Limits

**A - E4**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

FCM Zoning Ordinance Update








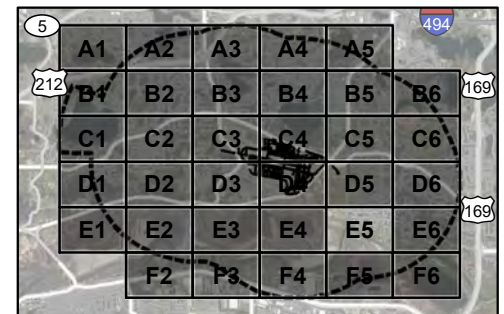
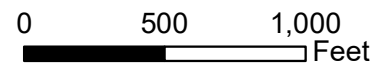
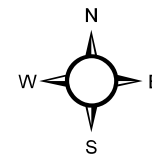


## FCM Airspace Zones Within Zoning Limits

**A - E5**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



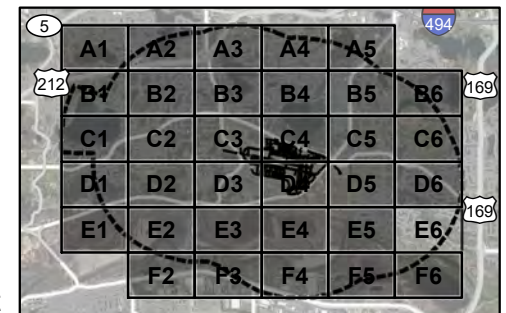
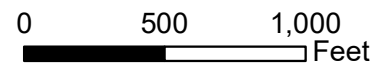
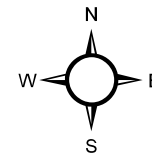


## FCM Airspace Zones Within Zoning Limits

**A - E6**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



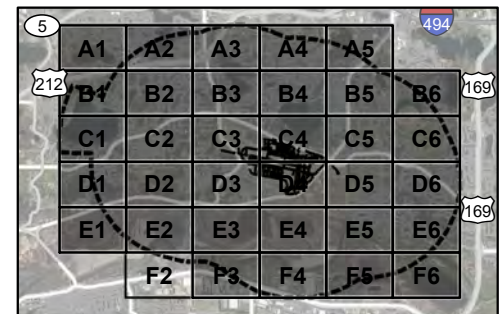
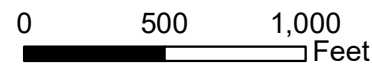
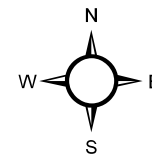


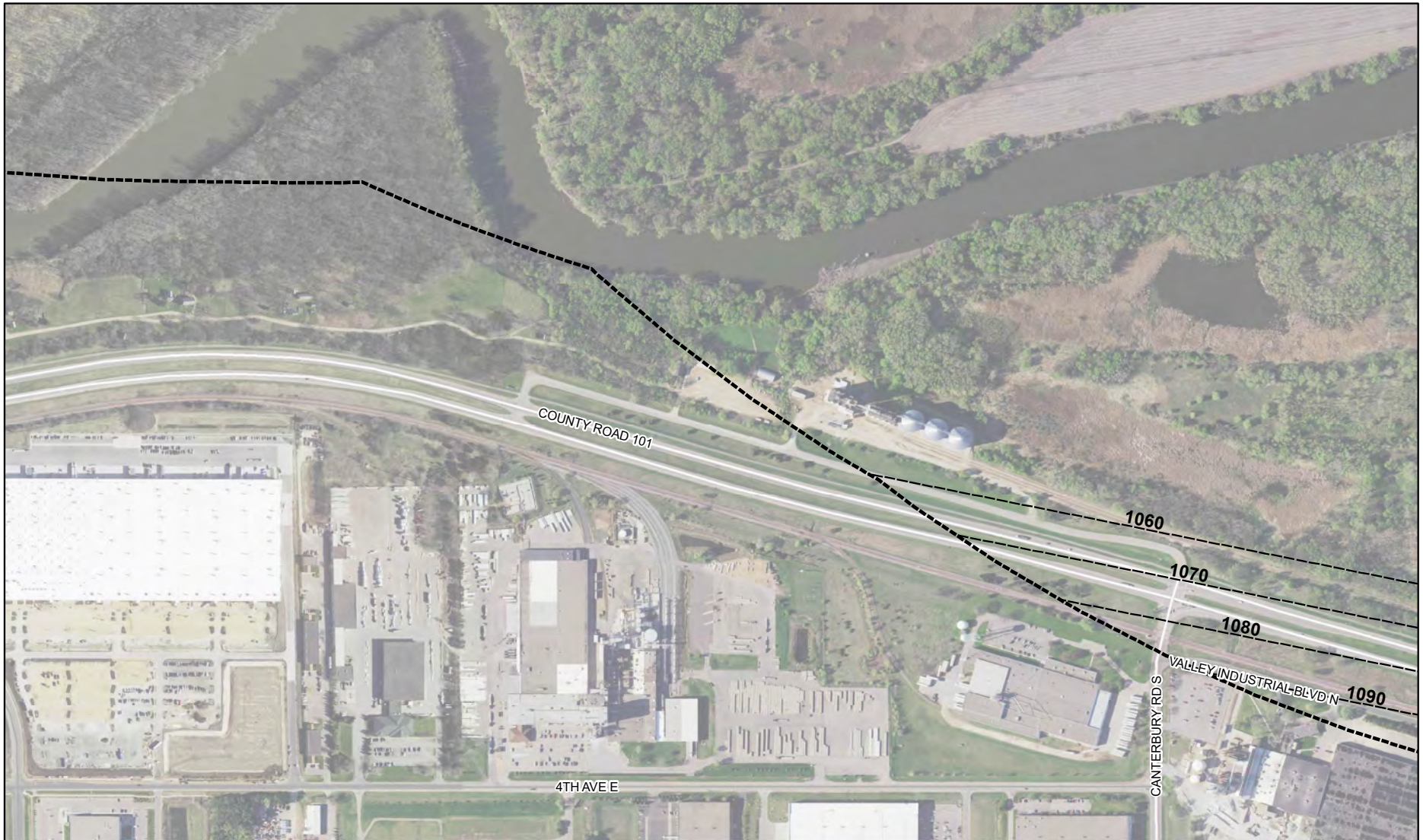
## FCM Airspace Zones Within Zoning Limits

**A - F2**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update

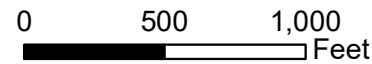
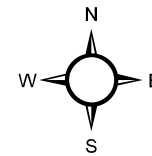




## FCM Airspace Zones Within Zoning Limits

**A - F3**




-  FCM Property Line
  -  Airspace Zoning Limit
  -  Part 77 Contours
- FCM Zoning Ordinance Update



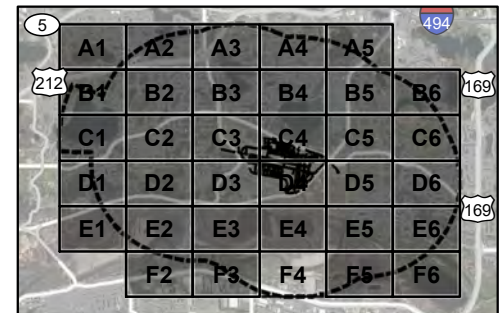
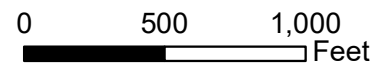
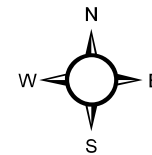


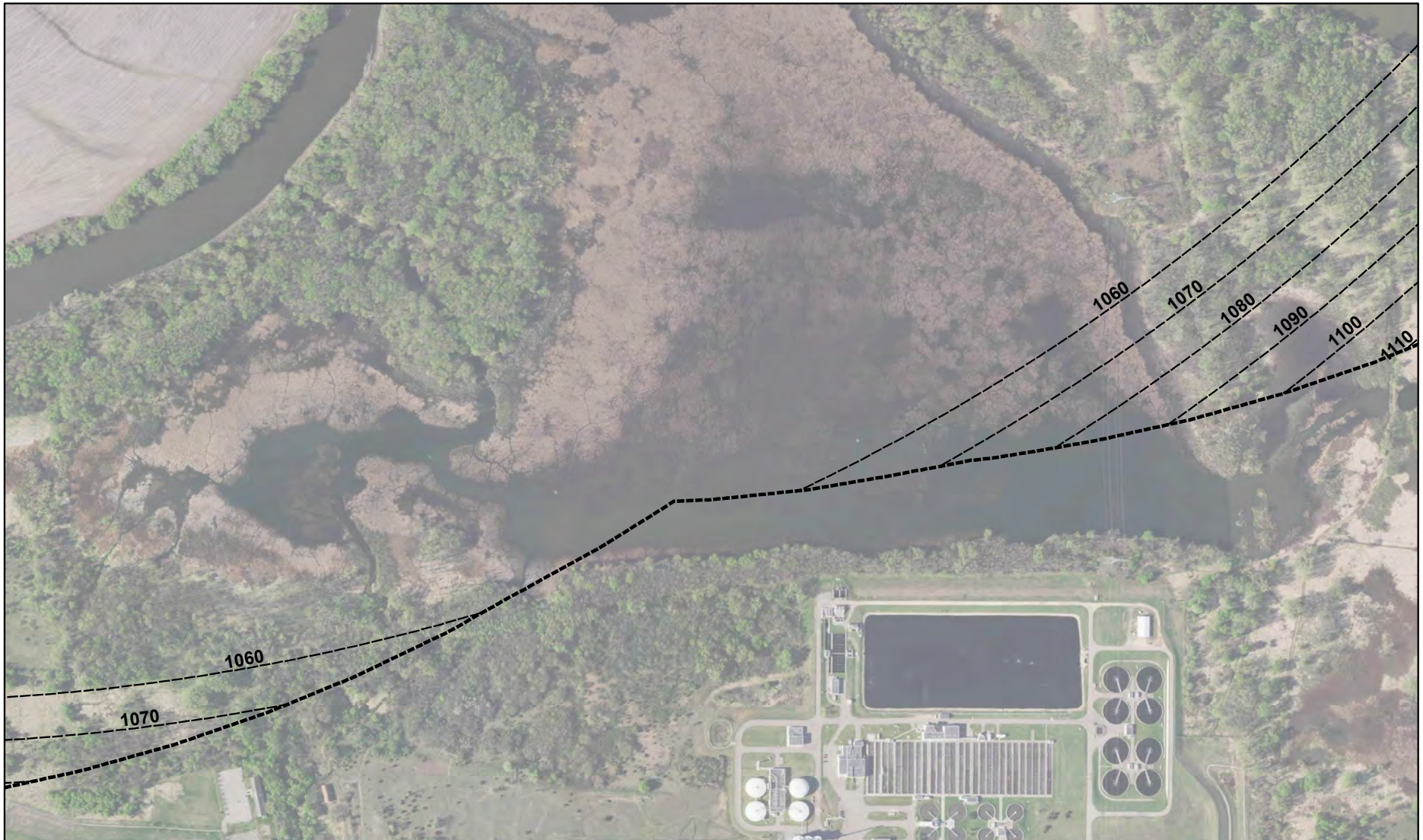
## FCM Airspace Zones Within Zoning Limits

**A - F4**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



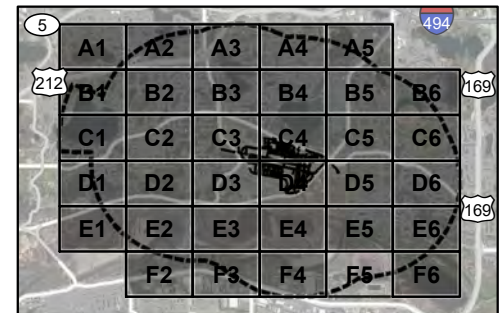
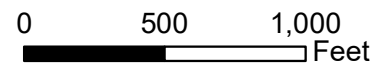
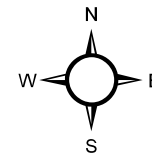


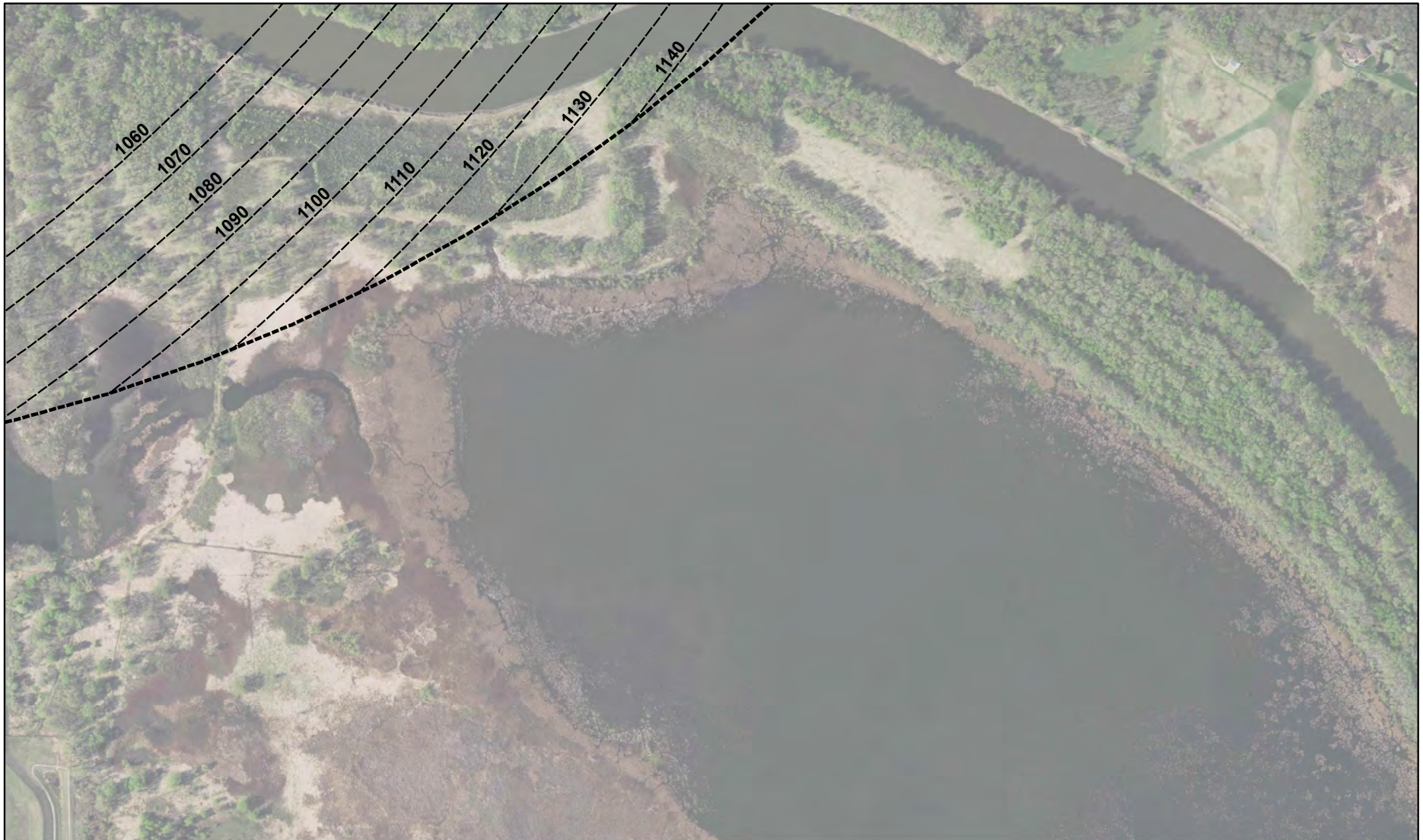
## FCM Airspace Zones Within Zoning Limits

**A - F5**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours




FCM Zoning Ordinance Update



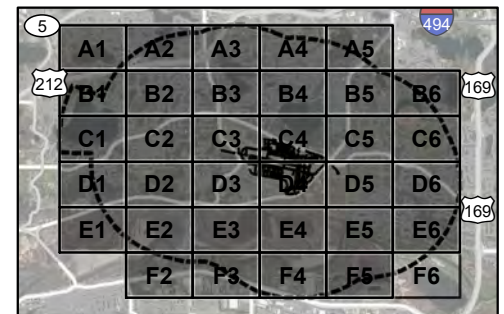
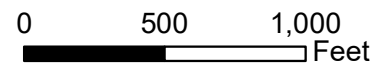
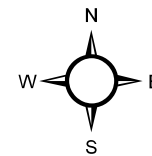


## FCM Airspace Zones Within Zoning Limits

**A - F6**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours

FCM Zoning Ordinance Update



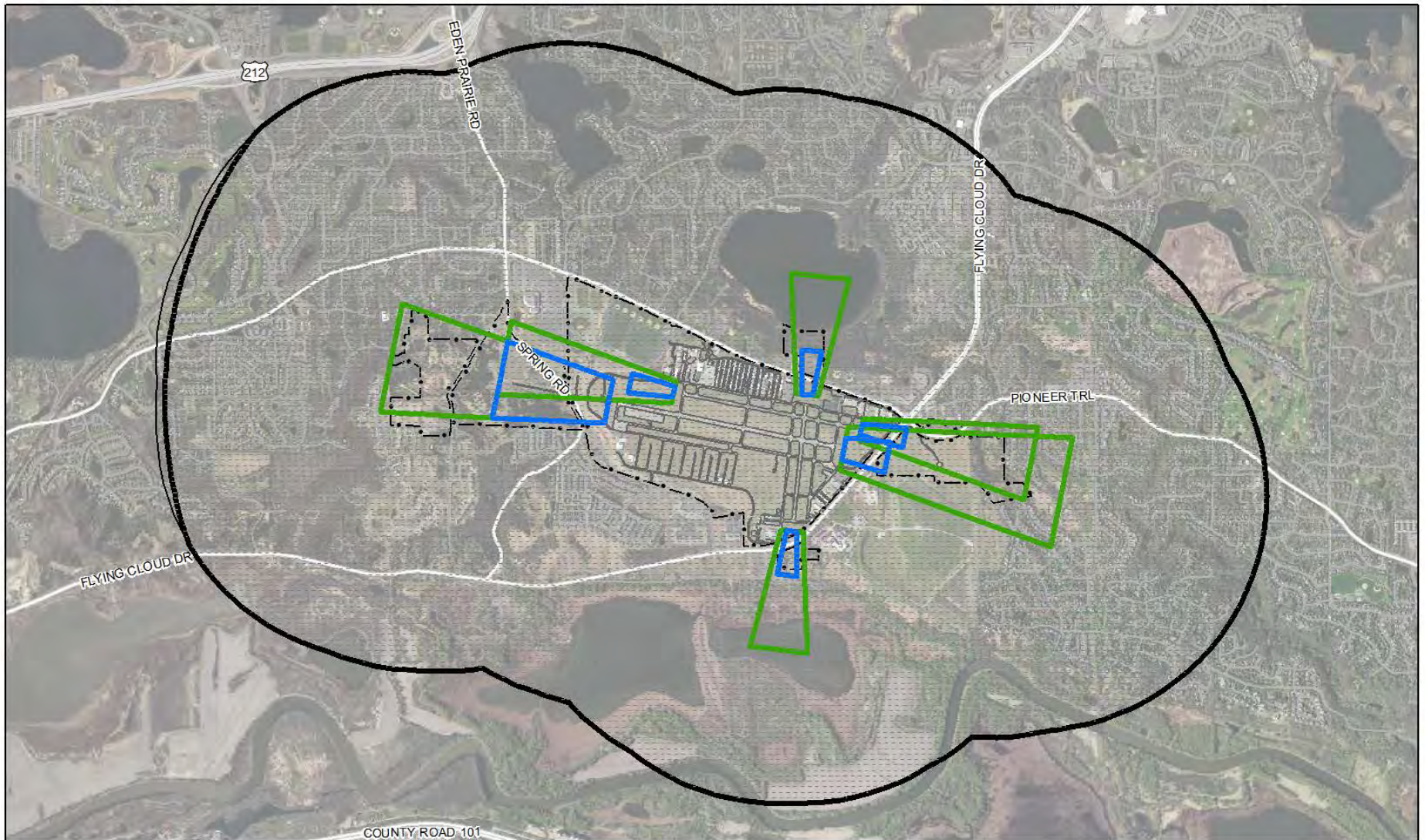
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**Appendix 9: FCM Safety Zone Grid Maps**




<b>Content</b>	<b>Page</b>
FCM Airspace Zones Within Zoning Limits - Index	9-1
FCM Airspace Zones Within Zoning Limits – Grid Maps A1 through F6	9-2

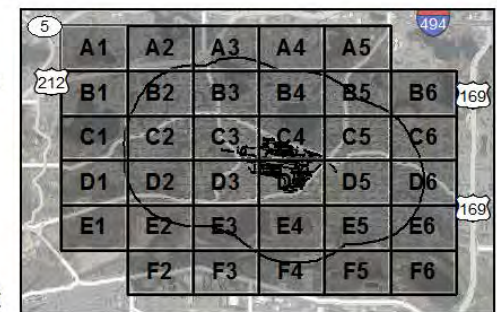
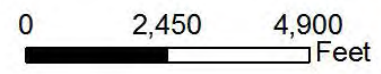
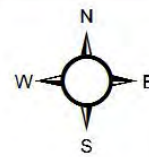
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## FCM Safety Zones Within Zoning Limits

### SZ - Index Sheet






-  FCM Property Line
-  JAZB Zone A
-  Safety Zoning Limit
-  JAZB Zone B
-  JAZB Zone C



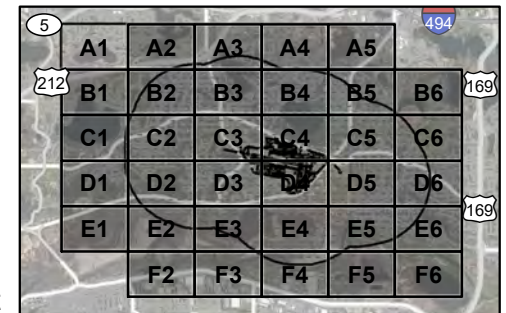
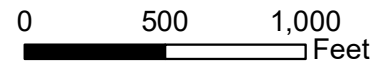
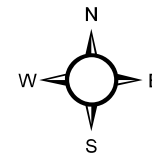


## FCM Safety Zones Within Zoning Limits

### SZ - A1

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



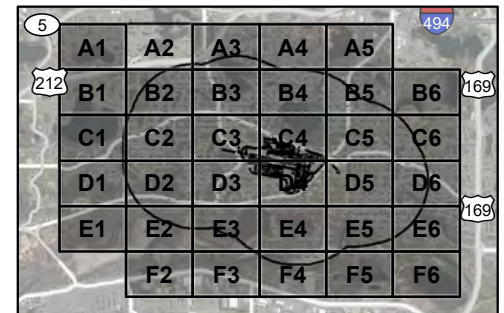
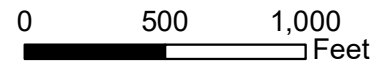
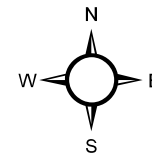


## FCM Safety Zones Within Zoning Limits

**SZ - A2**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

FCM Zoning Ordinance Update



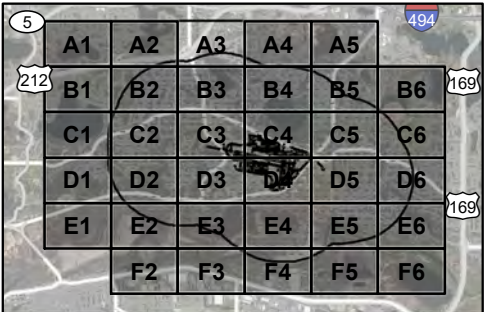
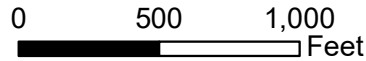
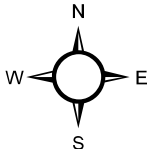


# FCM Safety Zones Within Zoning Limits

**SZ - A3**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

FCM Zoning Ordinance Update



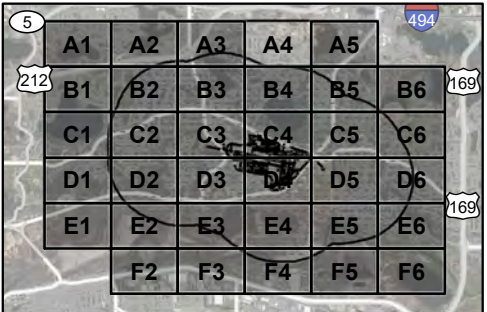
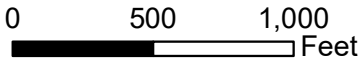
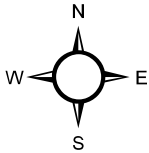


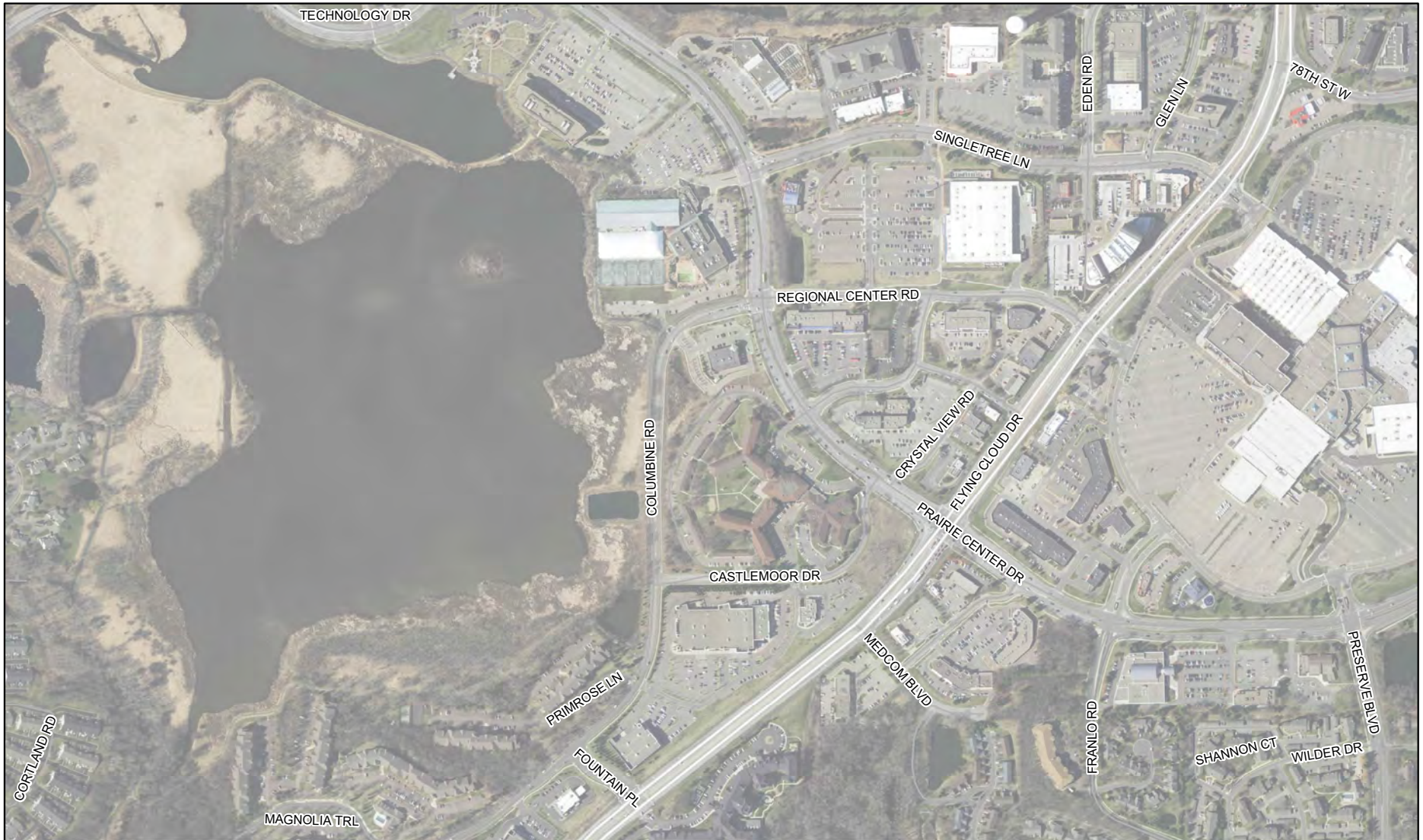
# FCM Safety Zones Within Zoning Limits

**SZ - A4**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



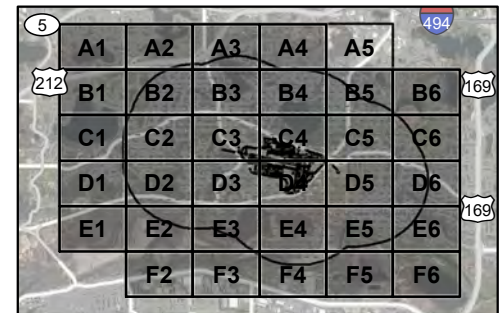
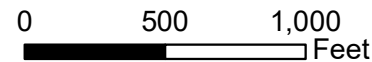
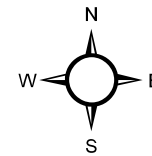


## FCM Safety Zones Within Zoning Limits

**SZ - A5**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

FCM Zoning Ordinance Update










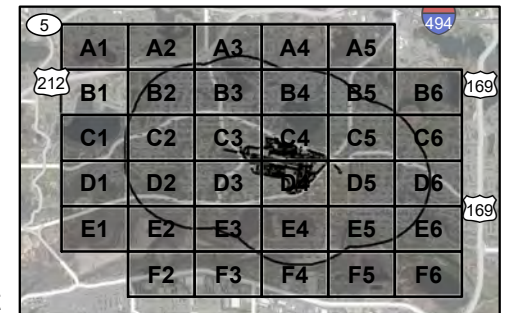
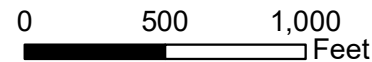
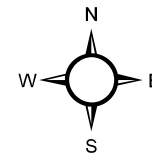


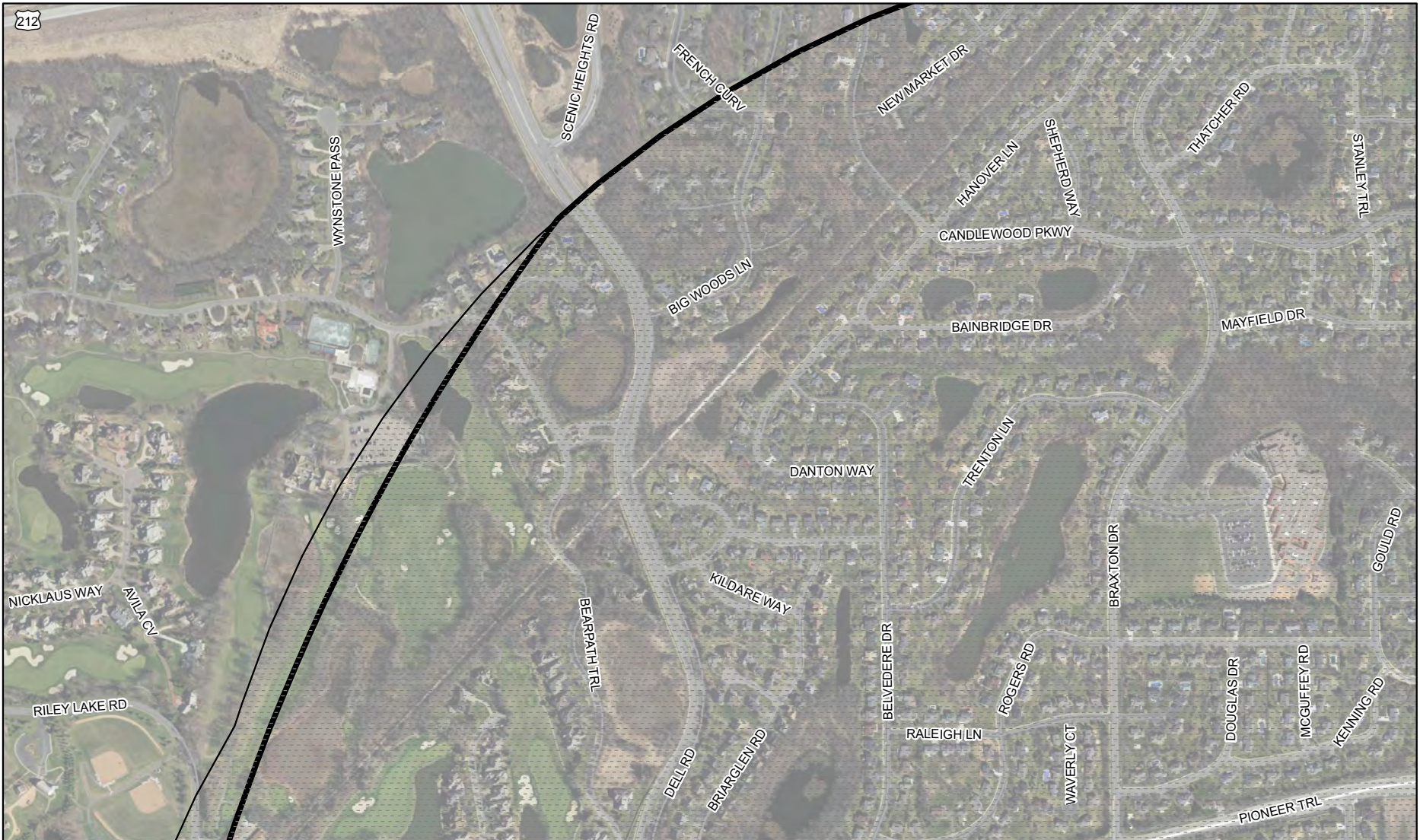
## FCM Safety Zones Within Zoning Limits

### SZ - B1

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



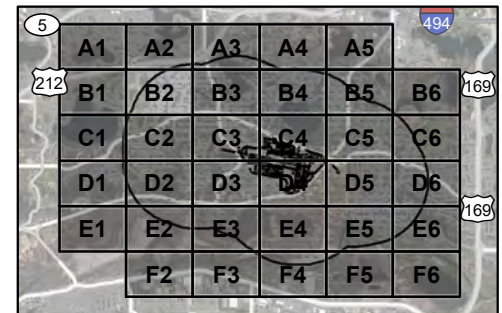
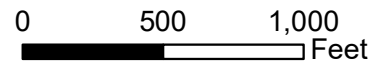
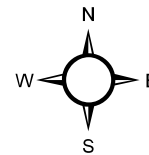


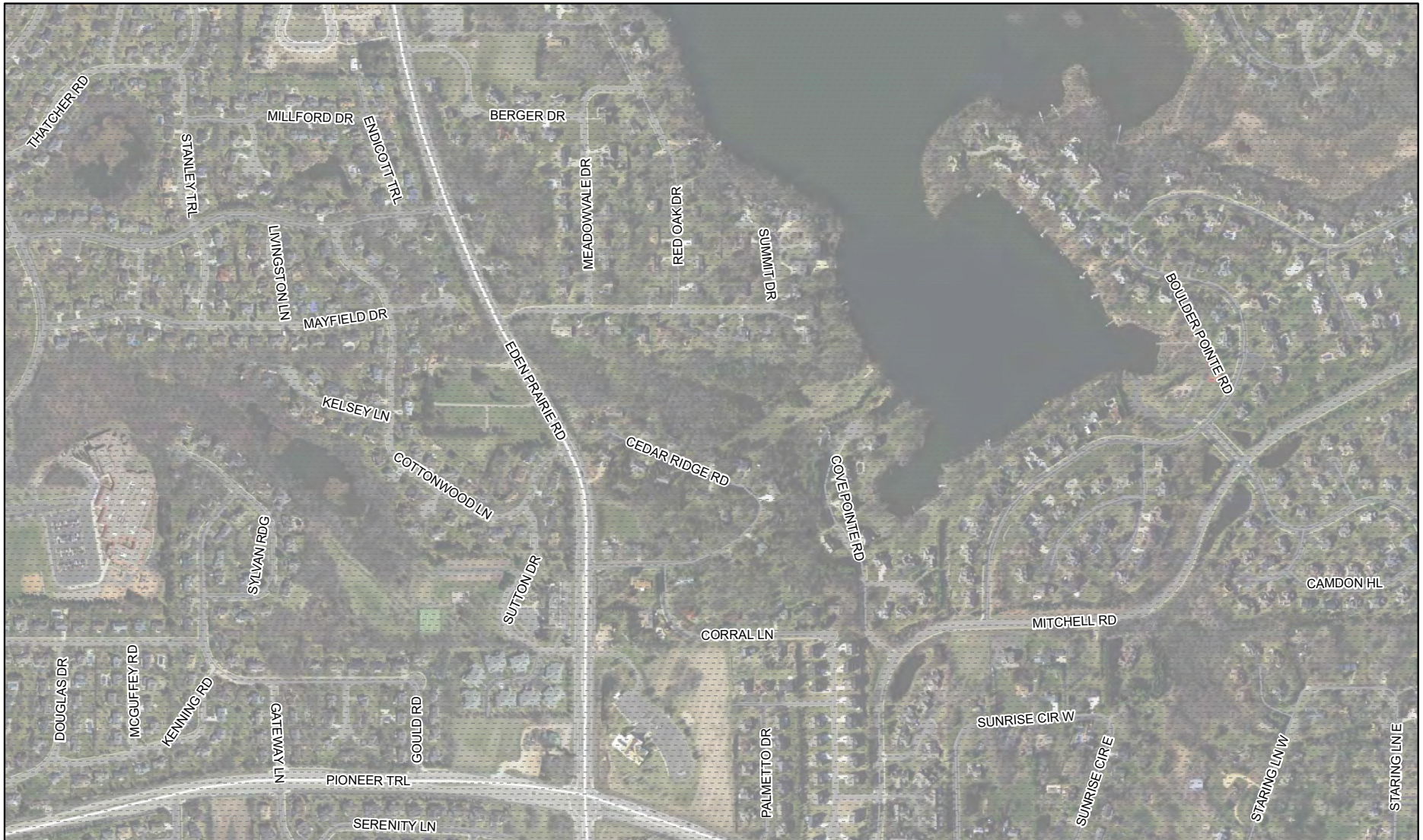
## FCM Safety Zones Within Zoning Limits

**SZ - B2**

-  FCM Property Line
-  Safety Zoning Limit
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C






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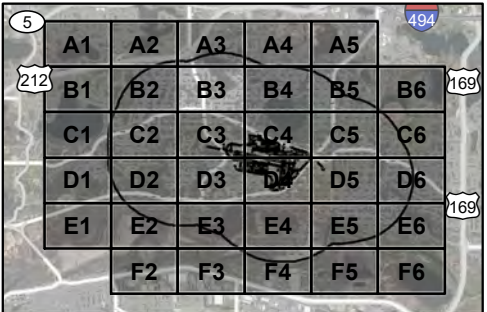
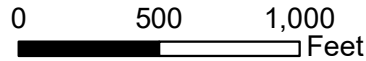
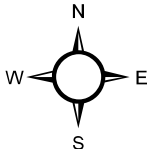


# FCM Safety Zones Within Zoning Limits

**SZ - B3**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



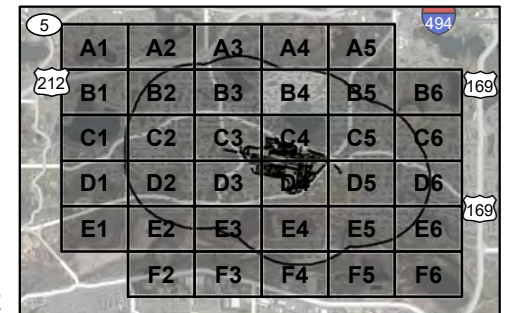
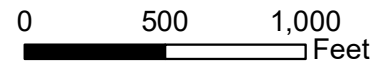
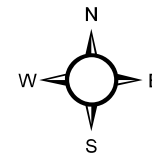


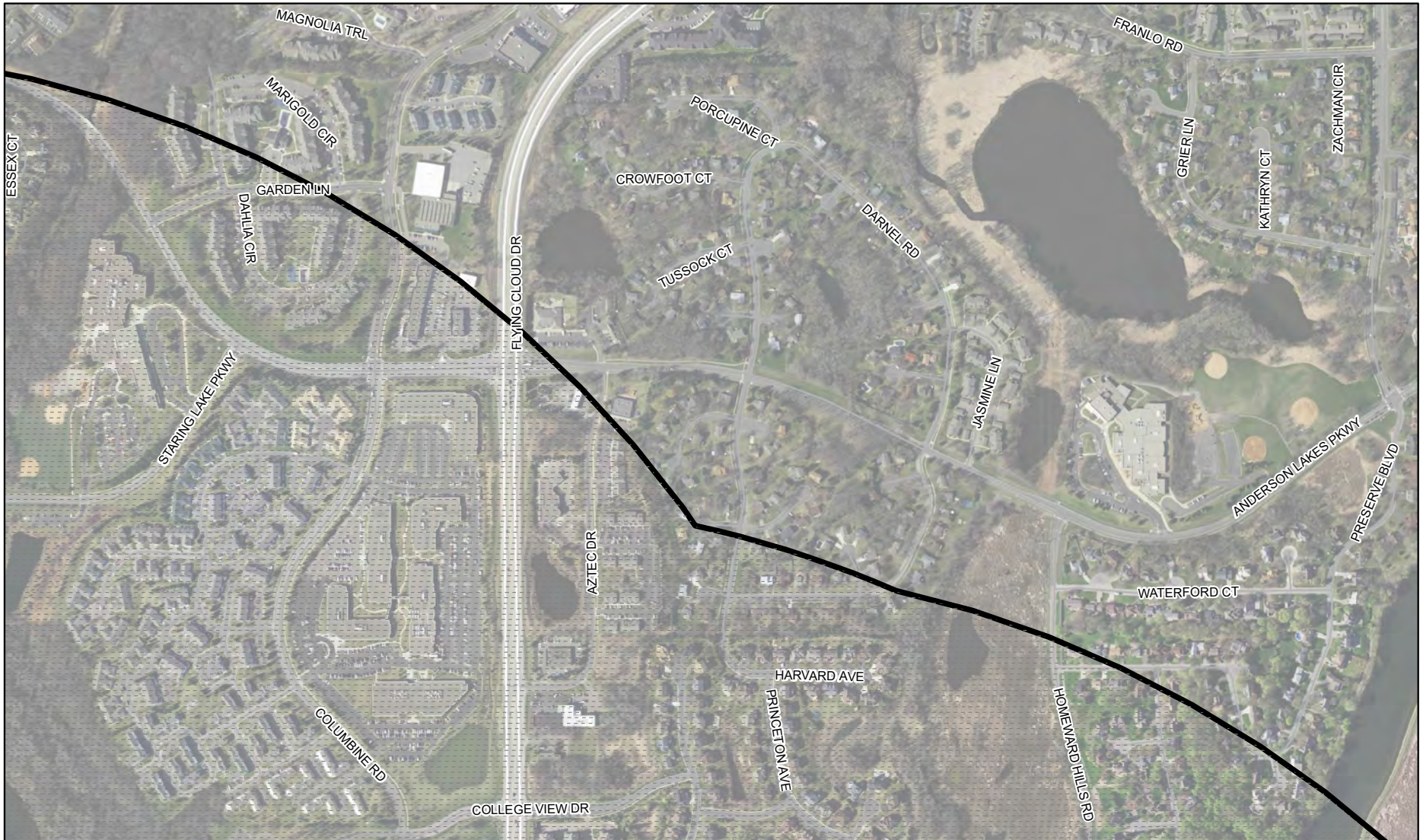
## FCM Safety Zones Within Zoning Limits

**SZ - B4**

-  FCM Property Line
-  Safety Zoning Limit
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C

FCM Zoning Ordinance Update



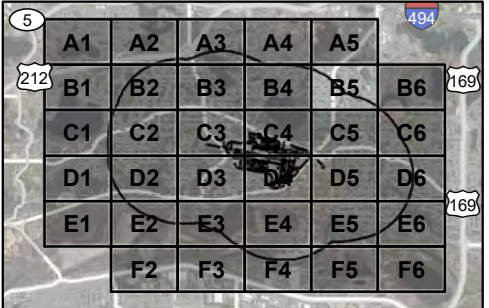
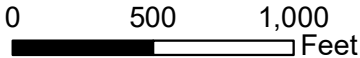
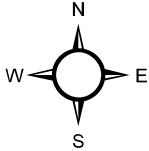


# FCM Safety Zones Within Zoning Limits

**SZ - B5**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



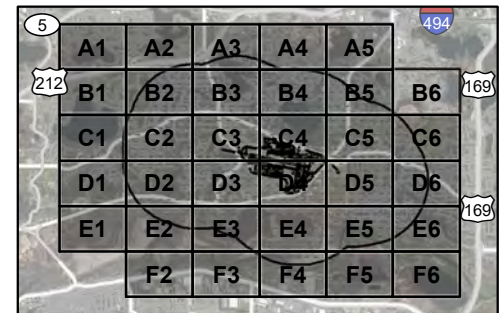
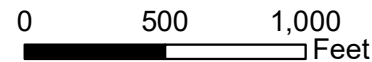
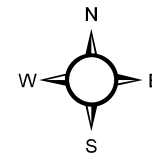


## FCM Safety Zones Within Zoning Limits

SZ - B6

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



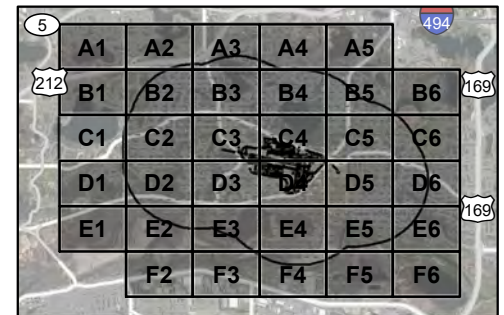
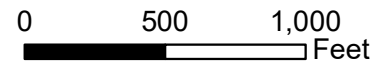
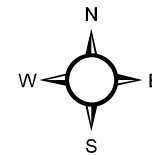


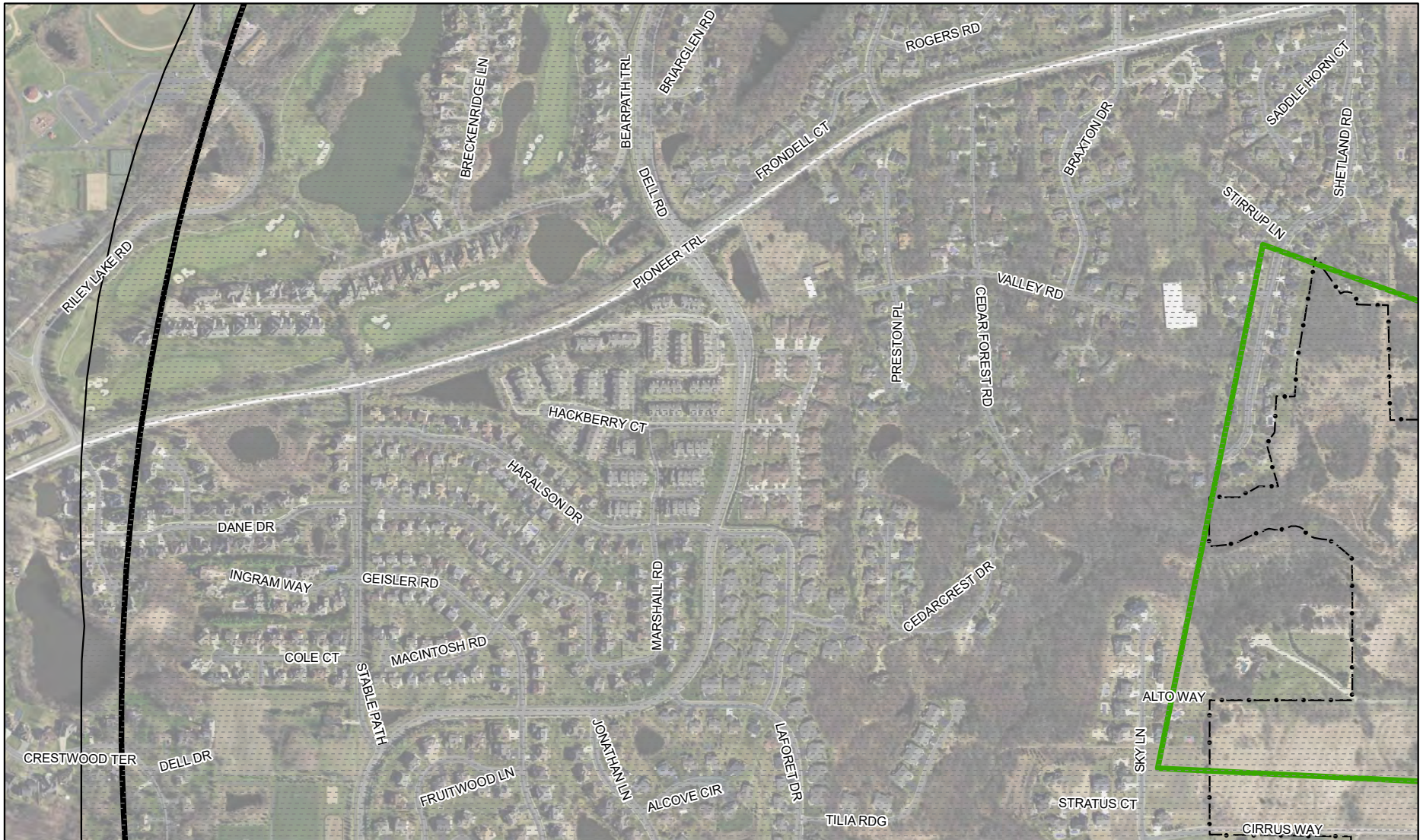
## FCM Safety Zones Within Zoning Limits

**SZ - C1**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update

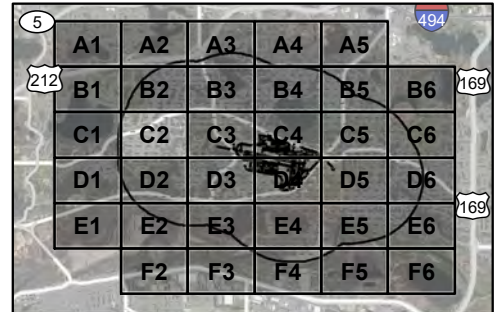
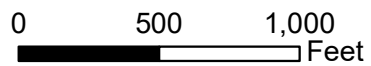
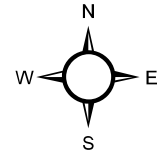




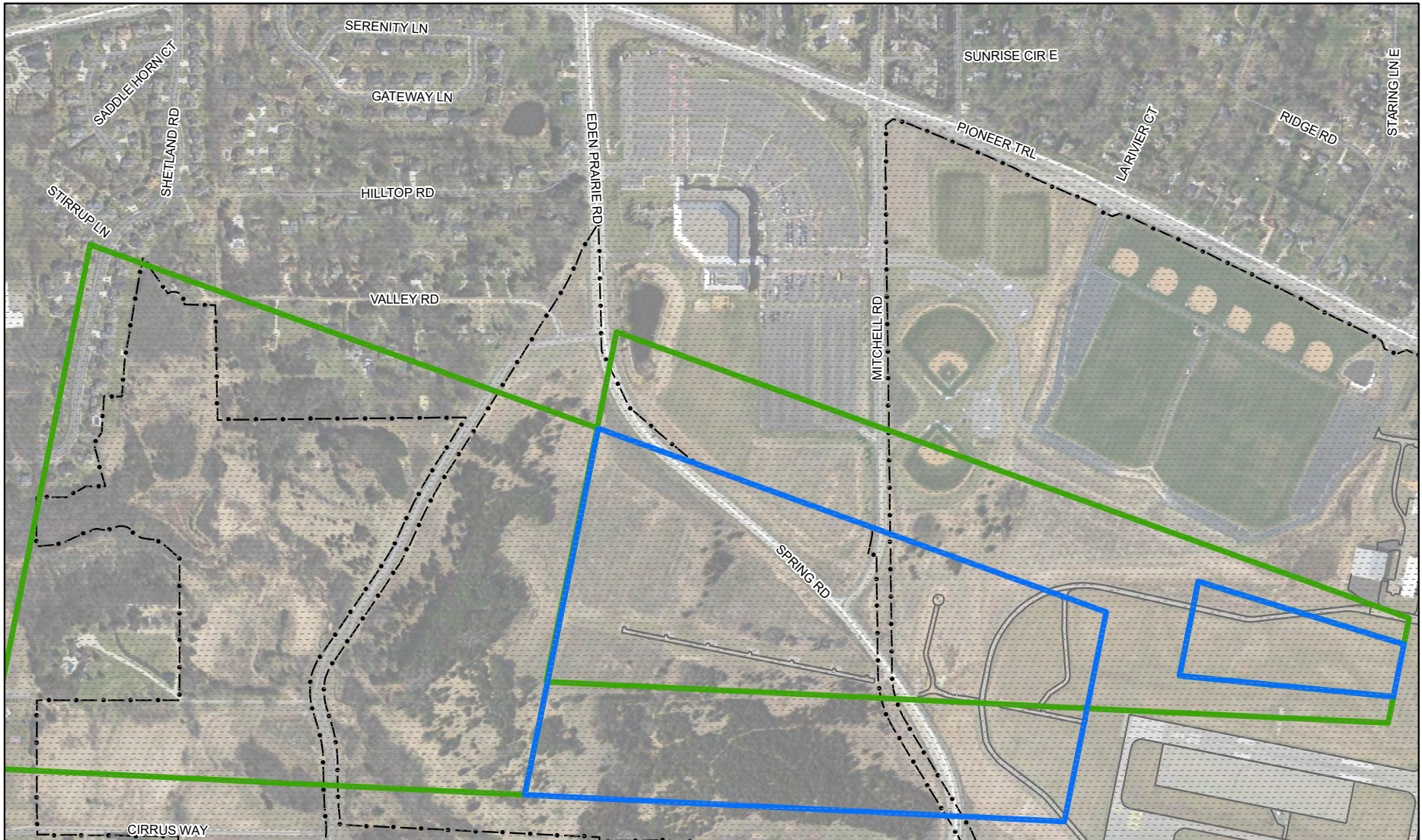
# FCM Safety Zones Within Zoning Limits

SZ - C2

-  FCM Property Line
-  Safety Zoning Limit
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C










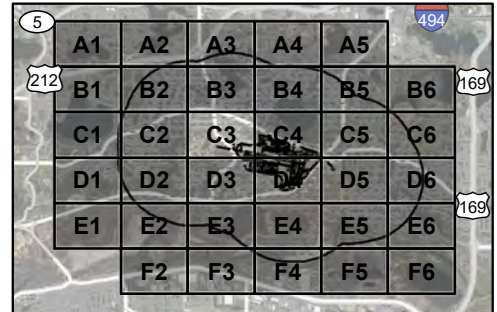
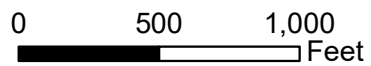
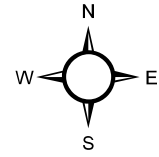


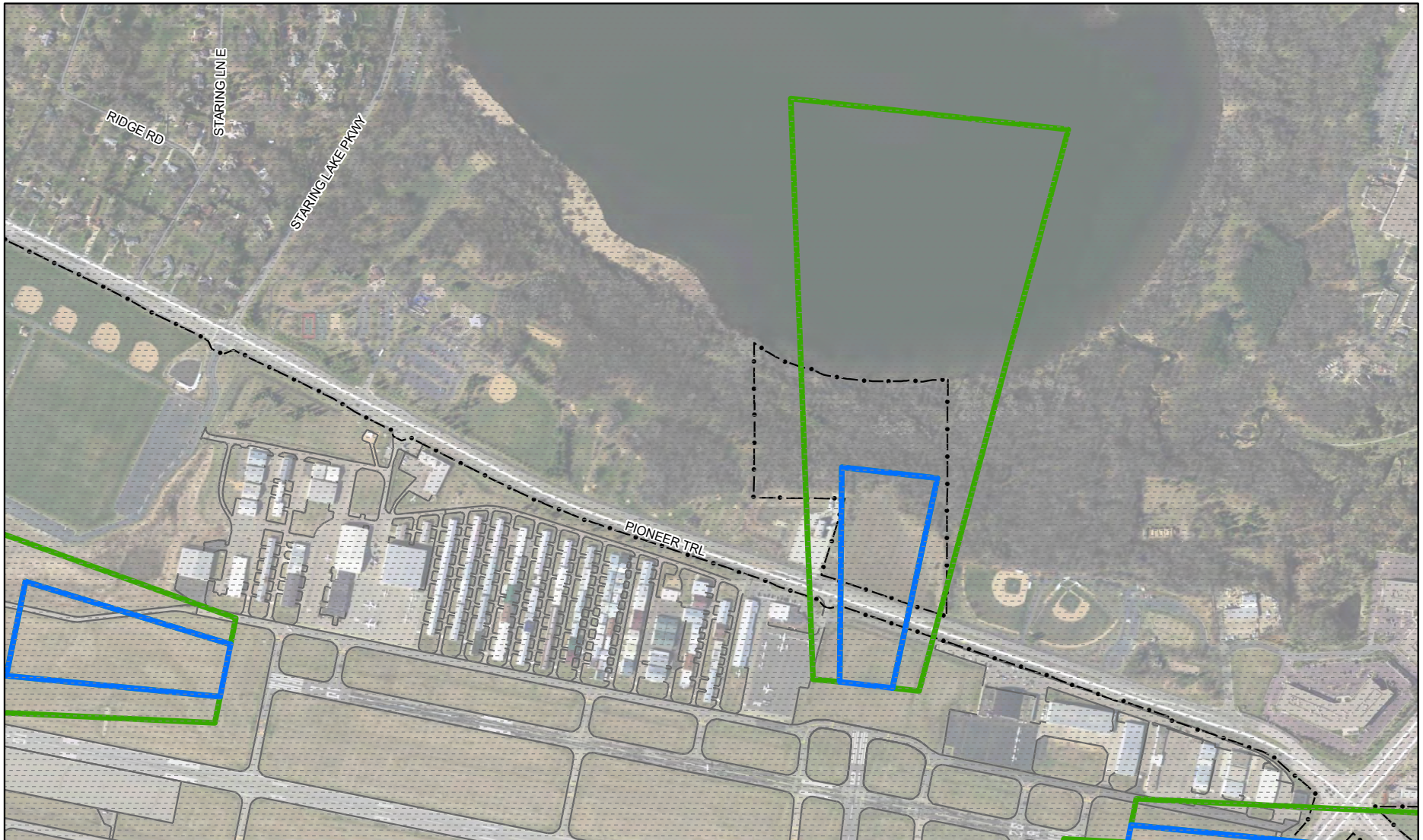
## FCM Safety Zones Within Zoning Limits

**SZ - C3**

-  FCM Property Line
-  Safety Zoning Limit
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C






FCM Zoning Ordinance Update



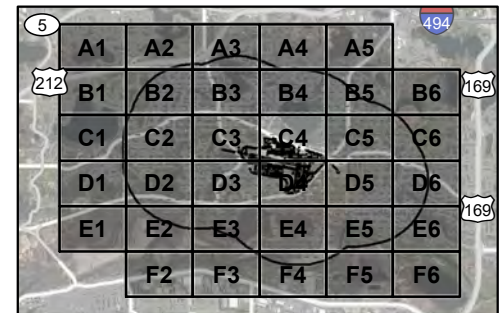
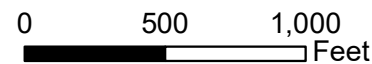
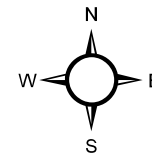


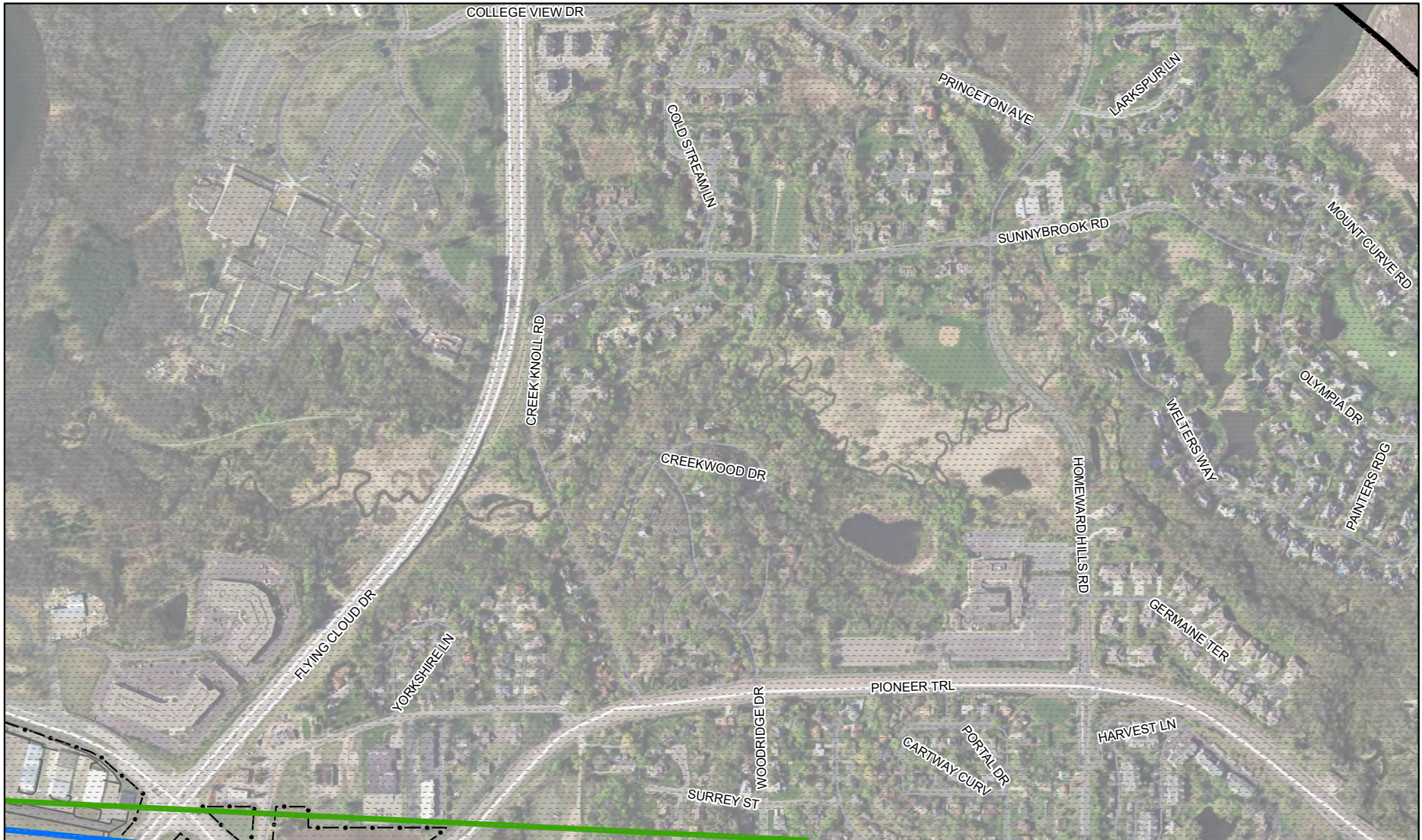
## FCM Safety Zones Within Zoning Limits

**SZ - C4**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  Safety Zoning Limit
-  JAZB Zone C






FCM Zoning Ordinance Update



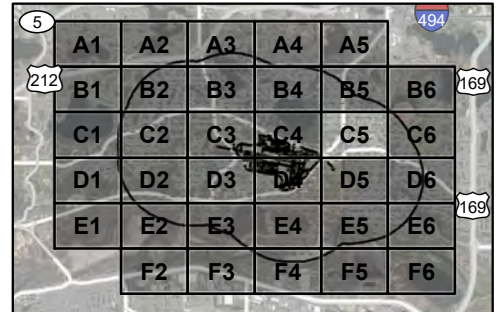
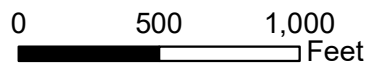
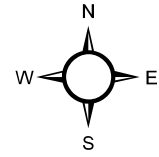


### FCM Safety Zones Within Zoning Limits

SZ - C5

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



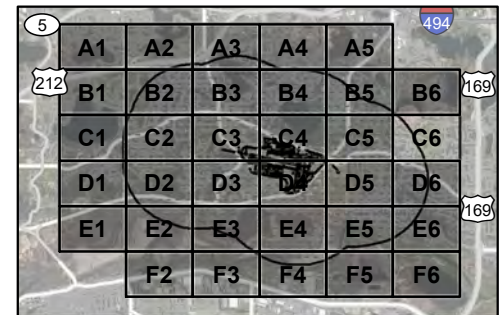
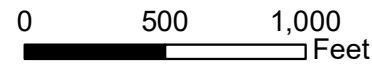
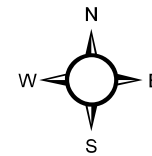


## FCM Safety Zones Within Zoning Limits

**SZ - C6**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



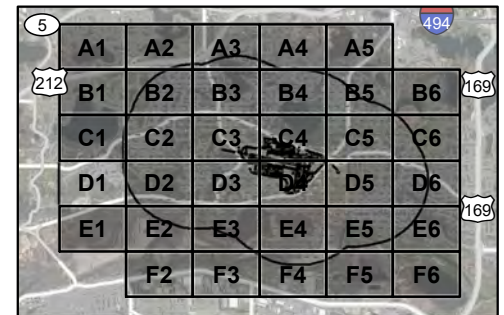
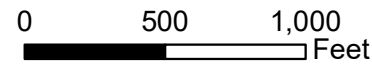
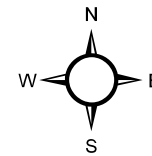


## FCM Safety Zones Within Zoning Limits

**SZ - D1**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



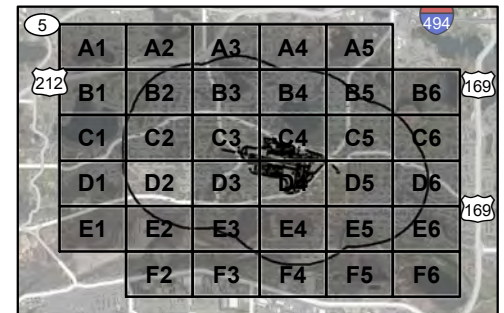
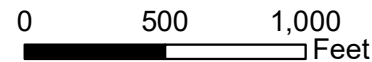
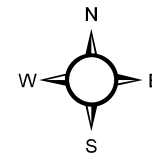


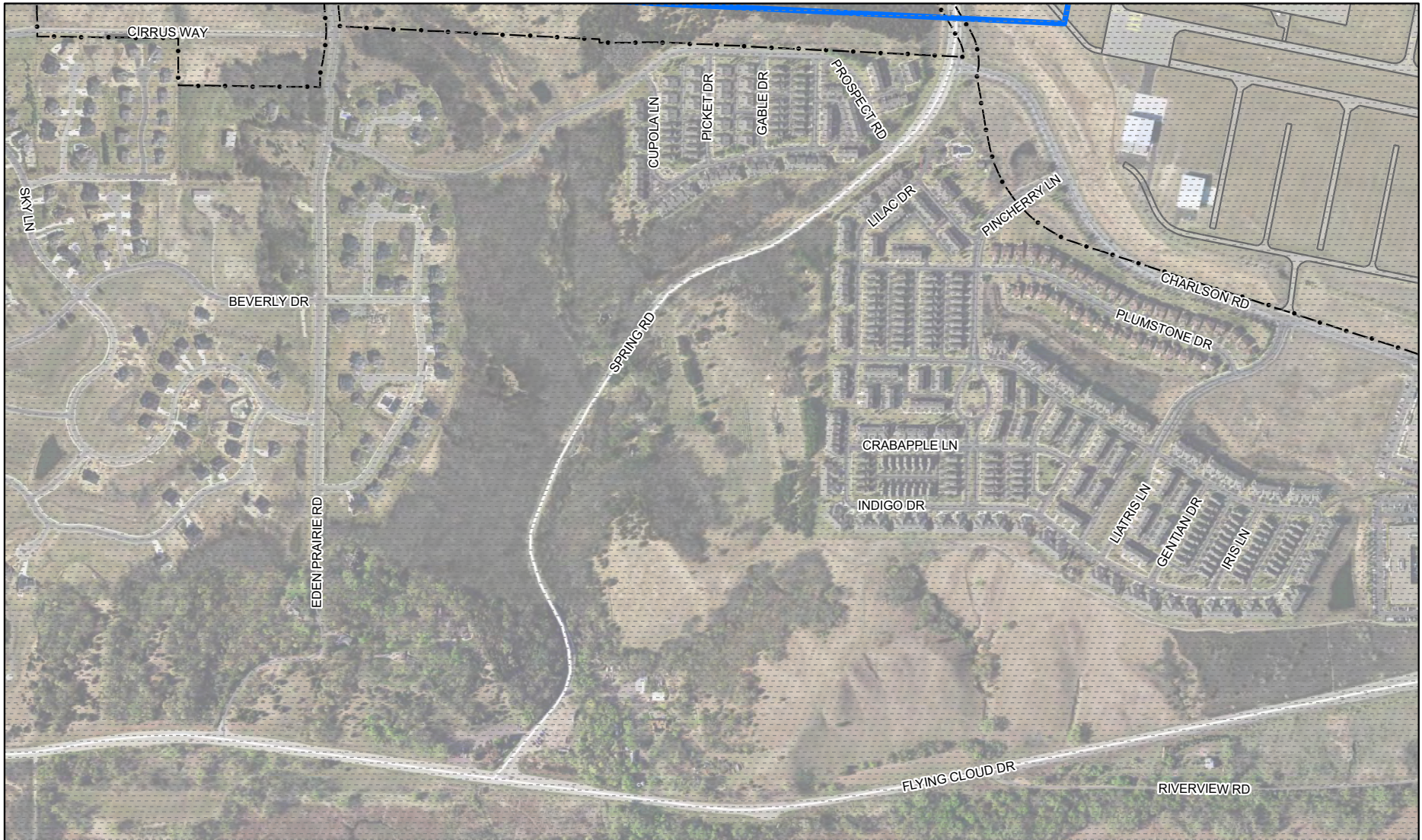
## FCM Safety Zones Within Zoning Limits

**SZ - D2**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



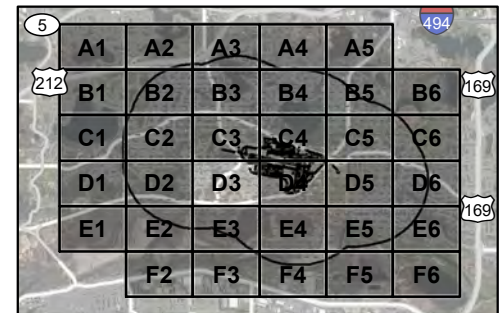
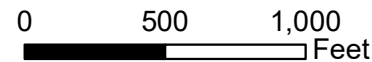
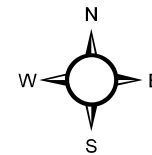


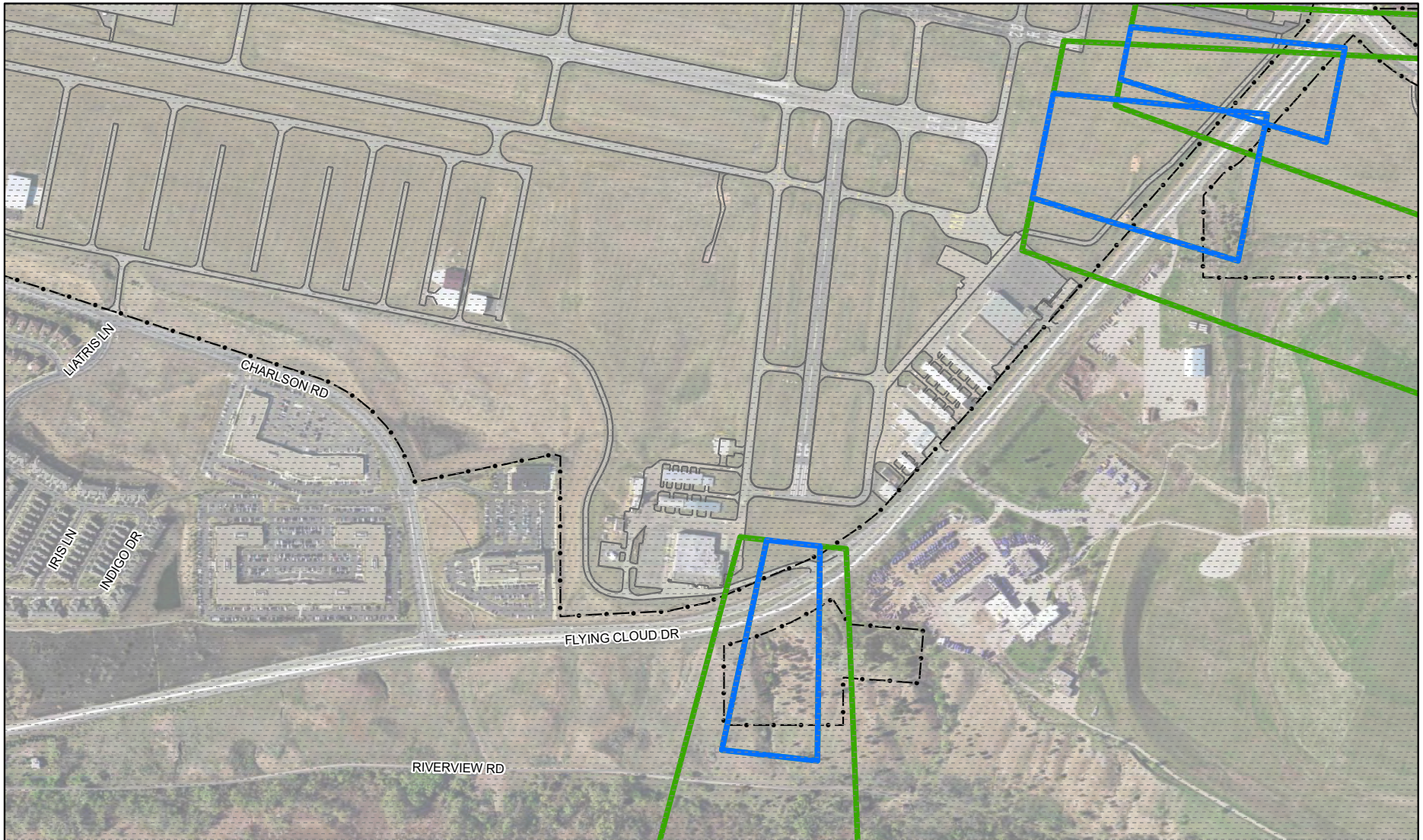
## FCM Safety Zones Within Zoning Limits

**SZ - D3**

-  FCM Property Line
-  JAZB Zone A
-  Safety Zoning Limit
-  JAZB Zone B
-  JAZB Zone C






FCM Zoning Ordinance Update



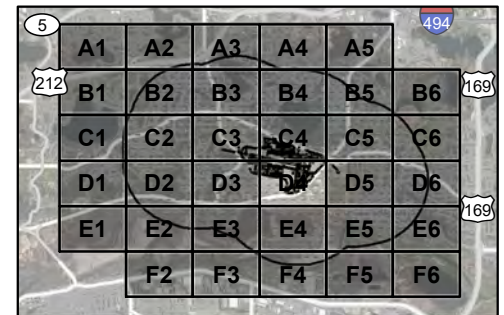
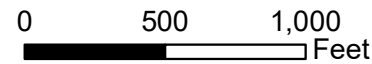
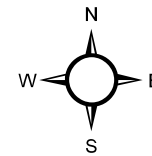


## FCM Safety Zones Within Zoning Limits

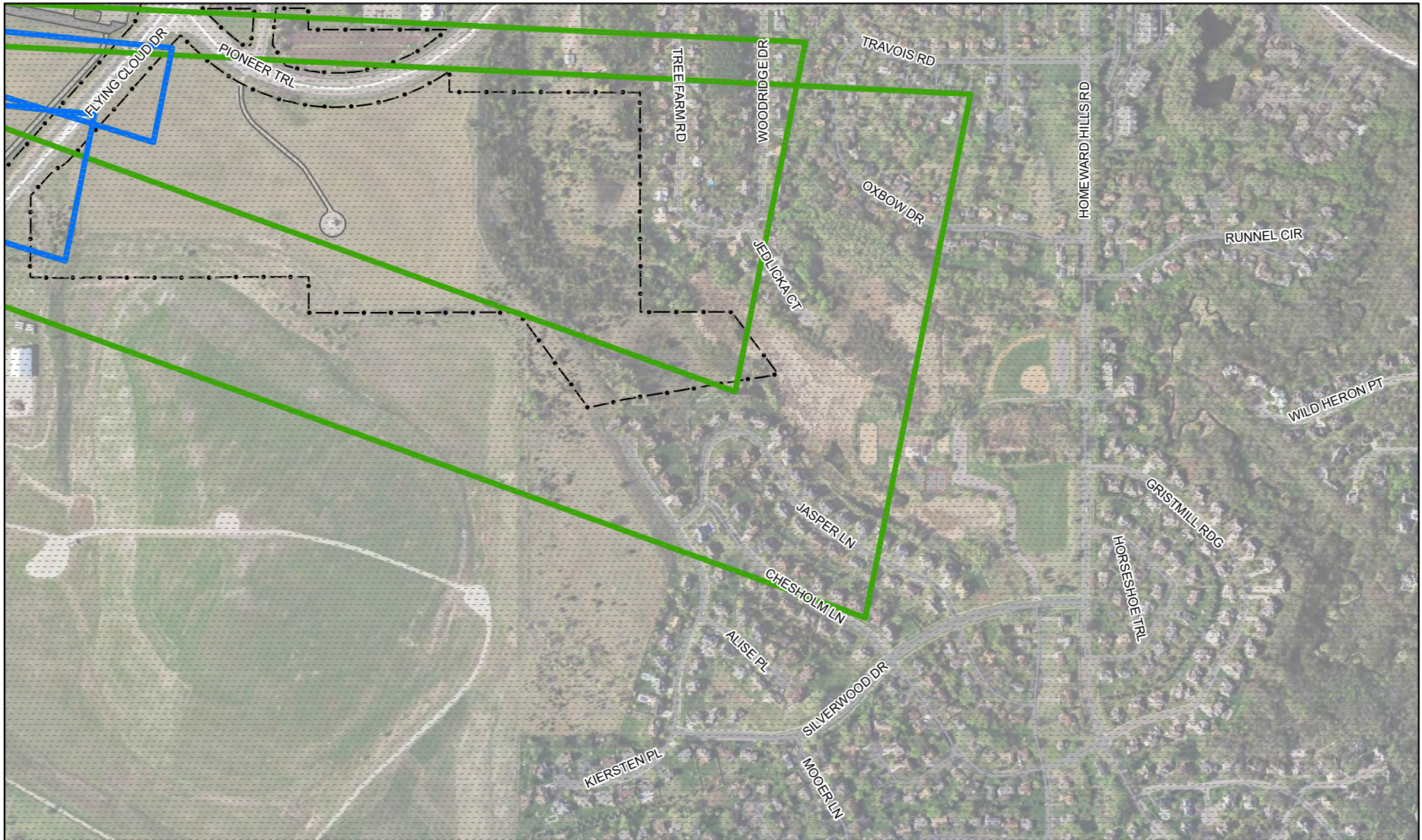
SZ - D4

-  FCM Property Line
-  Safety Zoning Limit
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C

FCM Zoning Ordinance Update





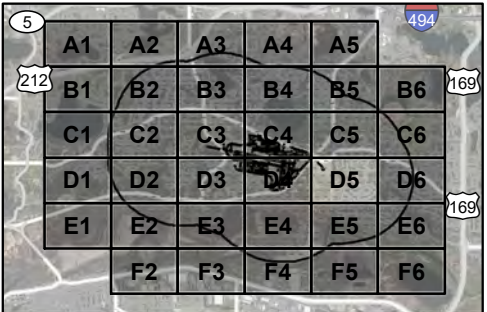
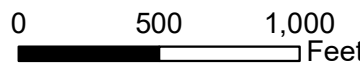
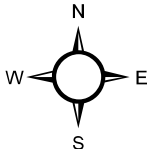


# FCM Safety Zones Within Zoning Limits

**SZ - D5**

-  FCM Property Line
-  JAZB Zone A
-  Safety Zoning Limit
-  JAZB Zone B
-  JAZB Zone C






FCM Zoning Ordinance Update



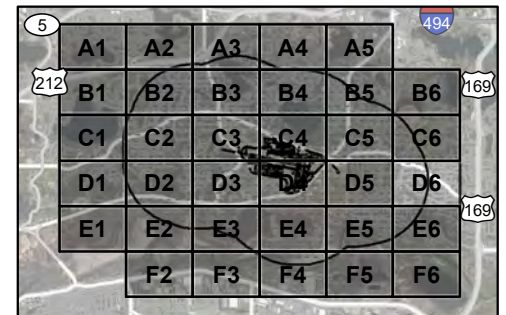
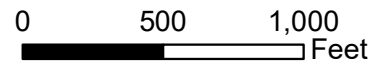
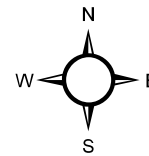


## FCM Safety Zones Within Zoning Limits

**SZ - D6**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

FCM Zoning Ordinance Update



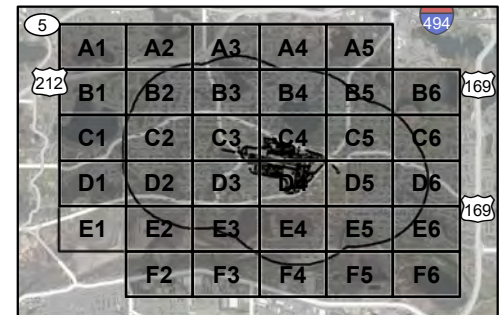
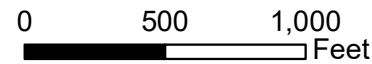
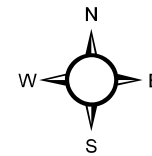


## FCM Safety Zones Within Zoning Limits

**SZ - E1**

- FCM Property Line
  JAZB Zone A
- Safety Zoning Limit
  JAZB Zone B
- JAZB Zone C






FCM Zoning Ordinance Update



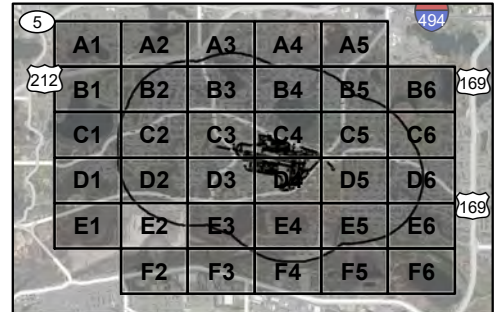
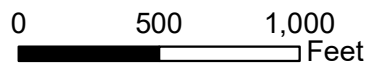
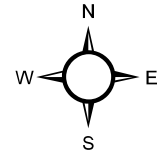


## FCM Safety Zones Within Zoning Limits

### SZ - E2

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



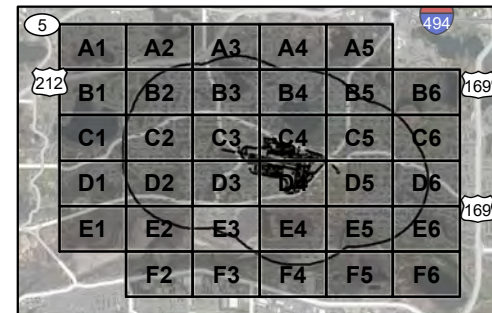
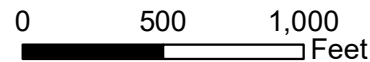
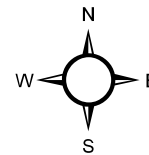


## FCM Safety Zones Within Zoning Limits

**SZ - E3**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update

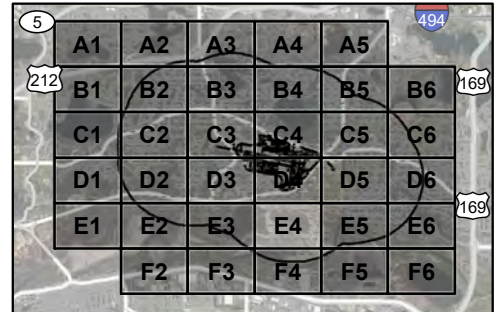
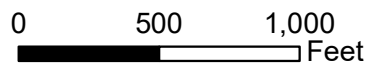
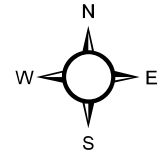




### FCM Safety Zones Within Zoning Limits

SZ - E4






-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit



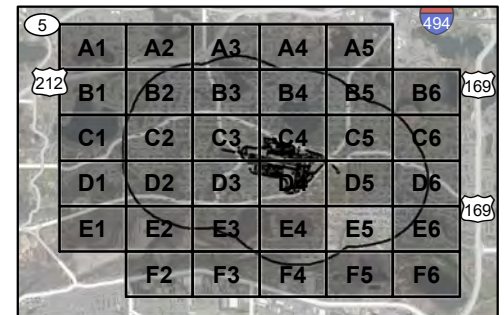
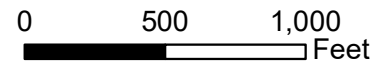
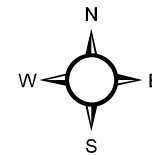


## FCM Safety Zones Within Zoning Limits

**SZ - E5**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



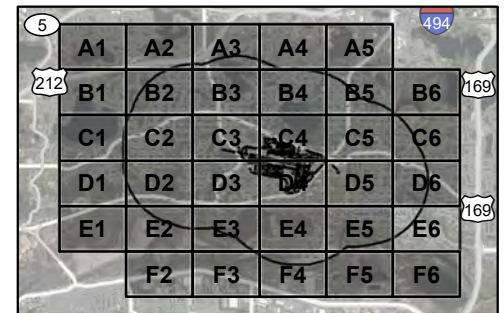
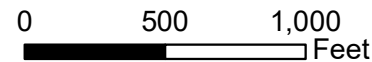
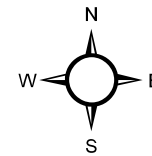


## FCM Safety Zones Within Zoning Limits

**SZ - E6**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

FCM Zoning Ordinance Update










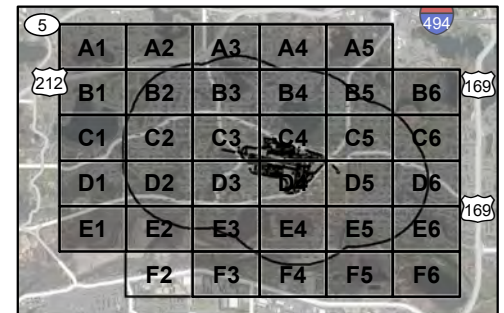
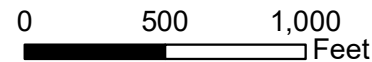
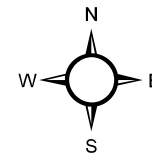


## FCM Safety Zones Within Zoning Limits

SZ - F2

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



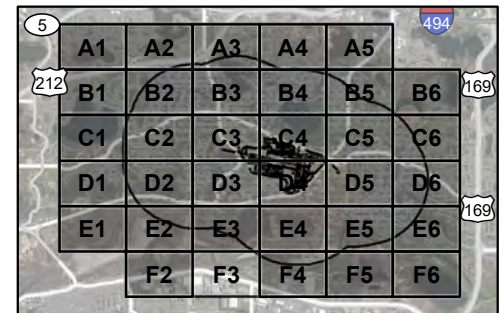
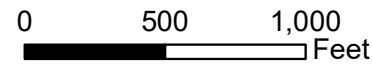
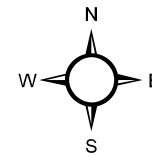


## FCM Safety Zones Within Zoning Limits

SZ - F3

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit






FCM Zoning Ordinance Update



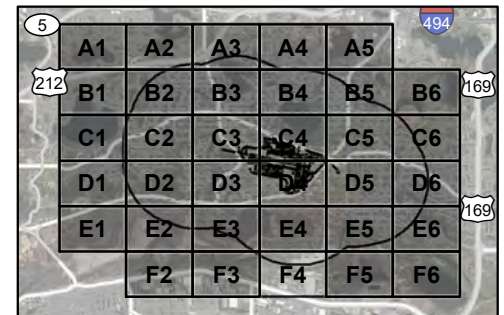
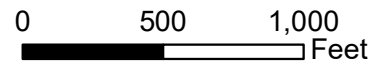
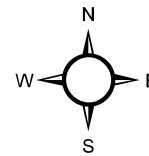


## FCM Safety Zones Within Zoning Limits

**SZ - F4**

-  FCM Property Line
-  JAZB Zone A
-  JAZB Zone B
-  JAZB Zone C
-  Safety Zoning Limit

FCM Zoning Ordinance Update



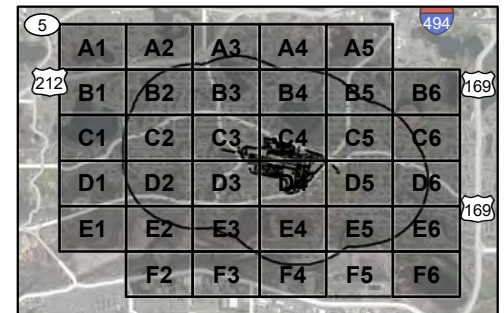
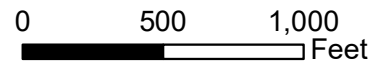
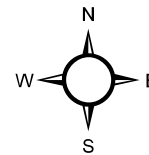


## FCM Safety Zones Within Zoning Limits

**SZ - F5**

- FCM Property Line
  JAZB Zone A
- Safety Zoning Limit
  JAZB Zone B
- JAZB Zone C

FCM Zoning Ordinance Update



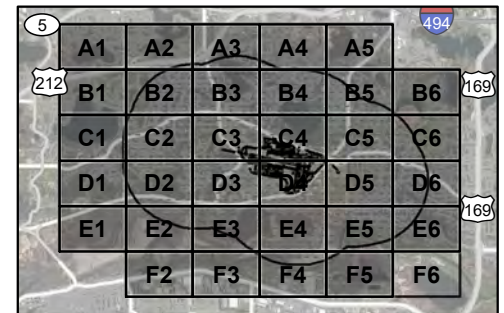
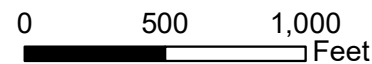
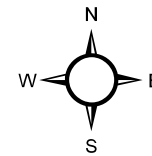


## FCM Safety Zones Within Zoning Limits

**SZ - F6**

- FCM Property Line
  JAZB Zone A
- Safety Zoning Limit
  JAZB Zone B
- JAZB Zone C

FCM Zoning Ordinance Update



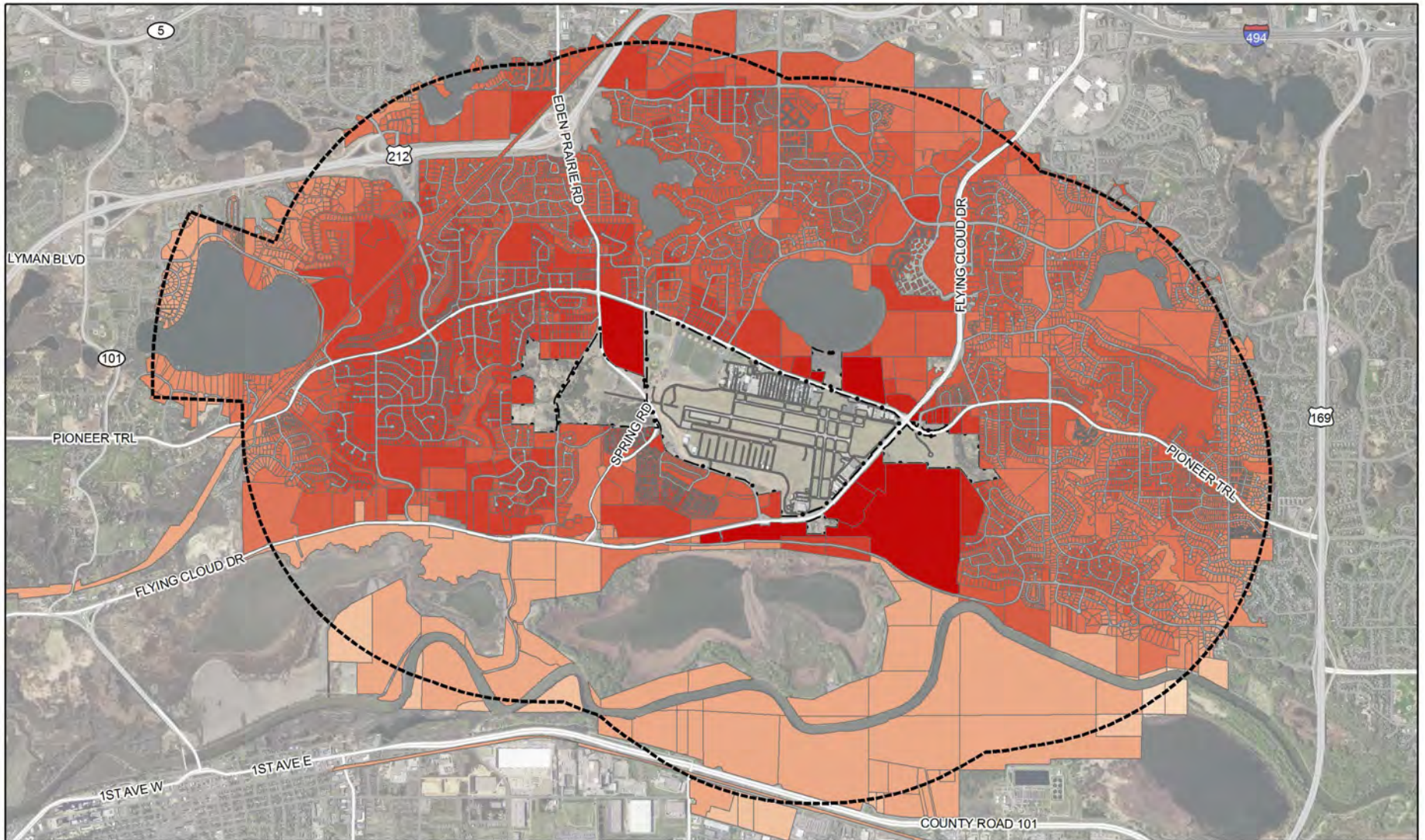
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**Appendix 10: FCM Maximum Construction Height Without Permit Grid Maps**

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FCM Maximum Construction Heights Without Permit – Index	10-1
FCM Maximum Construction Heights Without Permit – Grid Maps A1 through F6	10-2

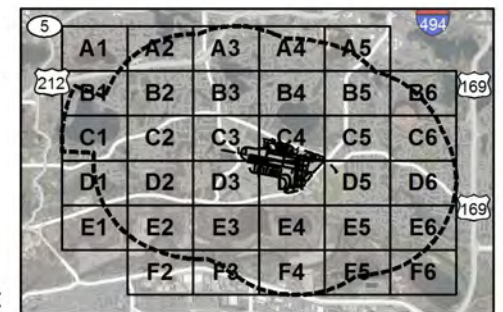
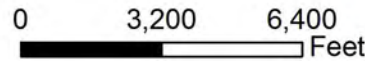
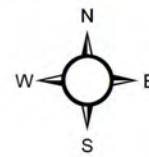
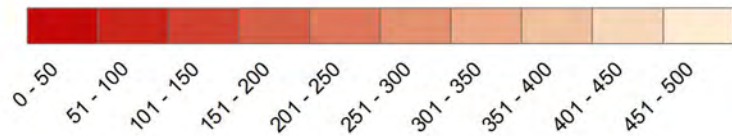
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# FCM Maximum Construction Heights Without Permit Within Zoning Limits

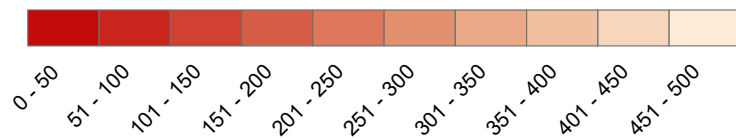
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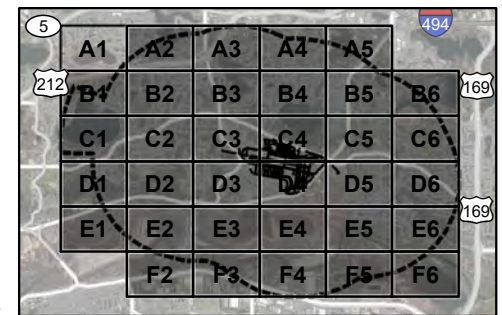
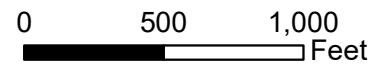
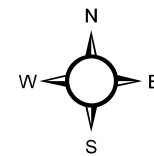


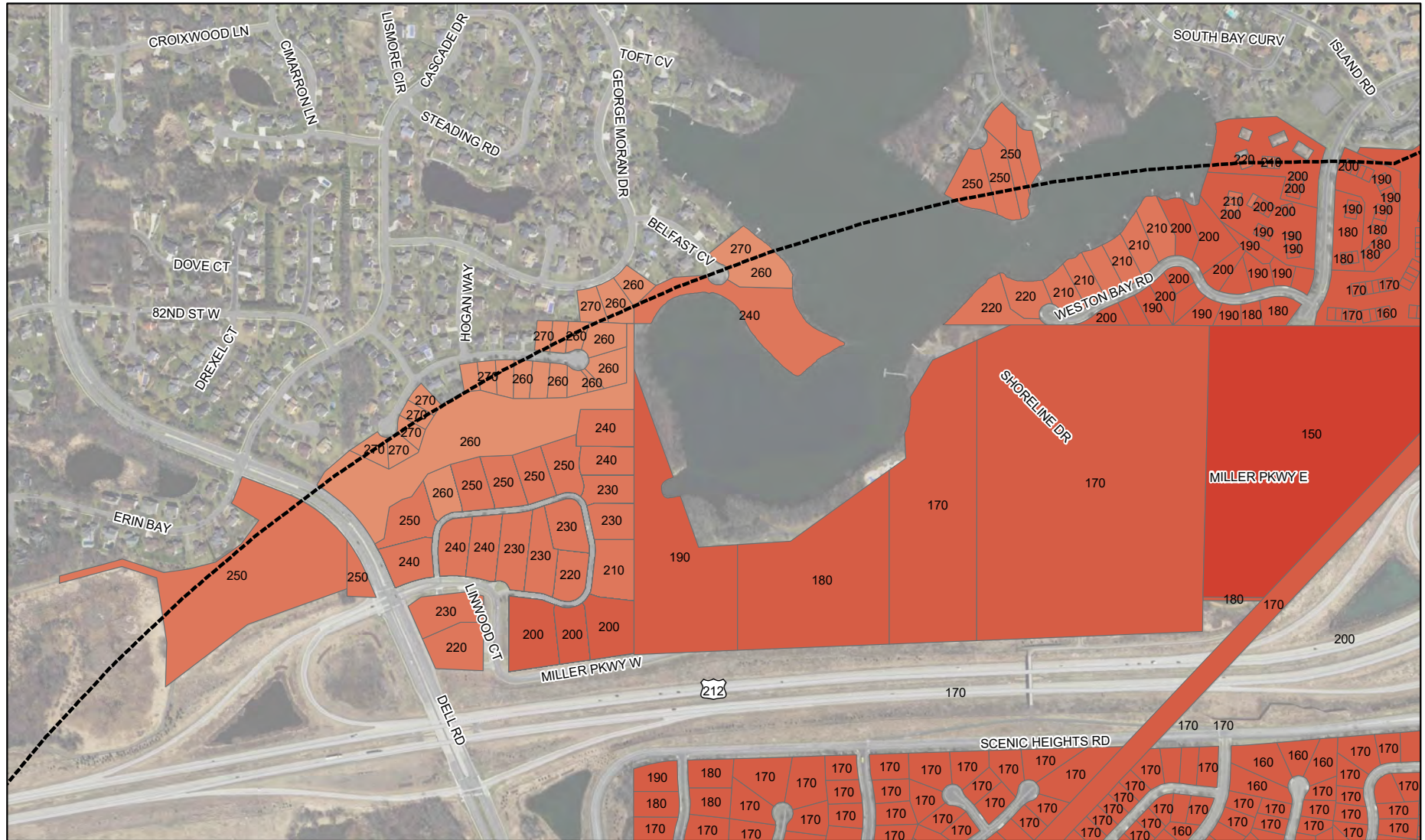
## FCM Maximum Construction Heights Without Permit Within Zoning Limits

MCH - A1



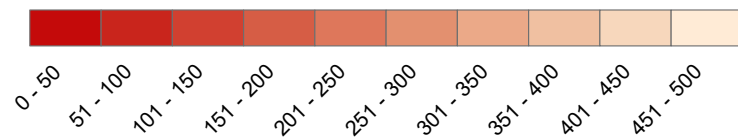
FCM Zoning Ordinance Update



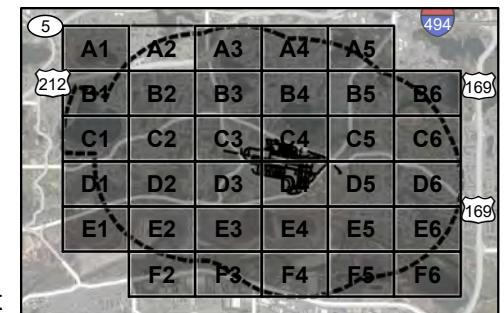
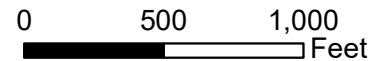
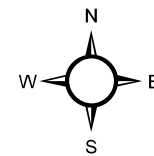


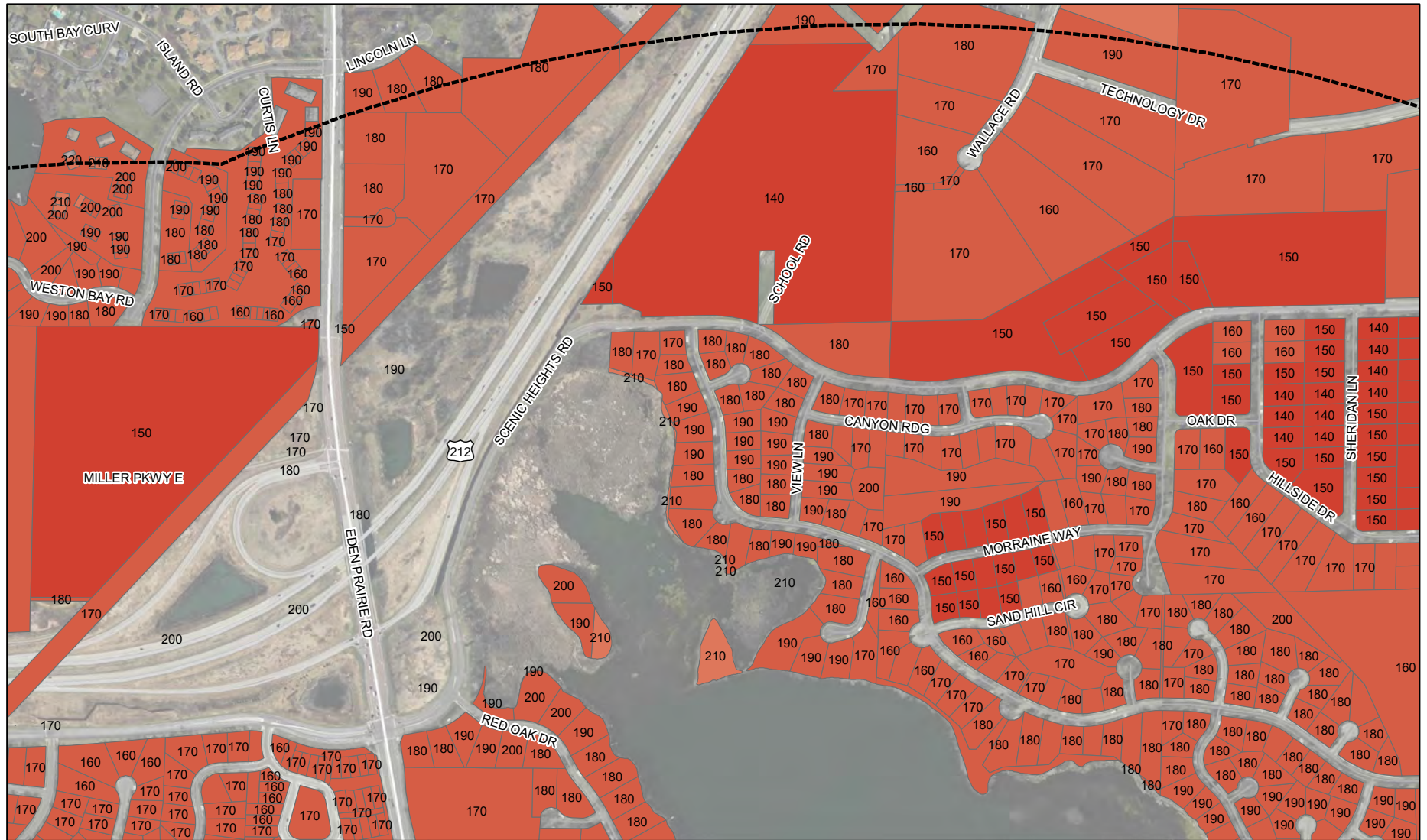
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MCH - A2



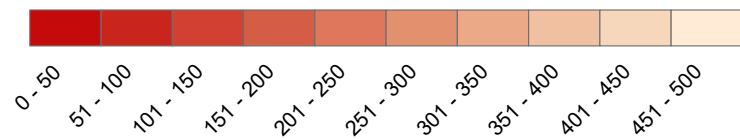
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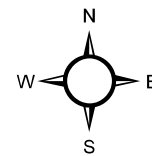


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

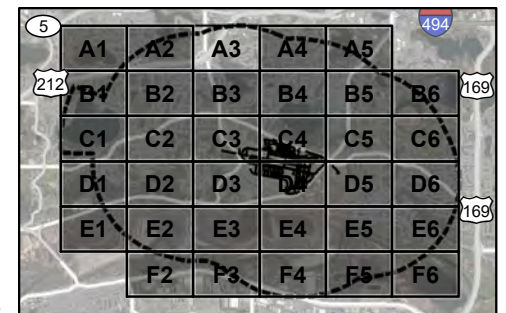
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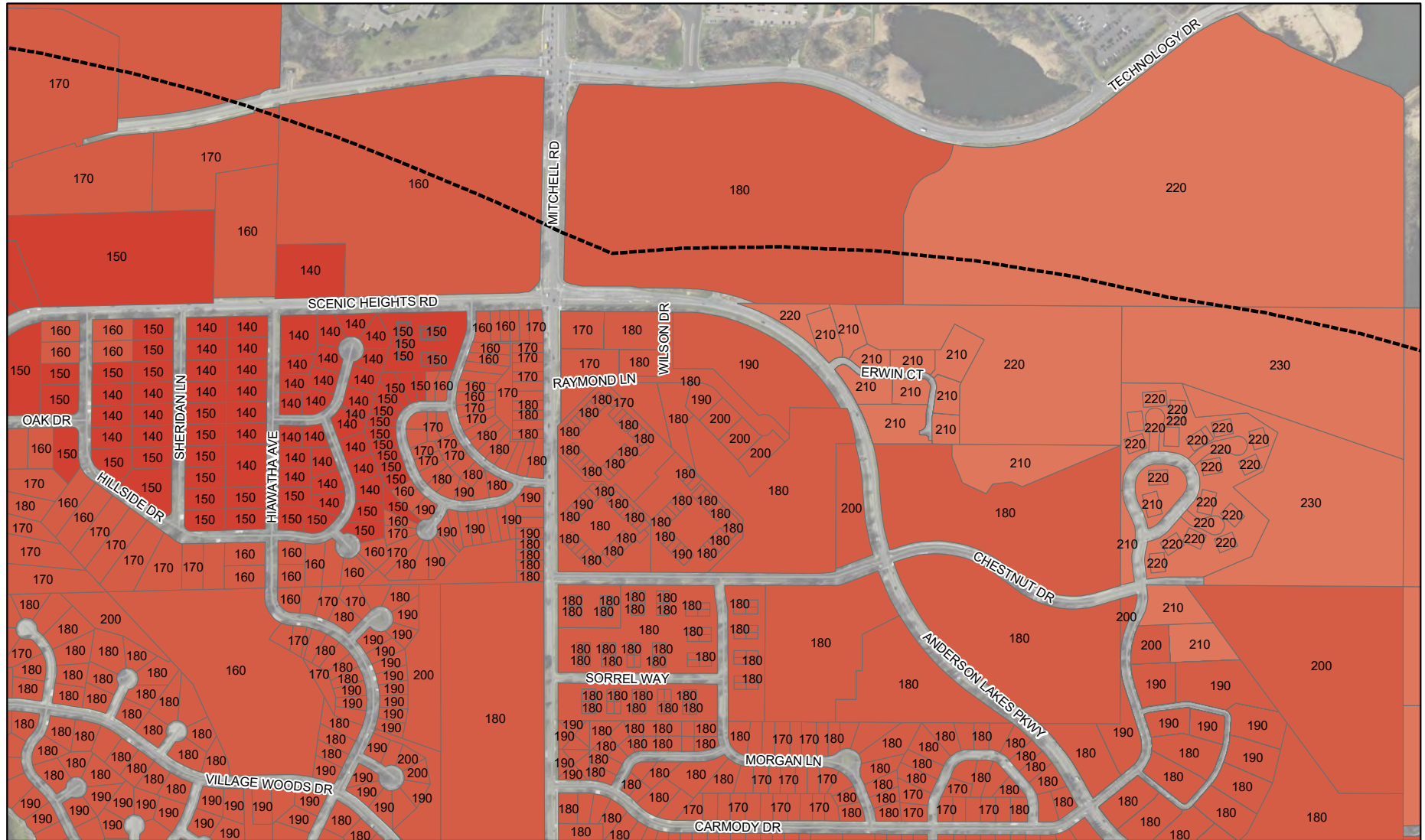


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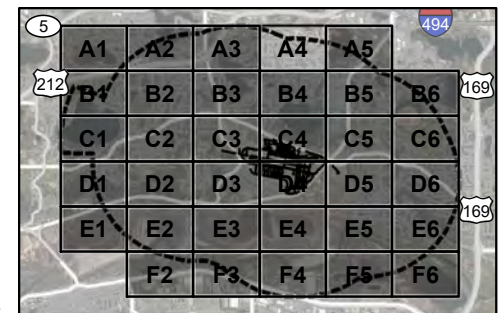
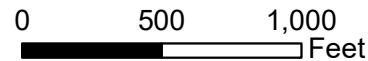
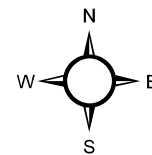
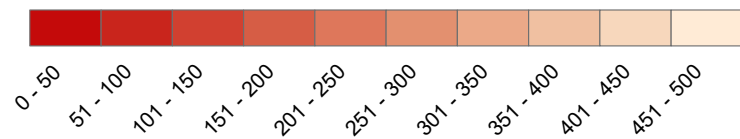
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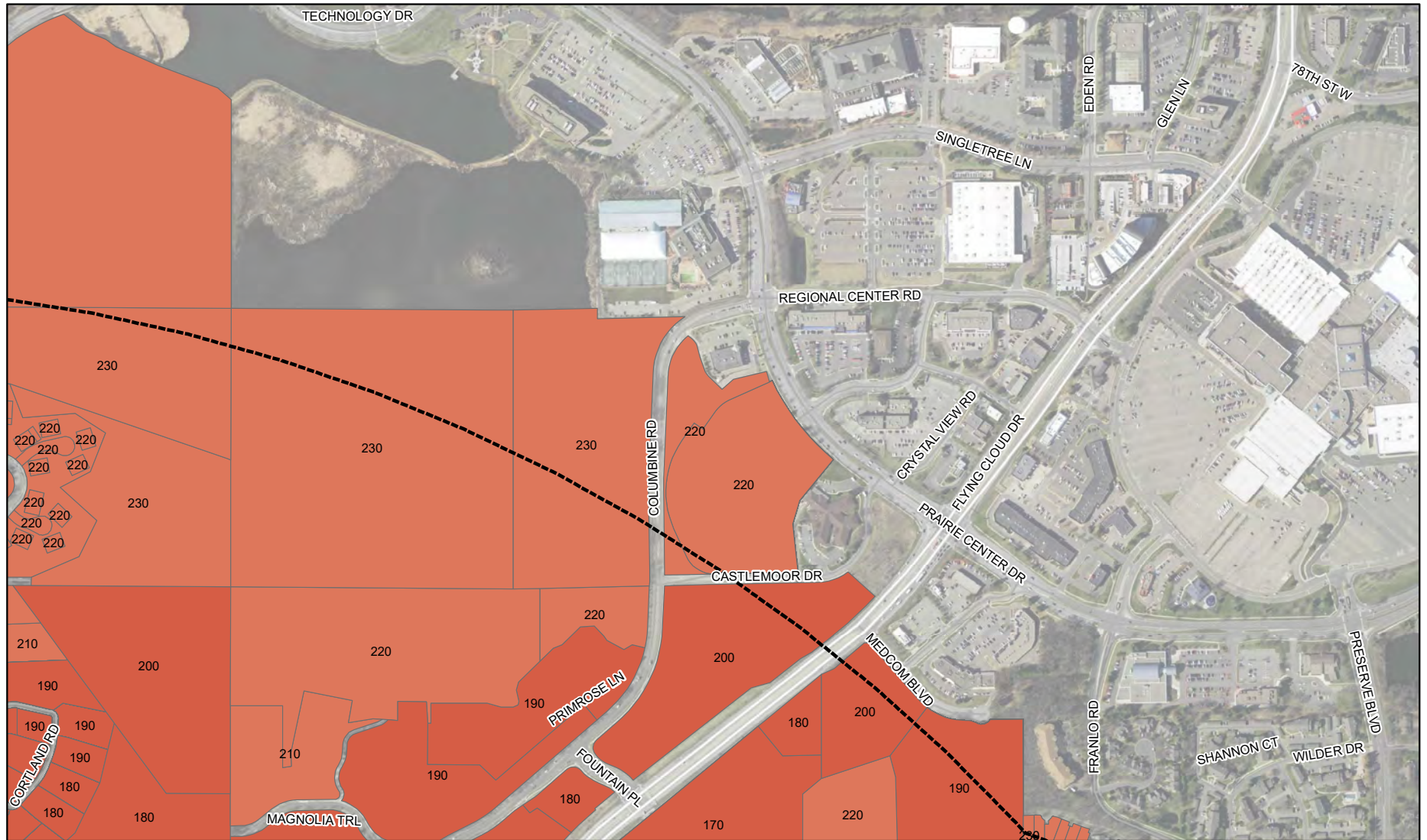




**FCM Maximum Construction Heights Without Permit Within Zoning Limits**

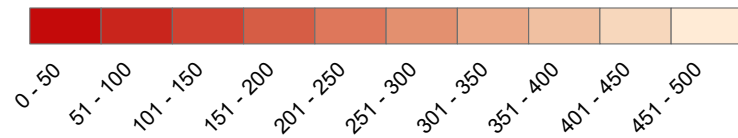
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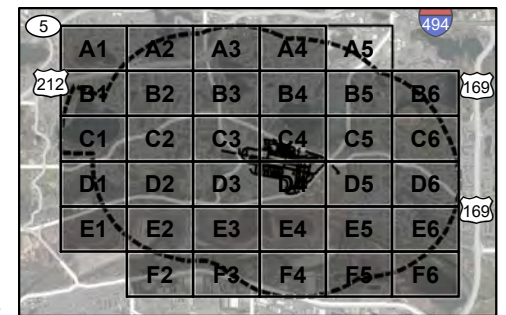
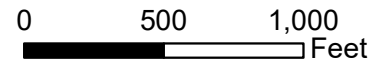
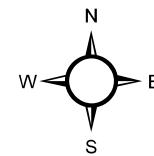


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

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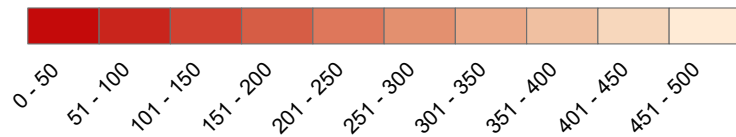
FCM Zoning Ordinance Update



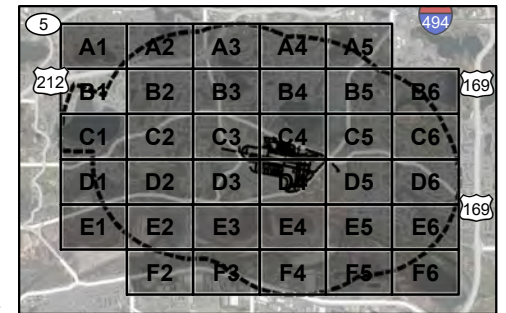
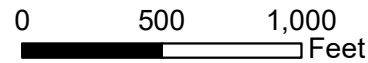
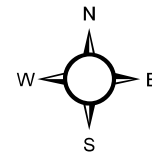


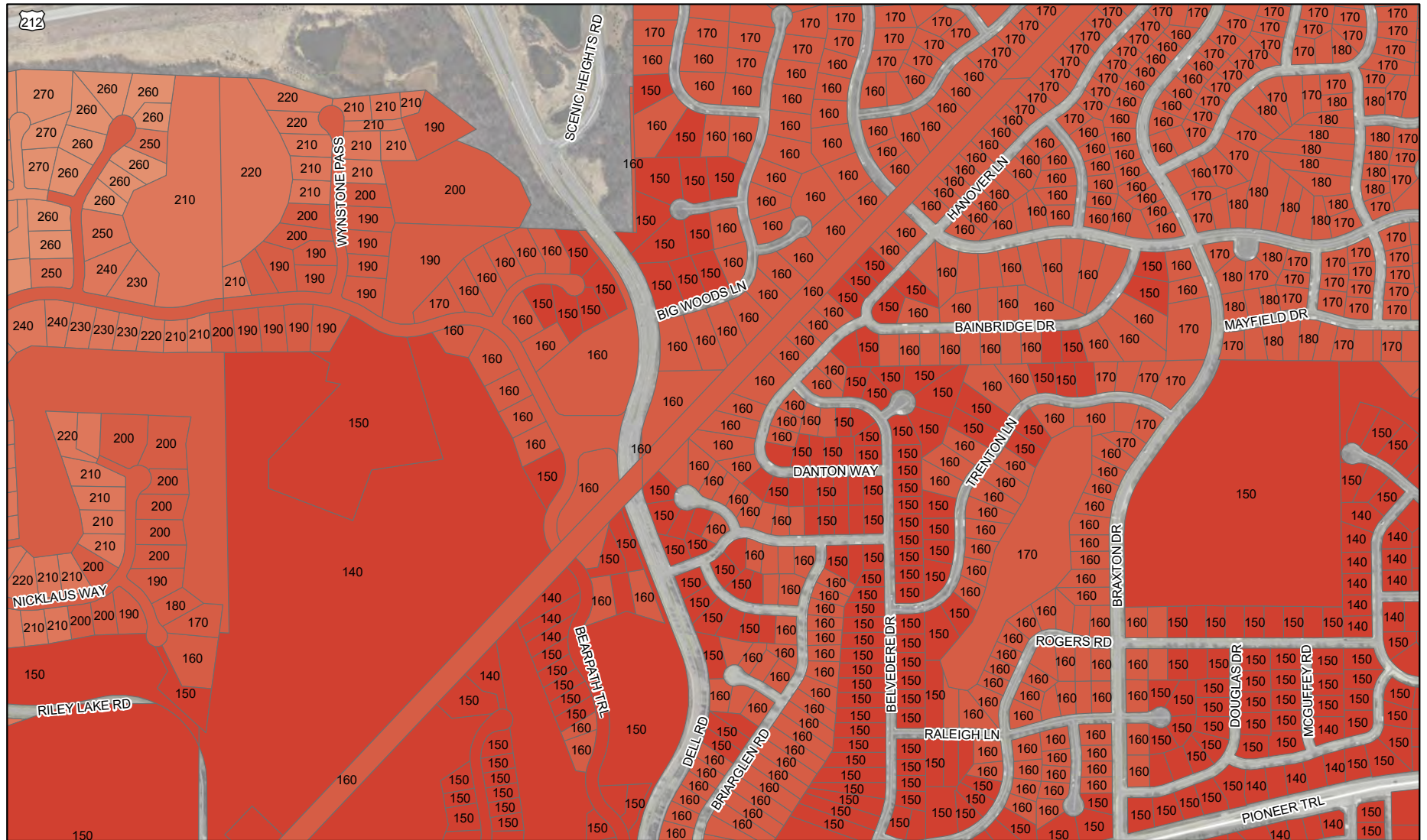
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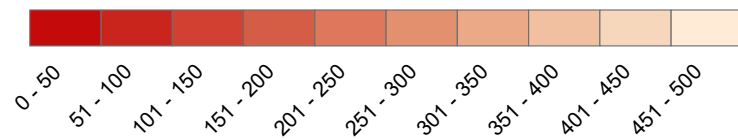
FCM Zoning Ordinance Update



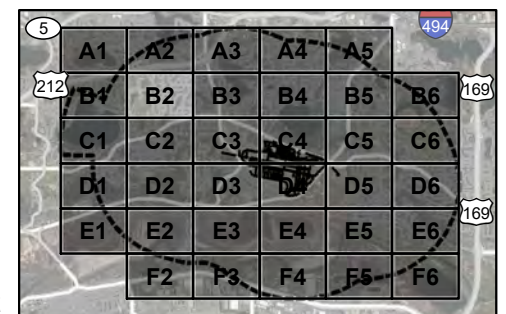
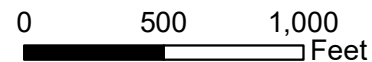
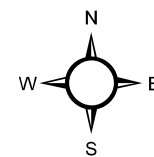


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

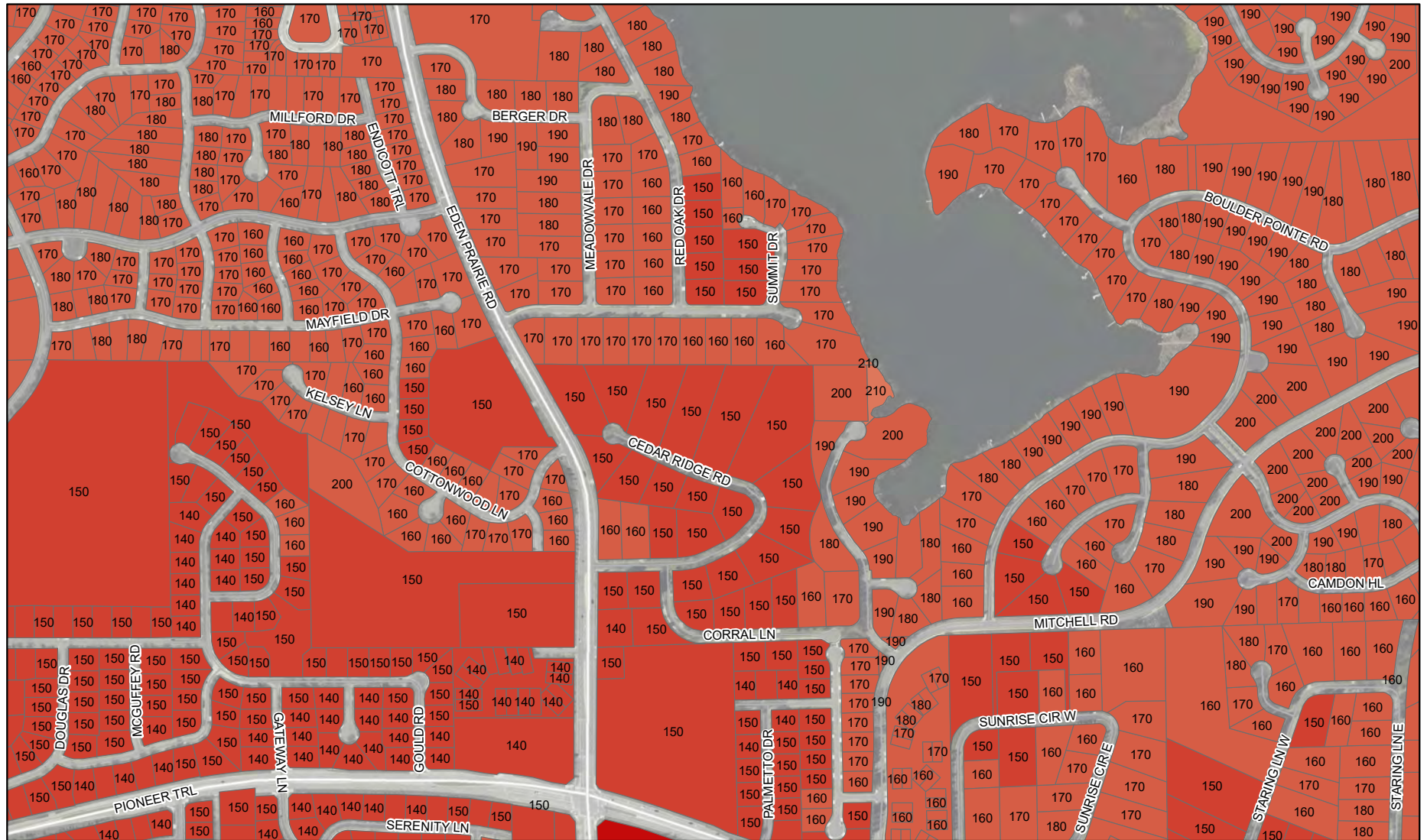
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FCM Zoning Ordinance Update

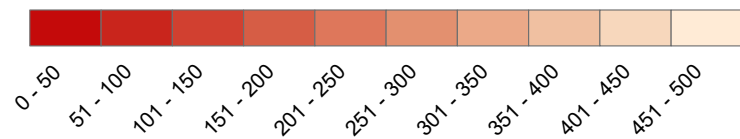




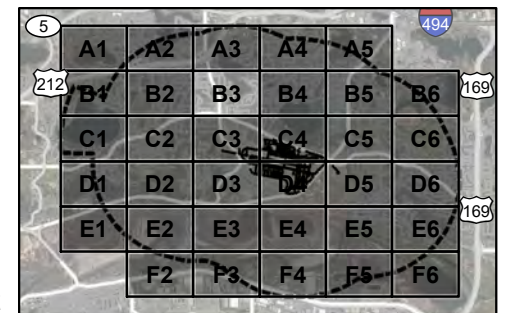
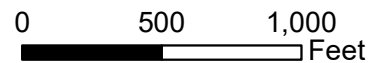
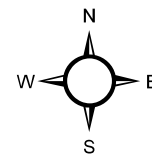


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

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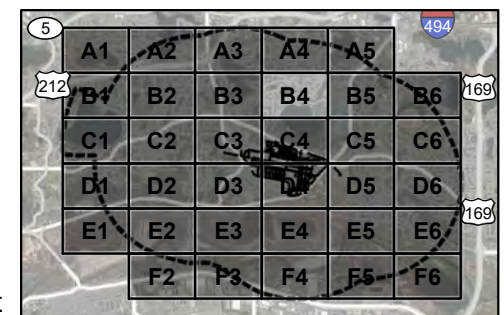
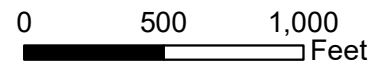
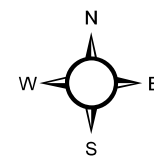
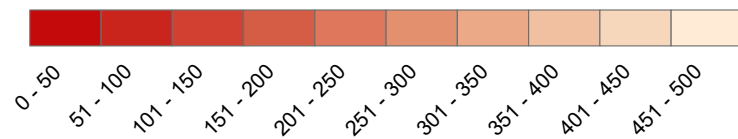
FCM Zoning Ordinance Update

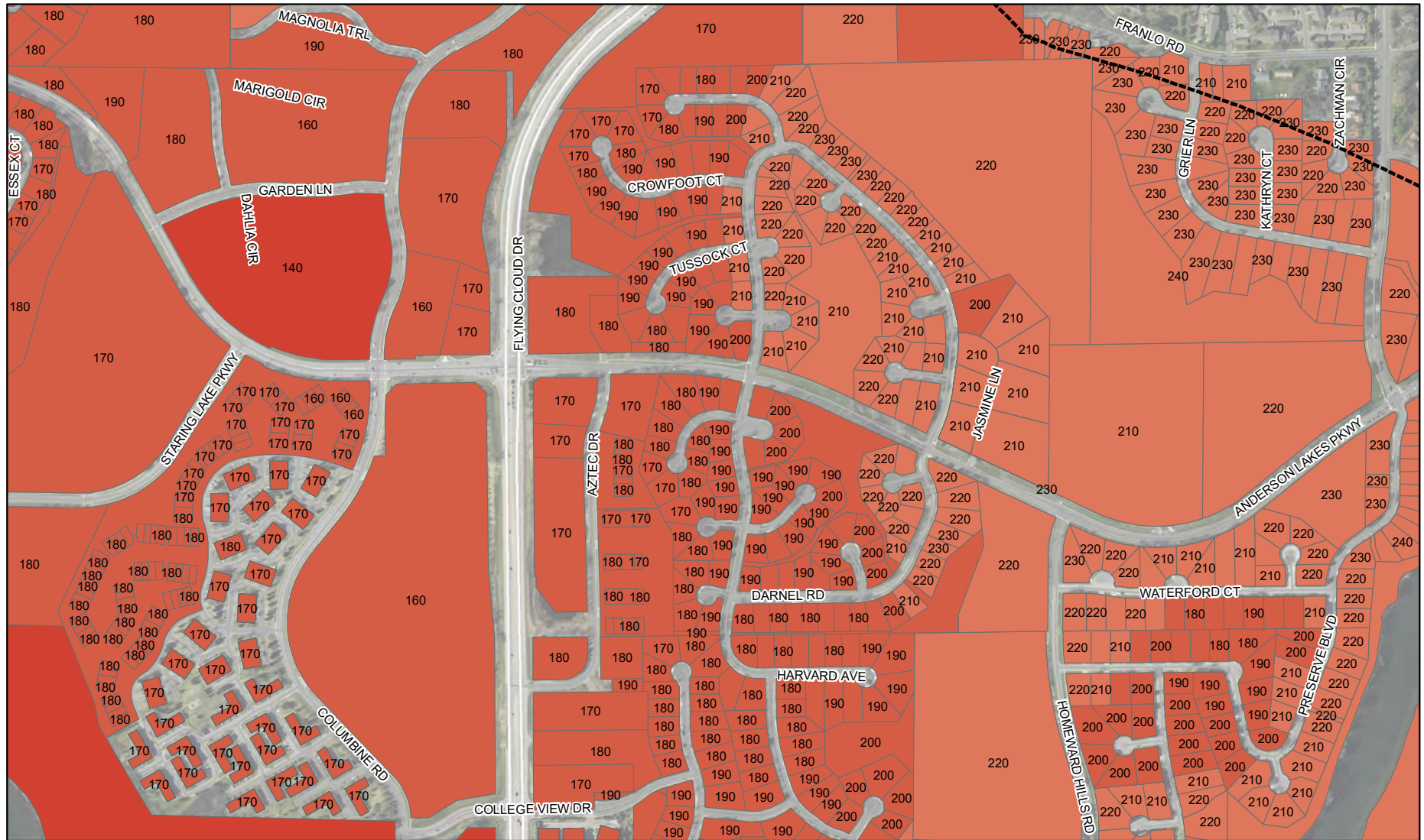




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

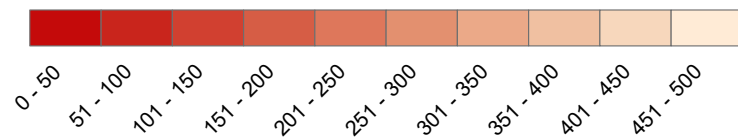
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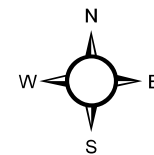


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

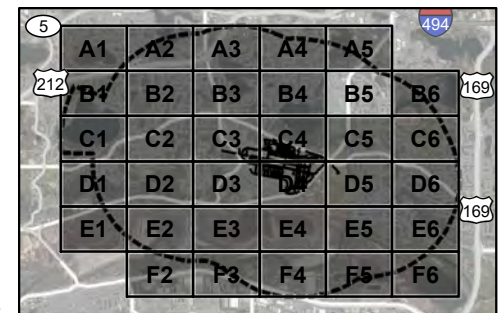
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FCM Zoning Ordinance Update

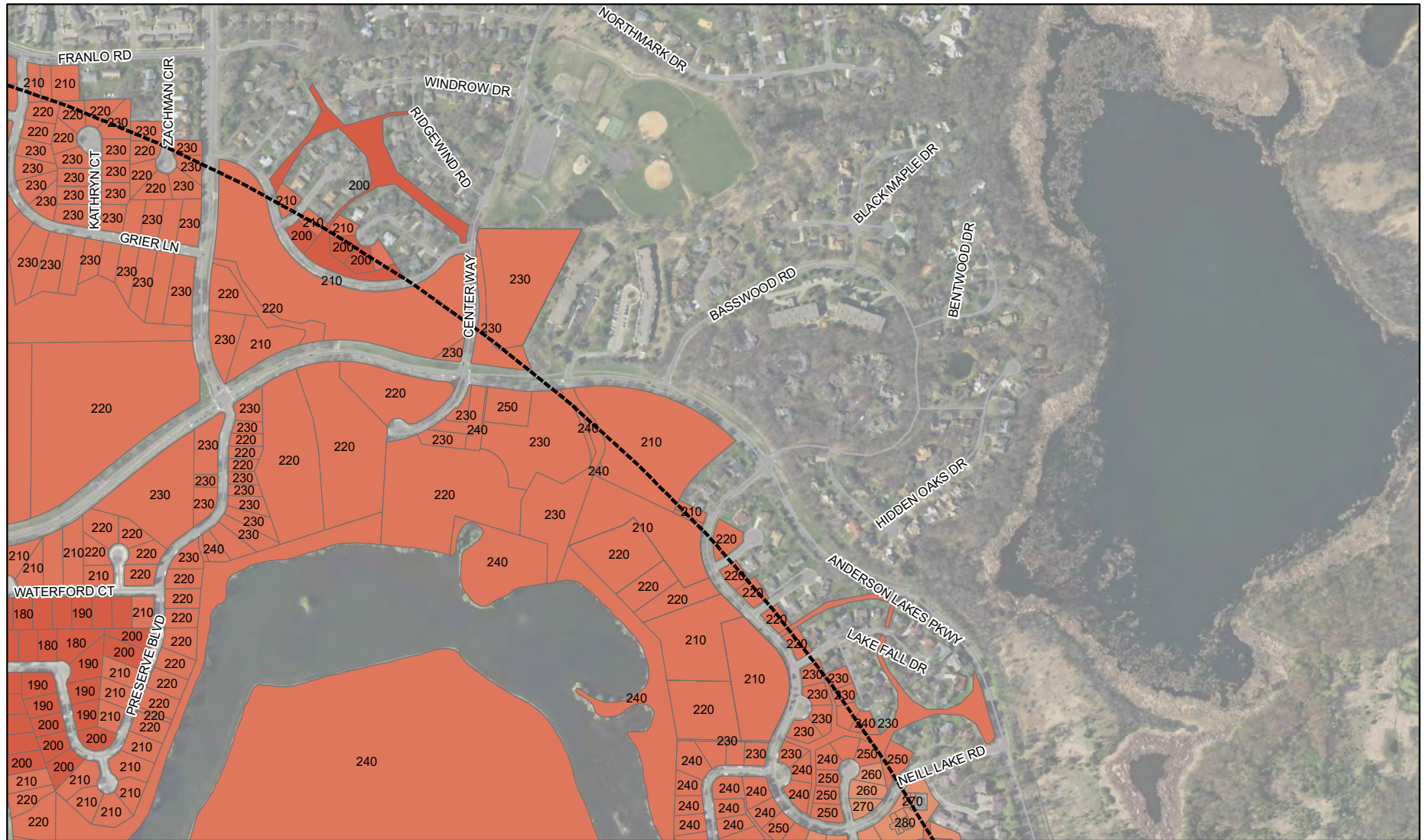


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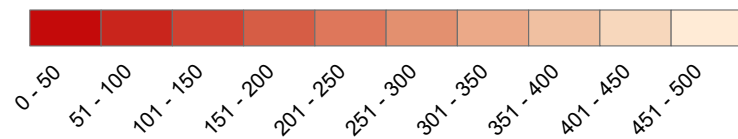
Appendix 10

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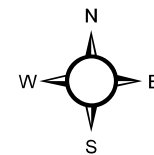


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

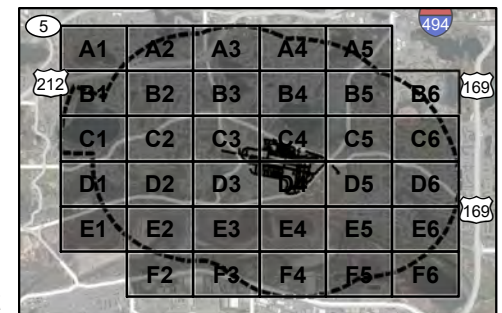
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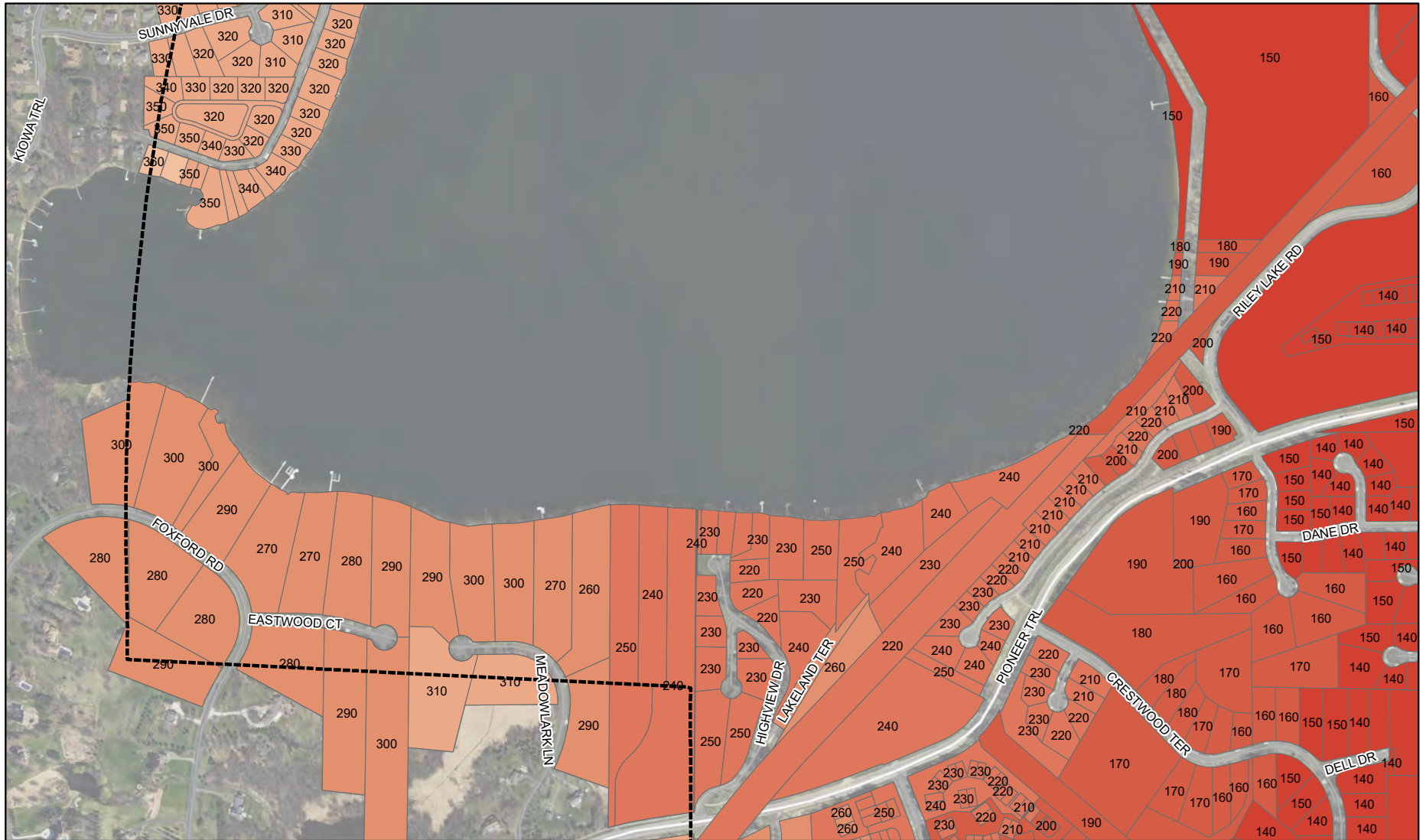


FCM Zoning Ordinance Update



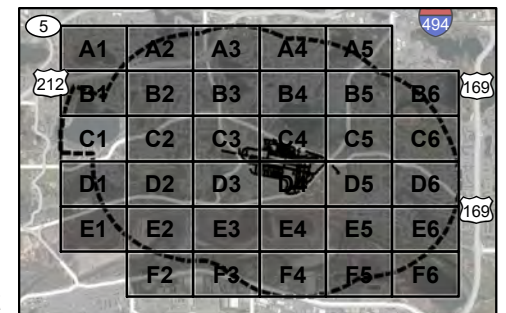
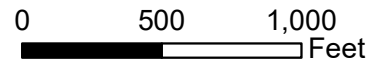
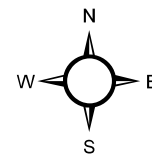
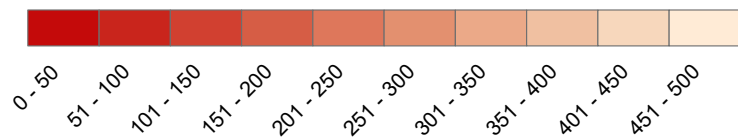
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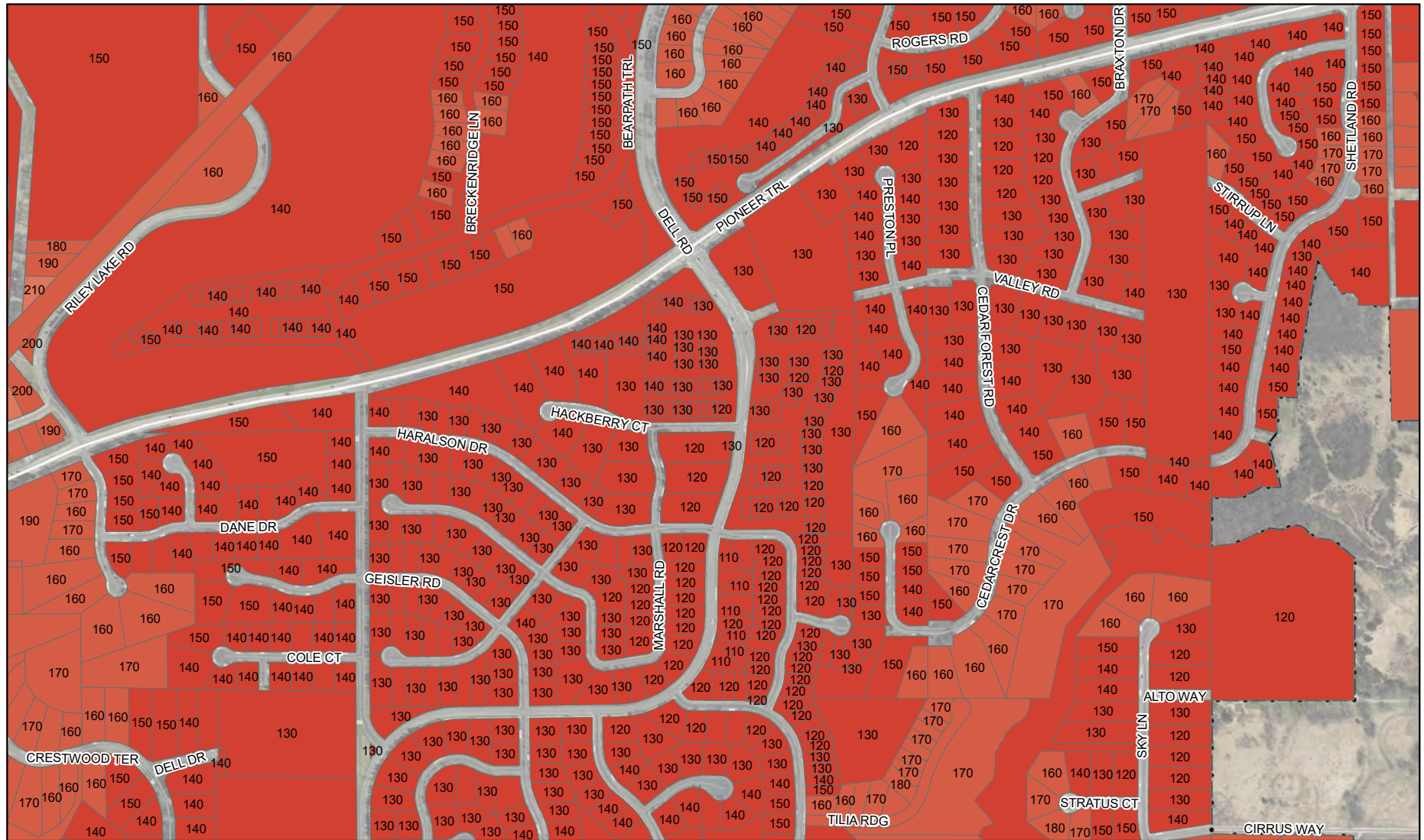




**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

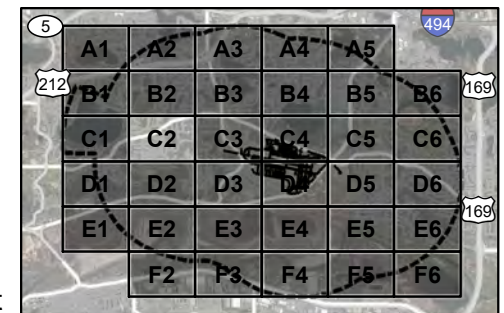
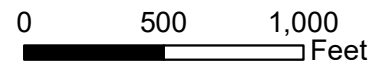
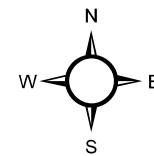
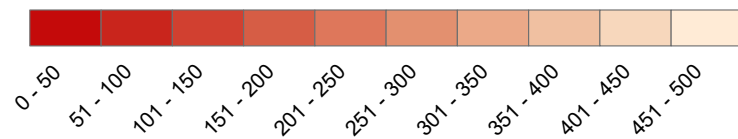
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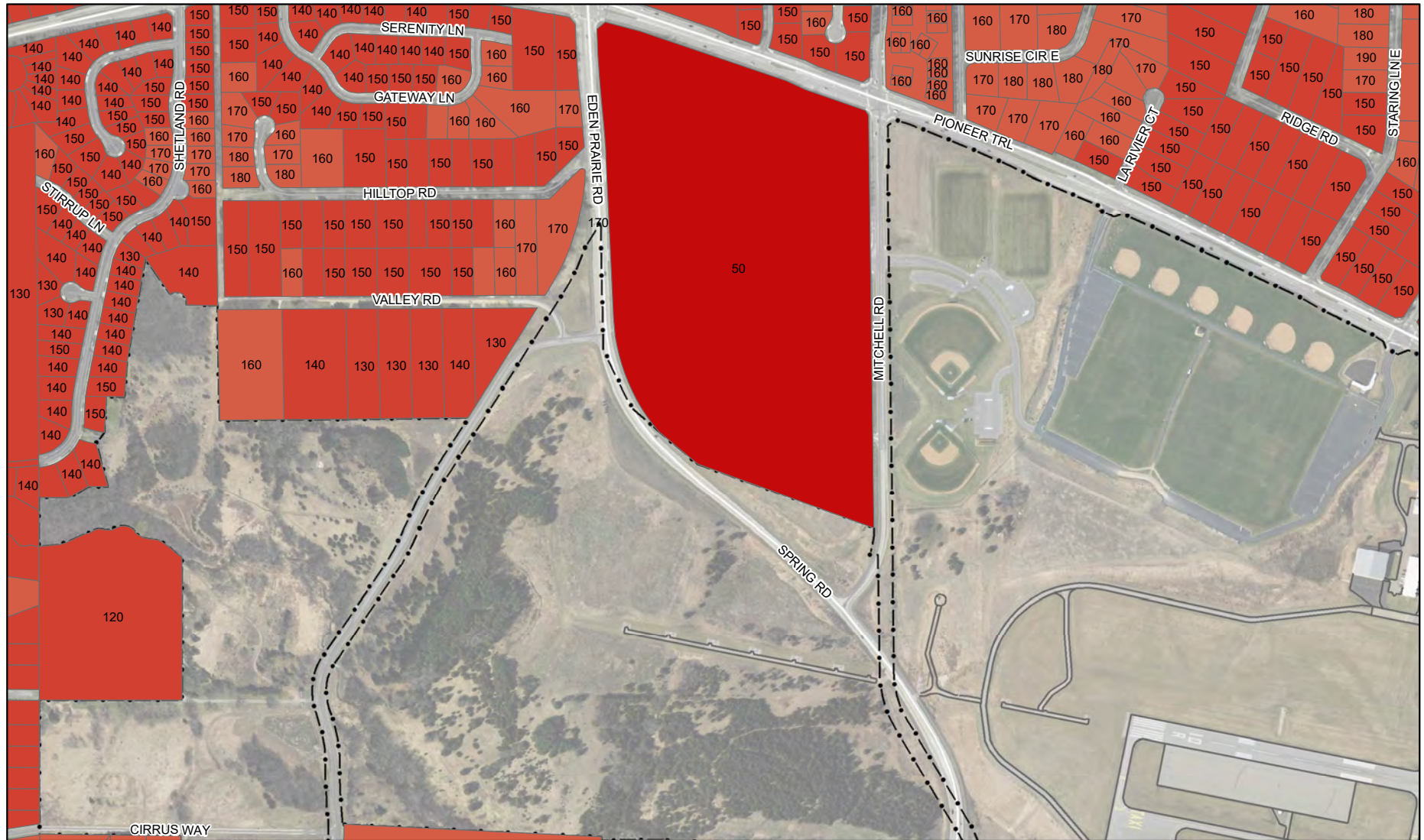




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

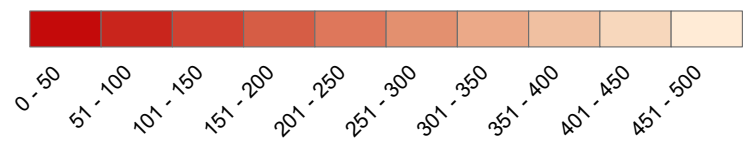
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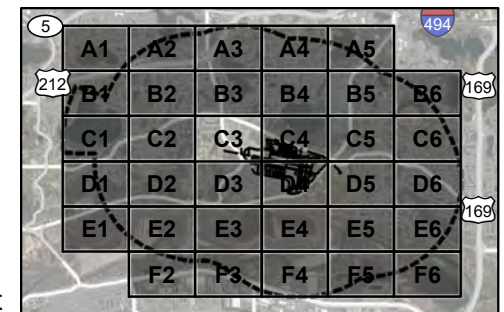
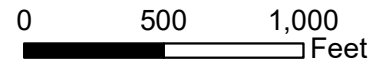
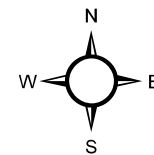


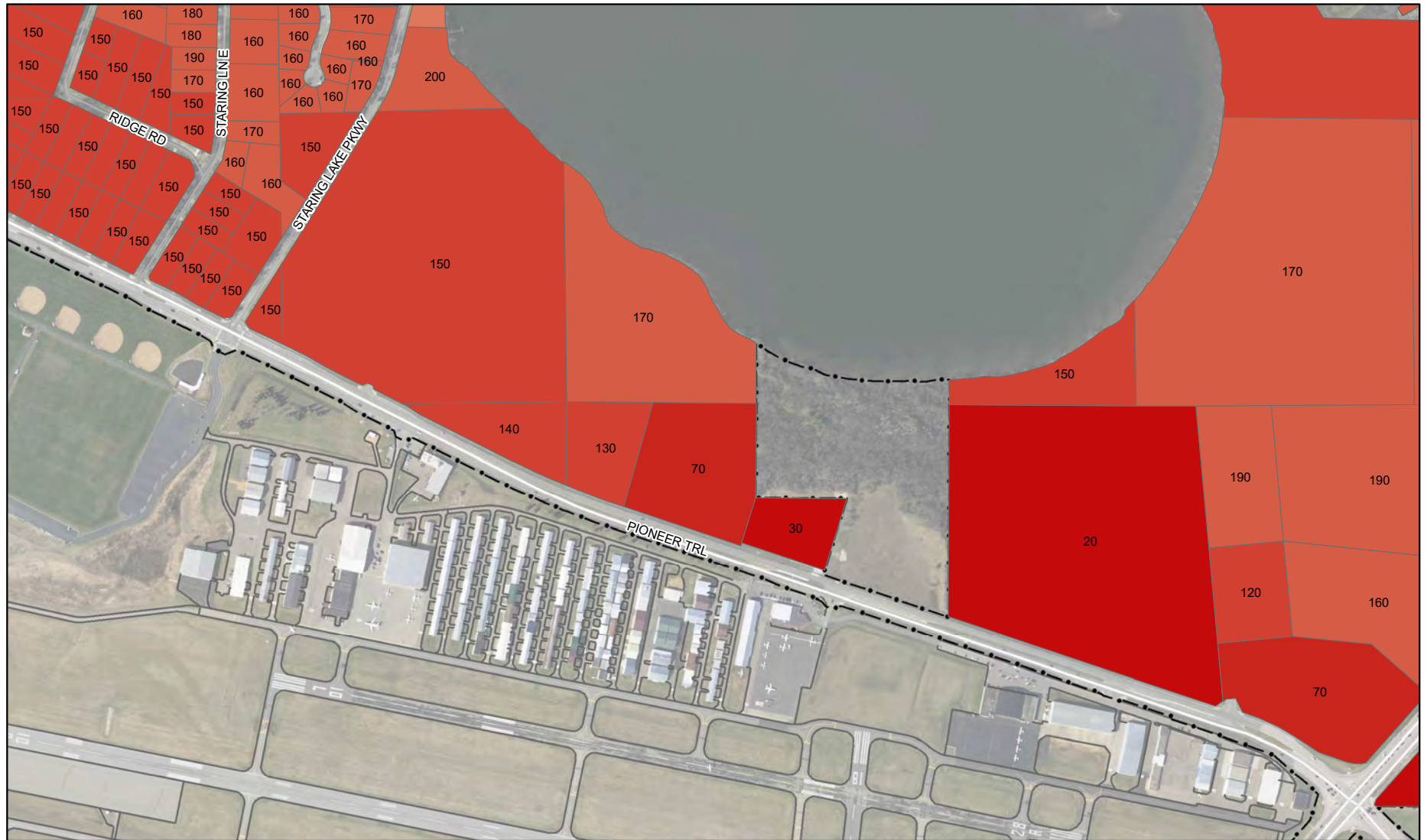
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MCH - C3



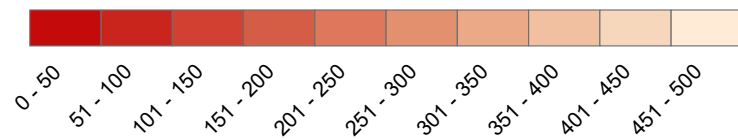
FCM Zoning Ordinance Update



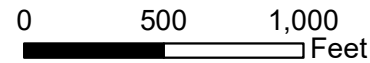
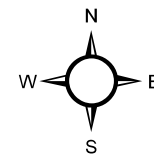


**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

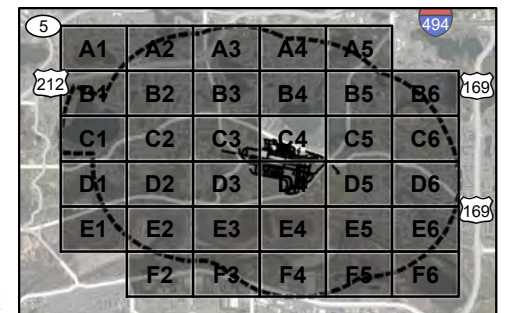
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FCM Zoning Ordinance Update

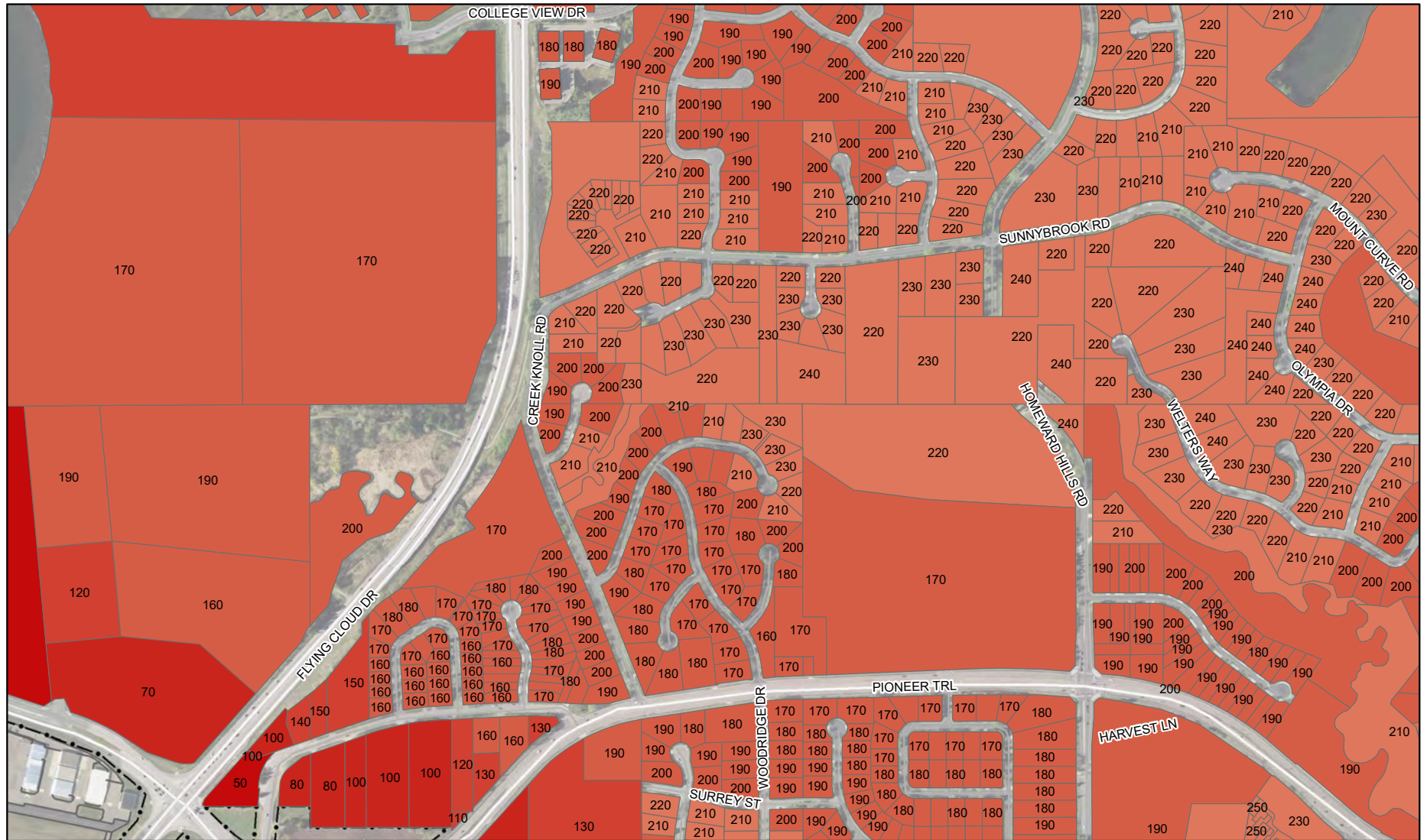


Appendix 10



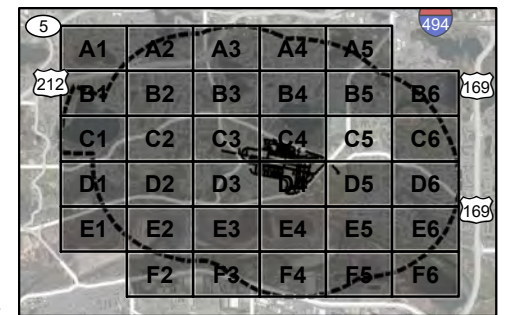
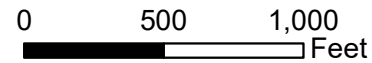
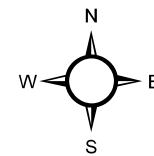
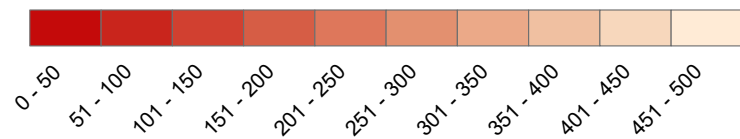
Page 10-16

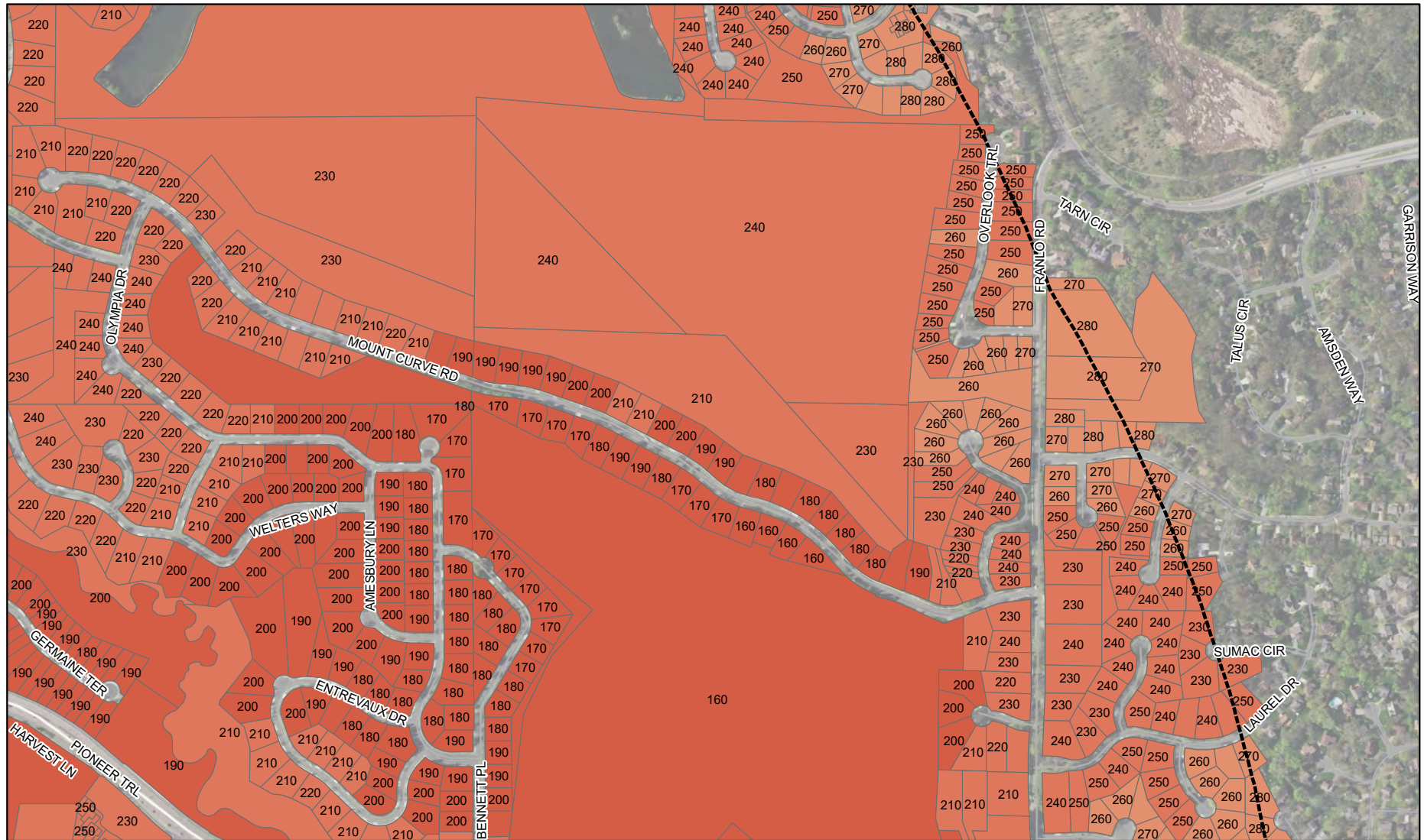




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

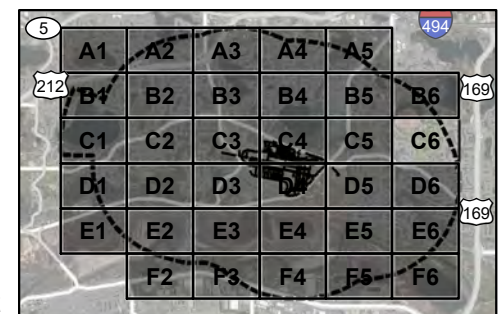
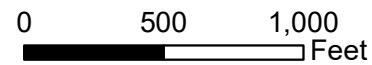
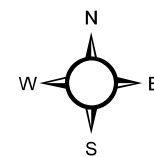
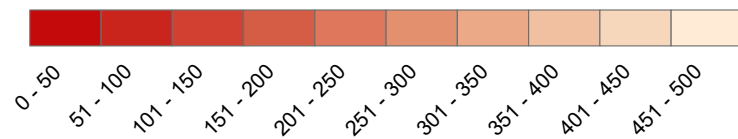
MCH - C5

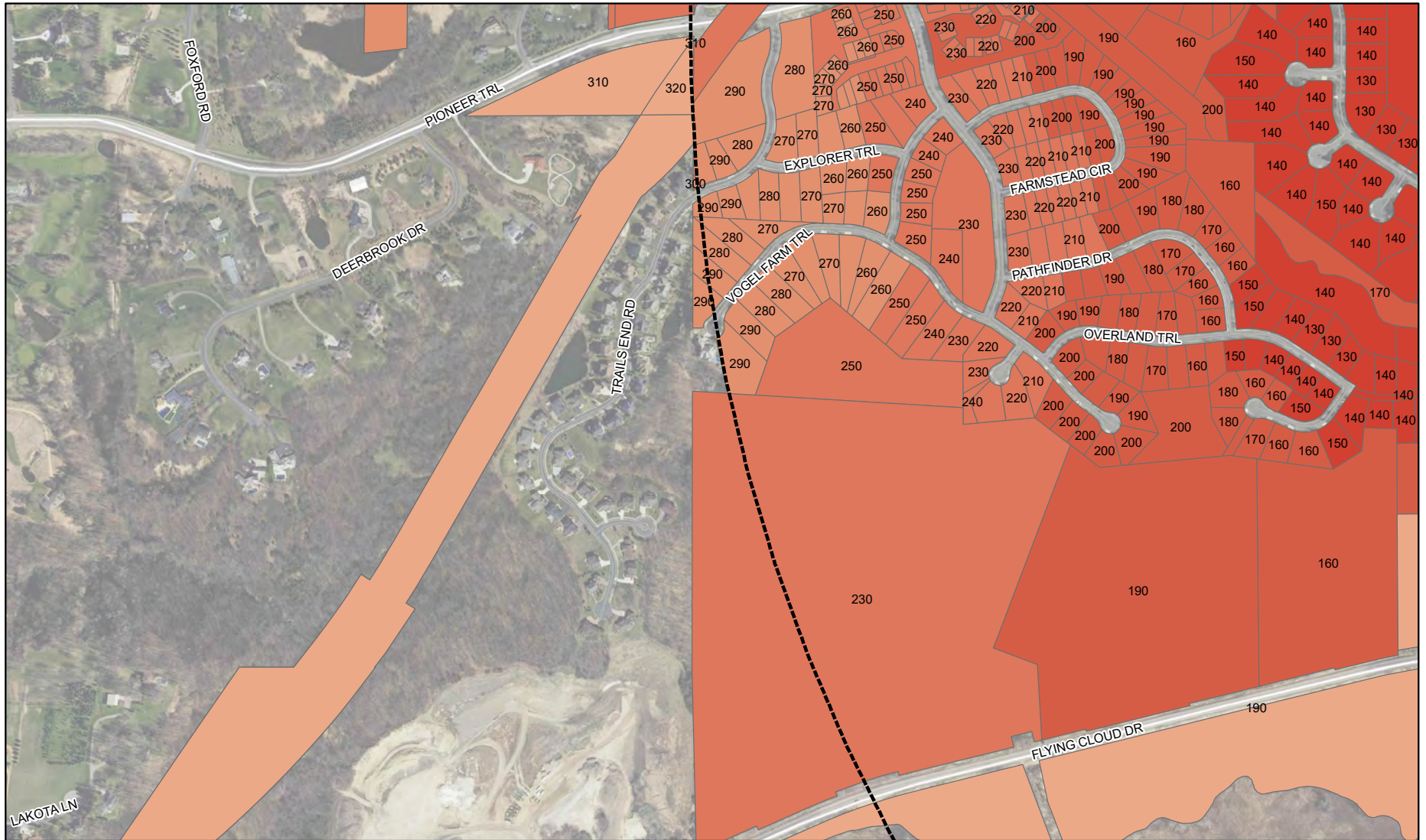




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

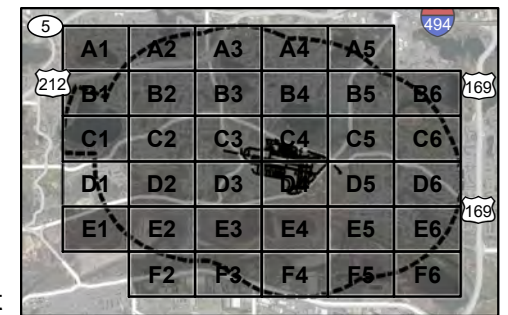
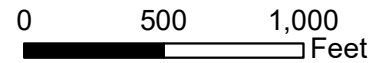
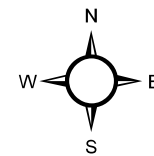
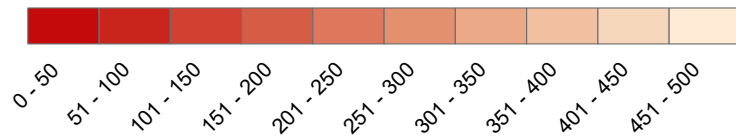
MCH - C6

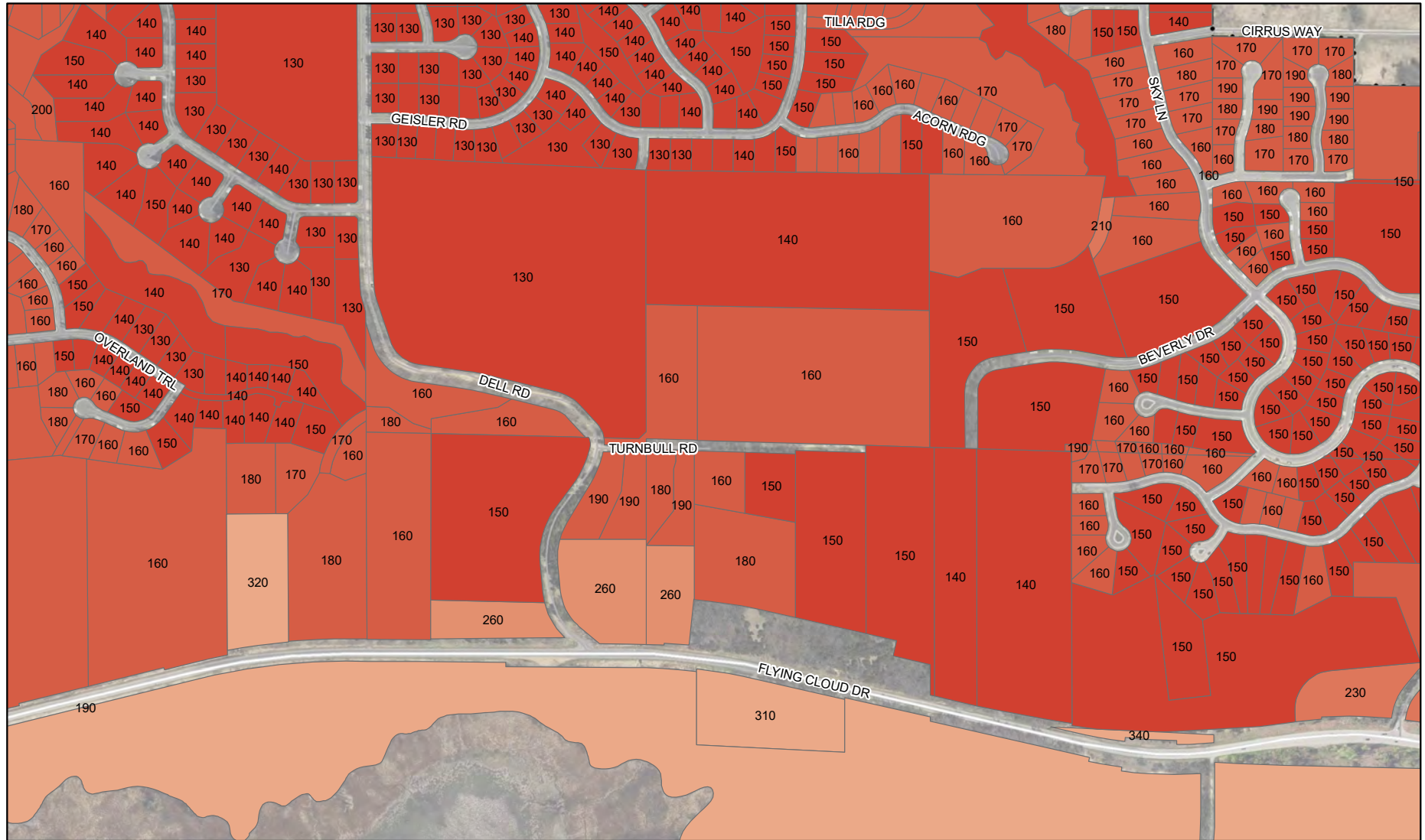




**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

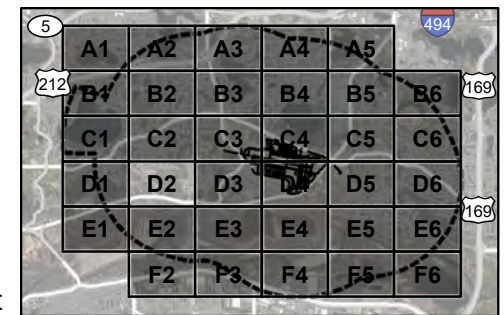
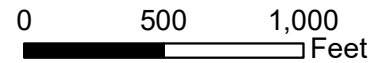
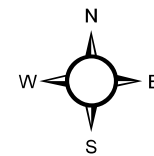
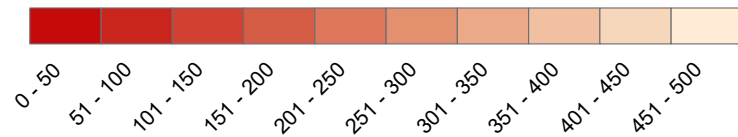
**MCH - D1**

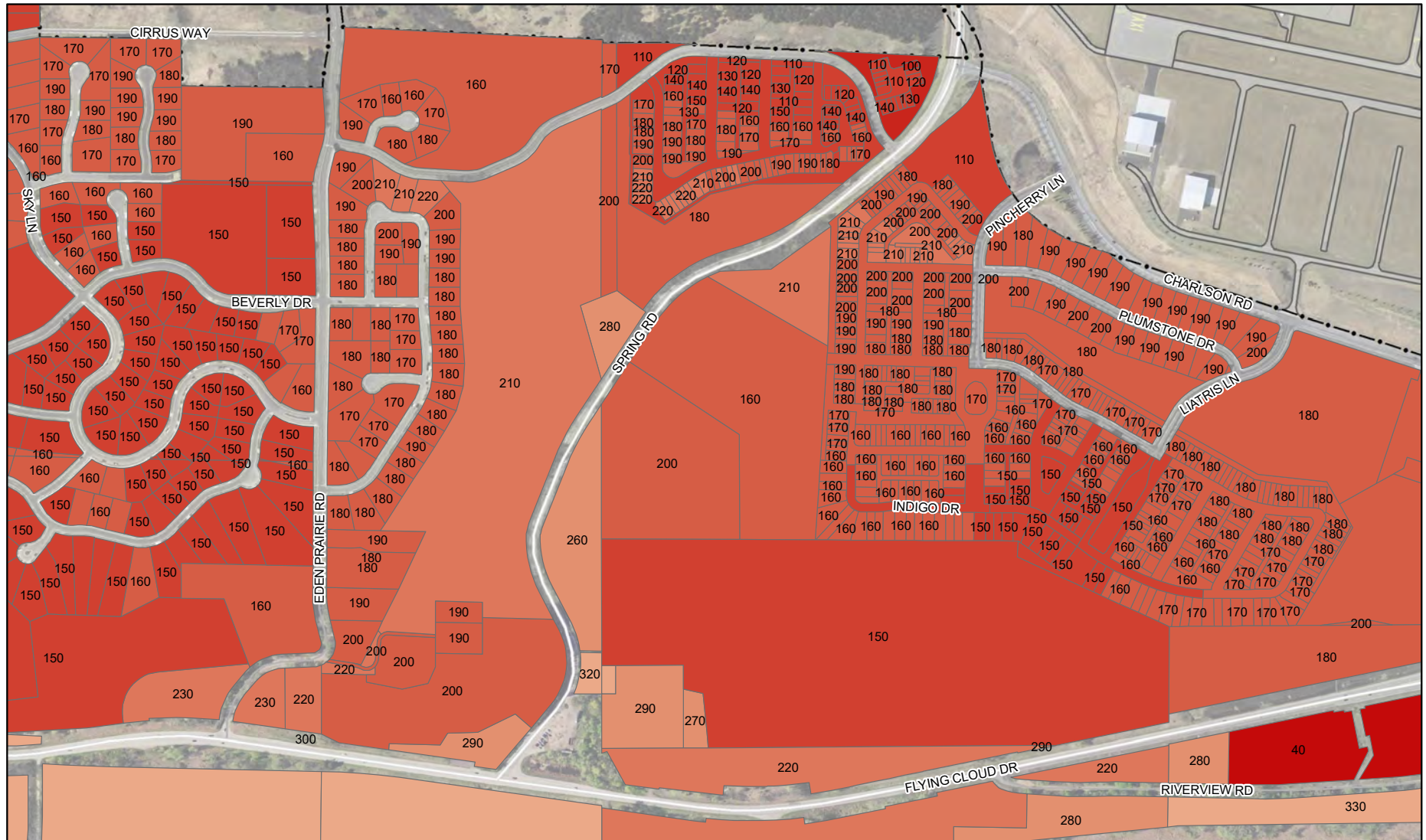




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

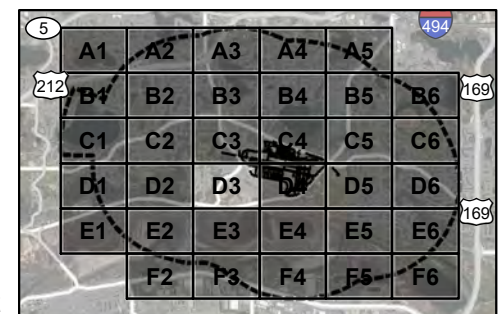
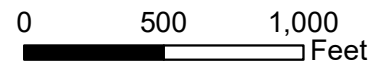
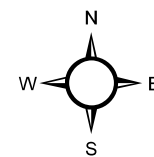
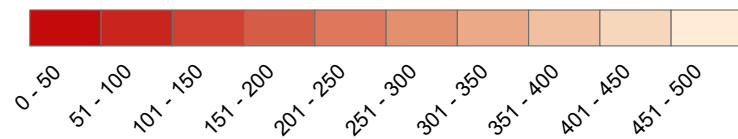
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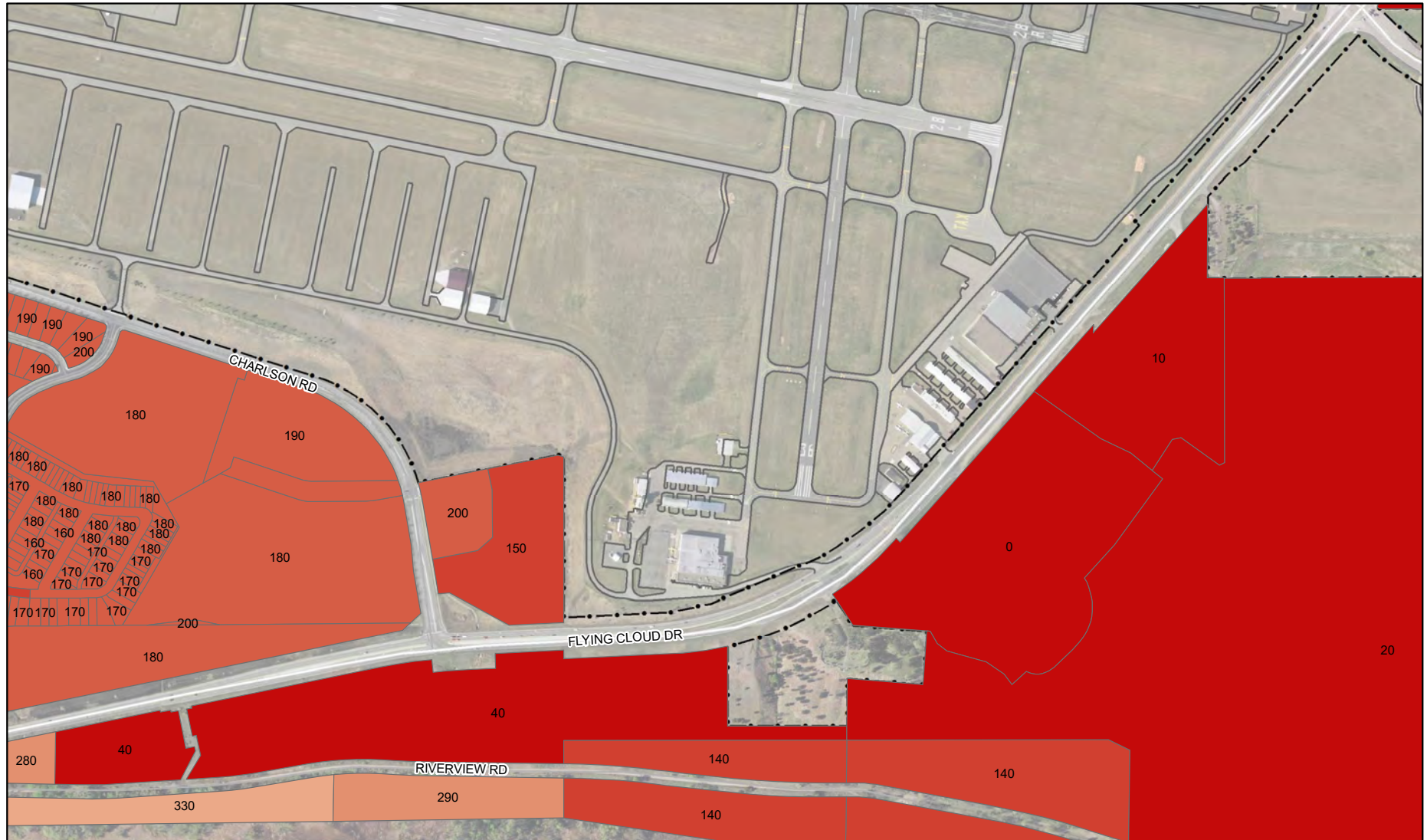




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

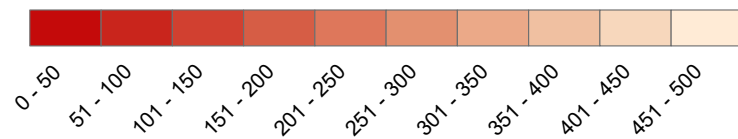
MCH - D3



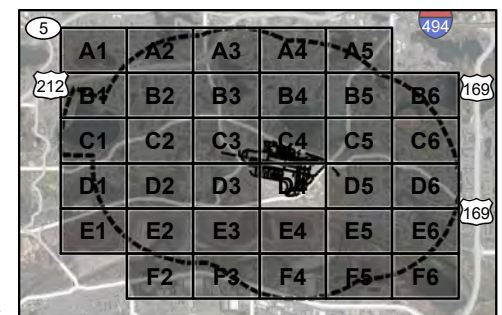
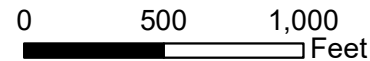
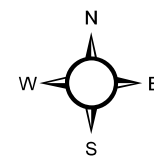


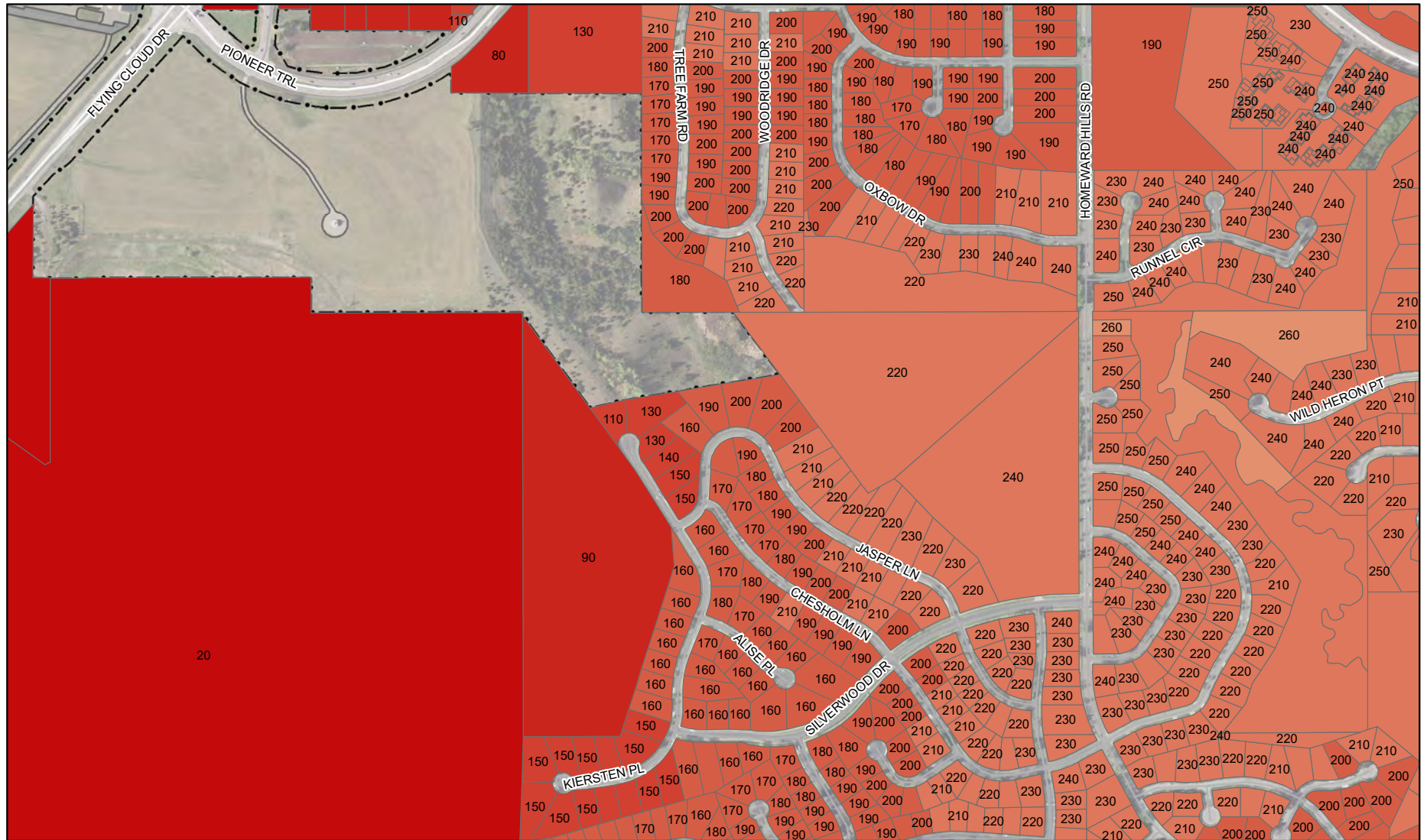
**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

**MCH - D4**



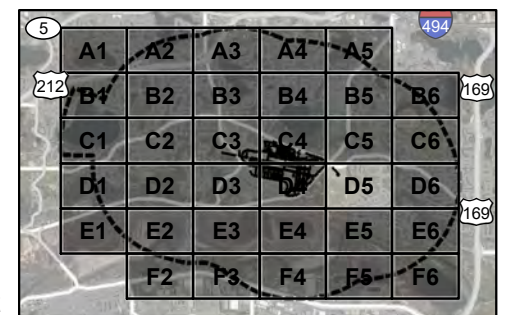
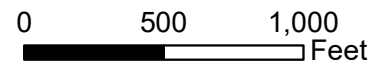
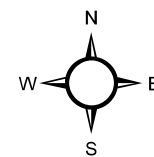
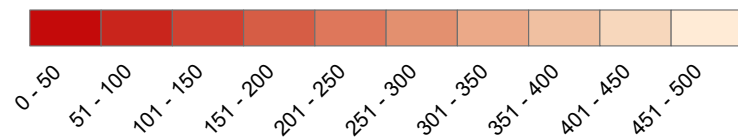
FCM Zoning Ordinance Update

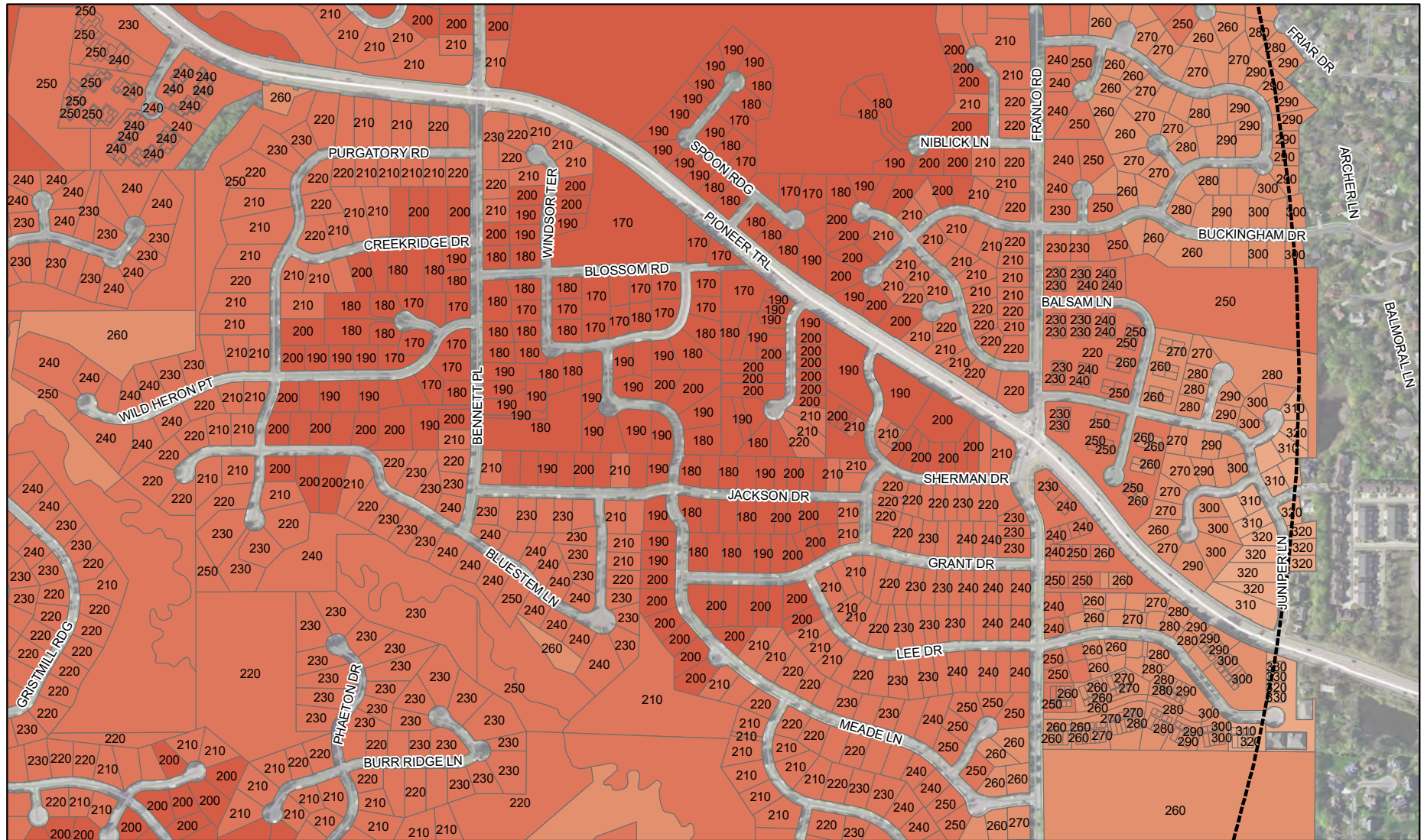




## FCM Maximum Construction Heights Without Permit Within Zoning Limits

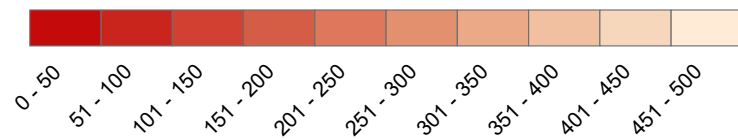
MCH - D5



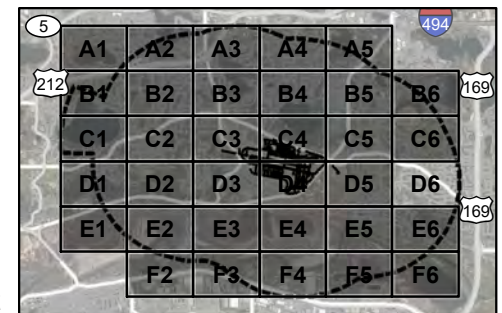
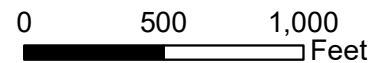
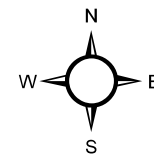


## FCM Maximum Construction Heights Without Permit Within Zoning Limits

MCH - D6



FCM Zoning Ordinance Update

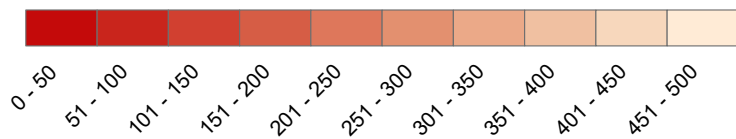




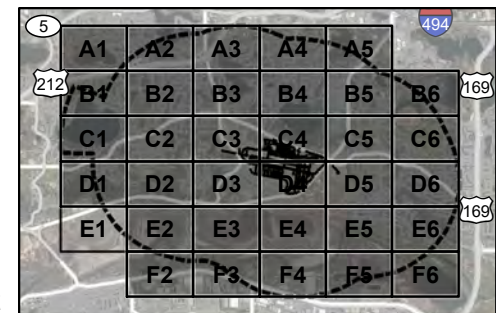
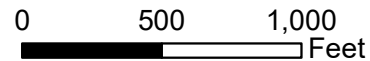
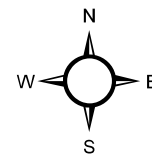


**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

**MCH - E1**



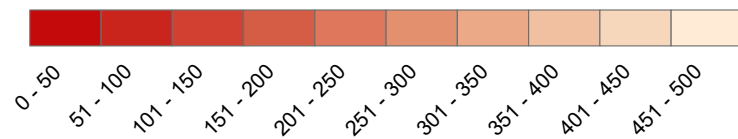
FCM Zoning Ordinance Update



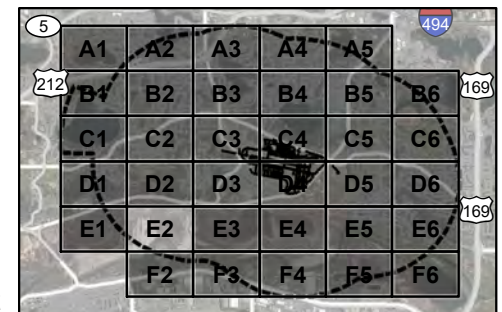
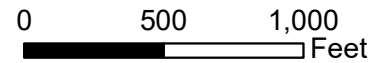
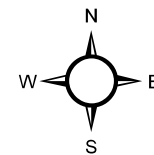


**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

**MCH - E2**



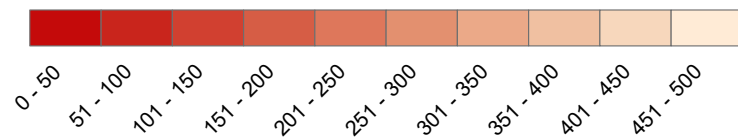
FCM Zoning Ordinance Update



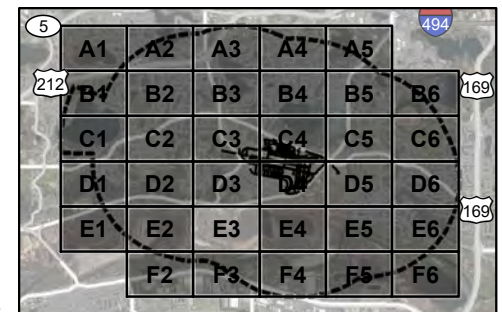
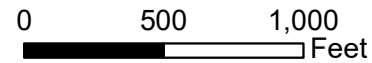
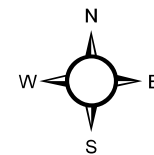


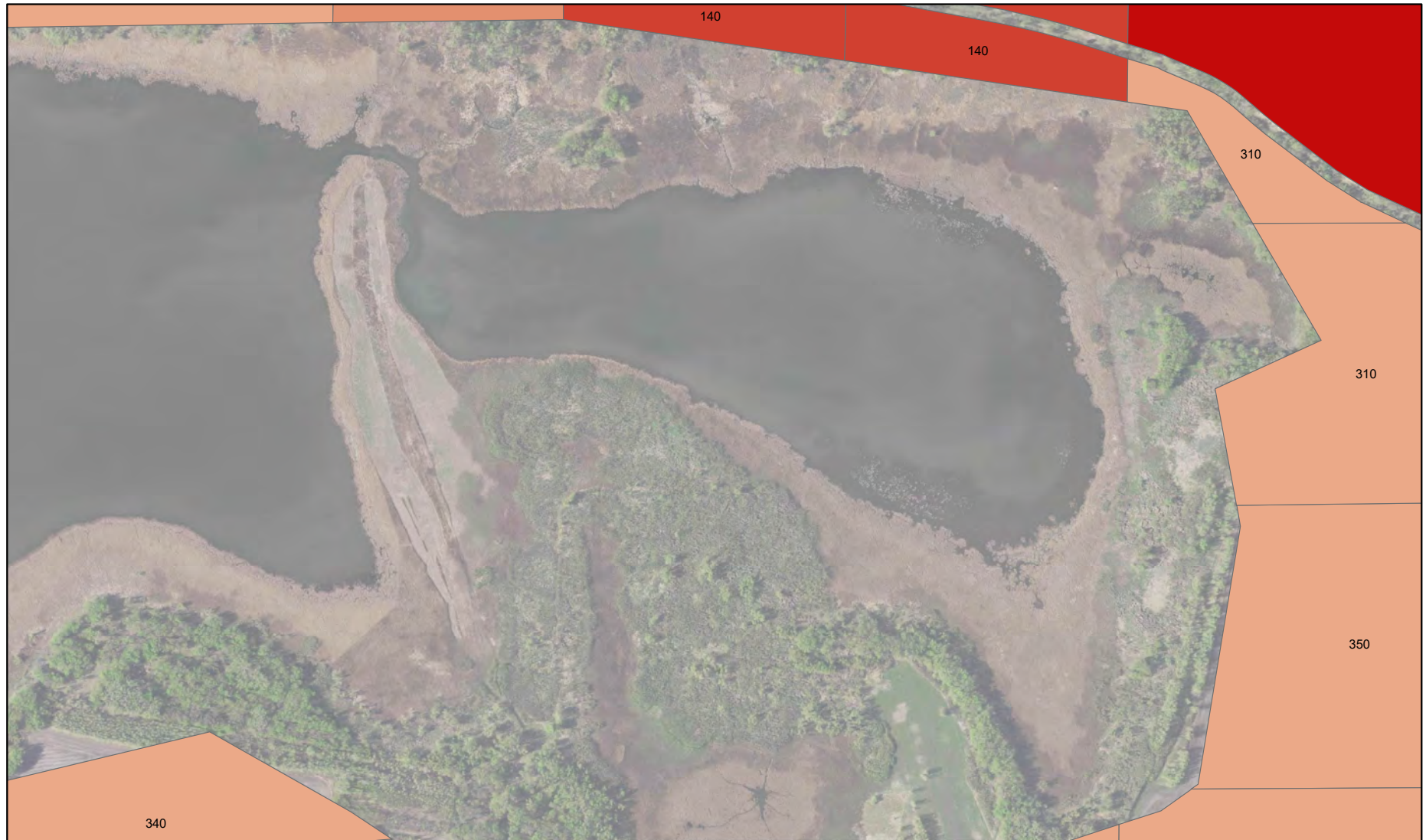
**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

**MCH - E3**



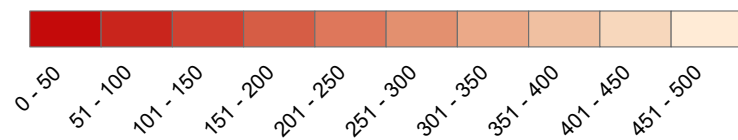
FCM Zoning Ordinance Update



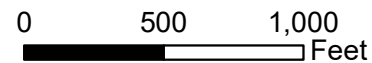
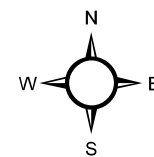


**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

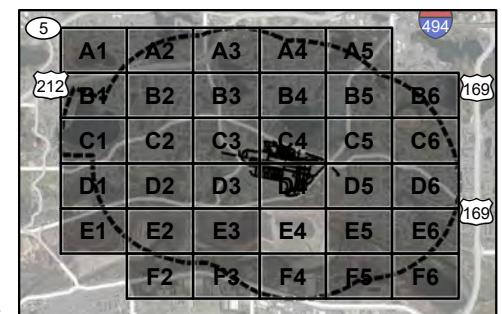
**MCH - E4**



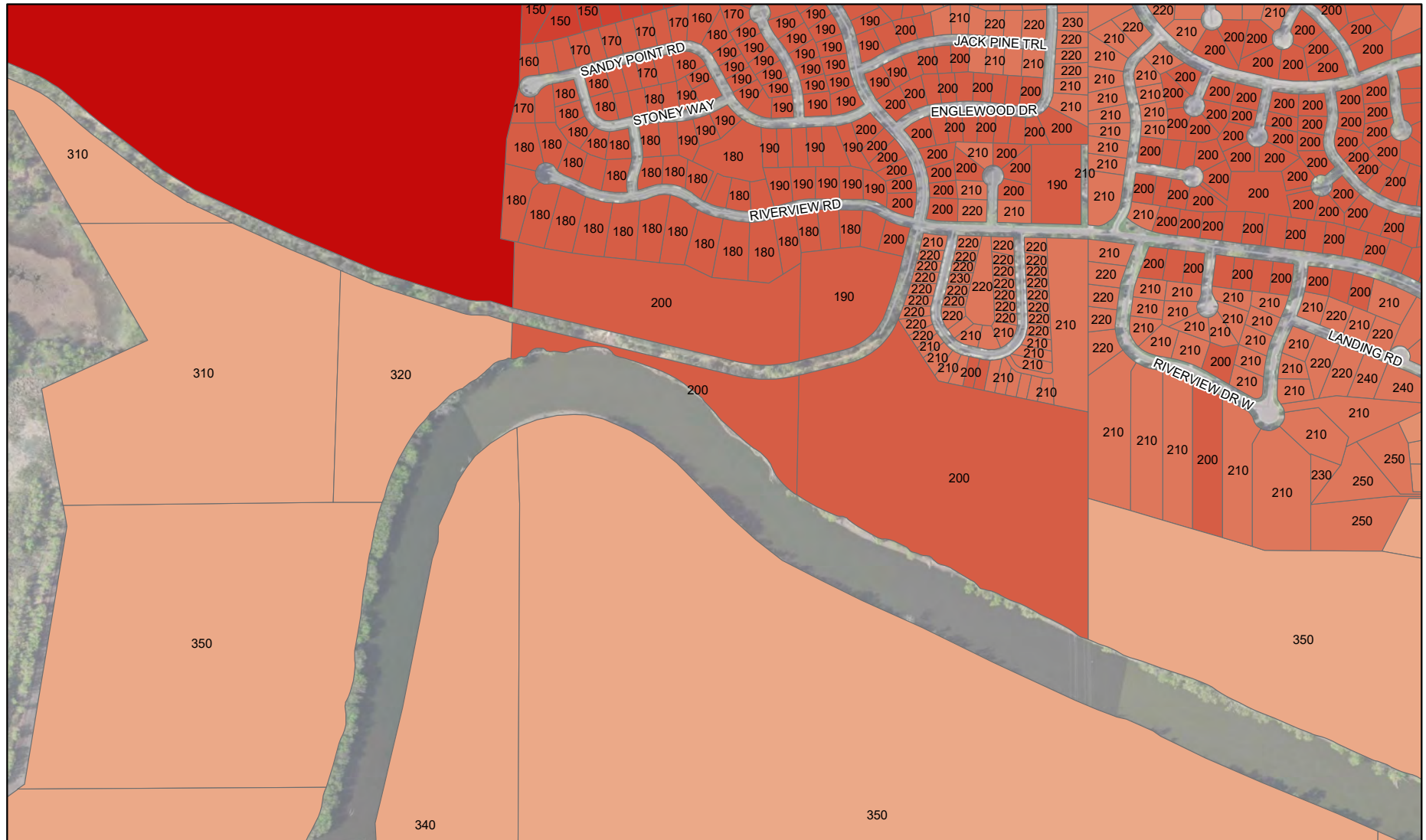
FCM Zoning Ordinance Update



Appendix 10

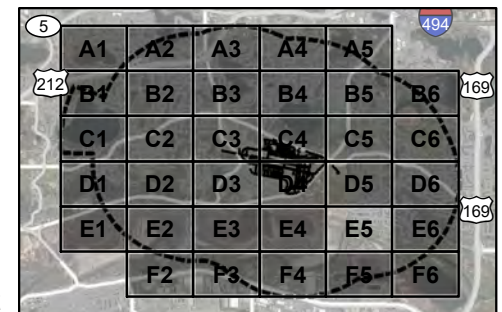
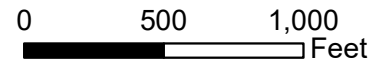
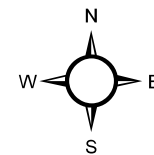
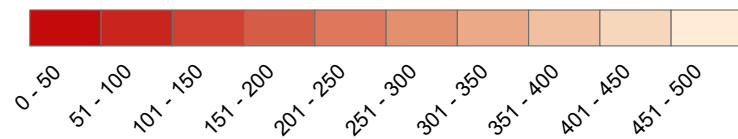


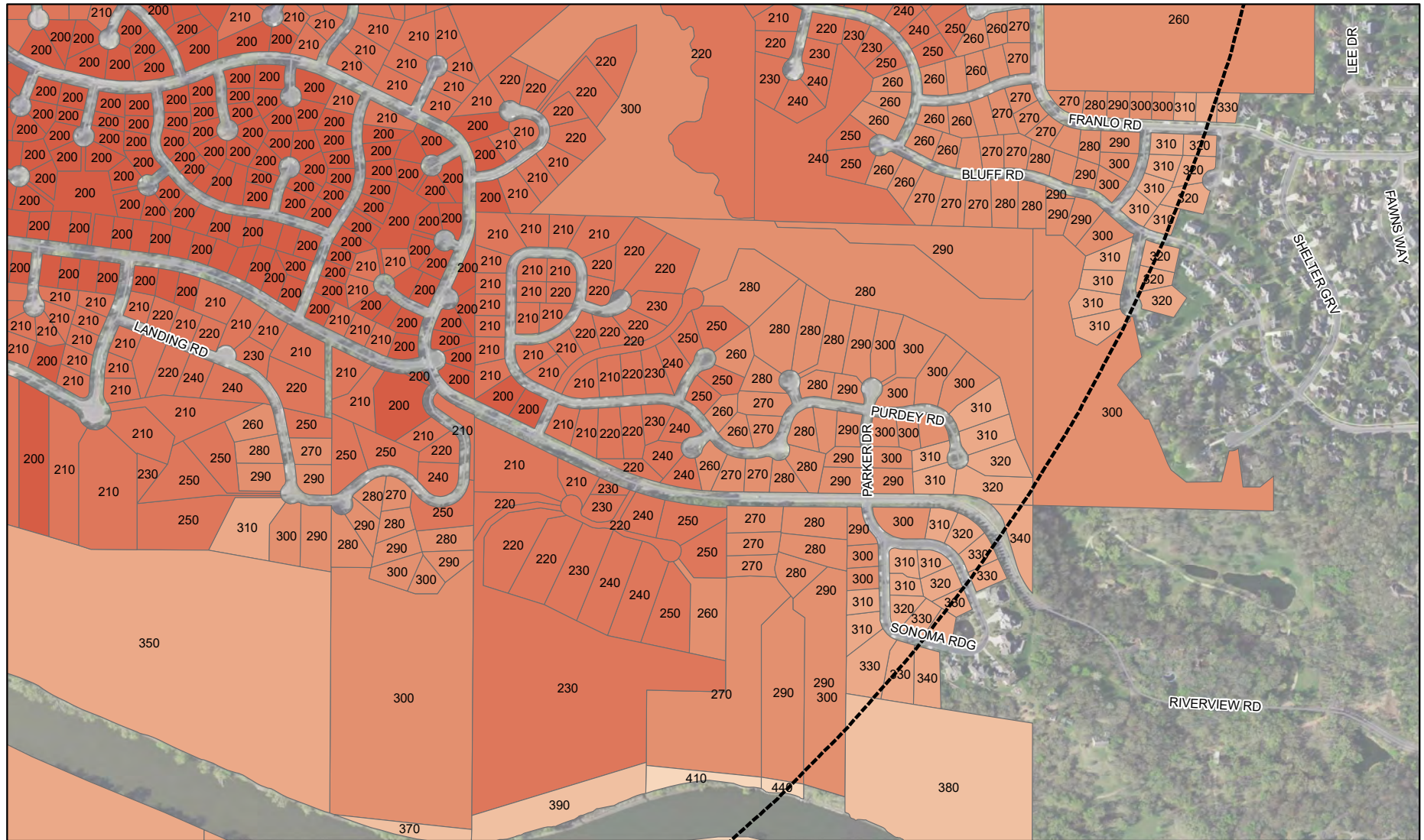
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### FCM Maximum Construction Heights Without Permit Within Zoning Limits

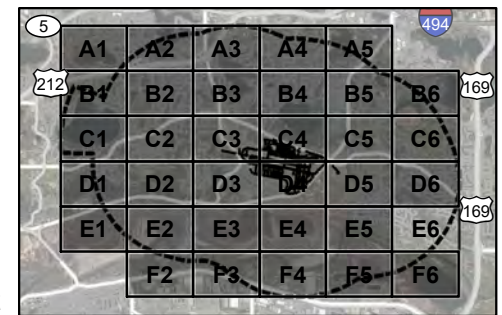
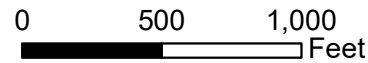
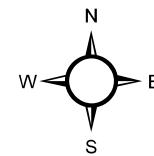
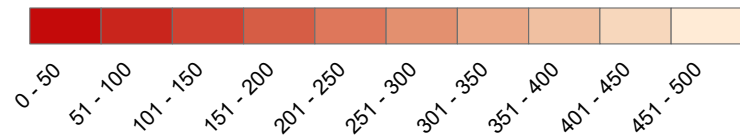
MCH - E5

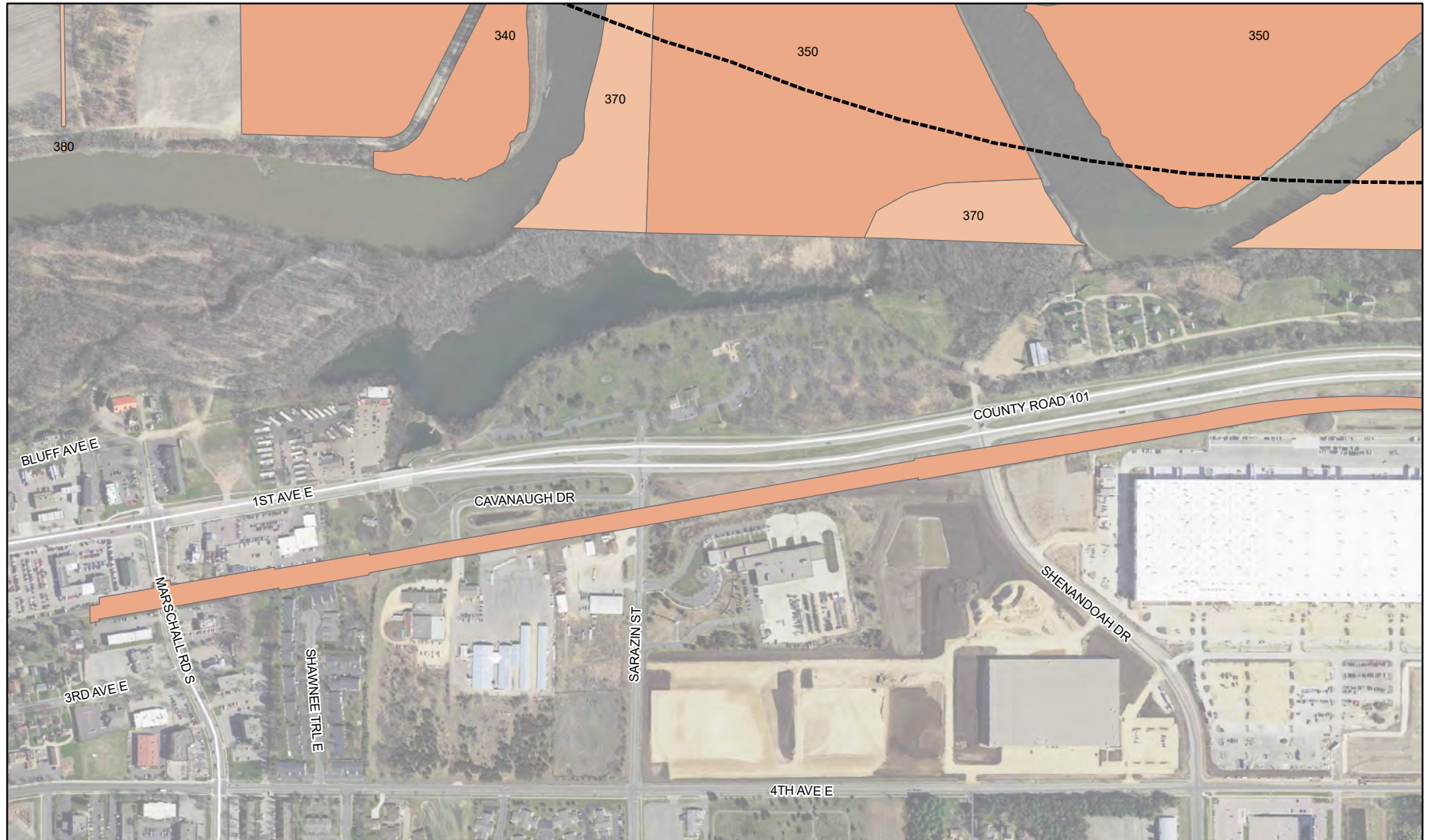




# FCM Maximum Construction Heights Without Permit Within Zoning Limits

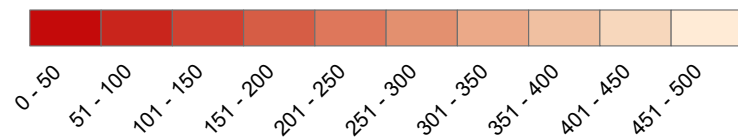
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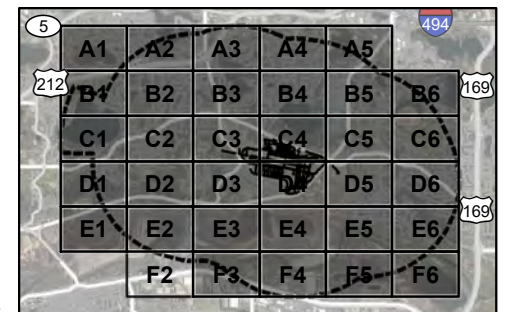
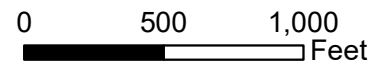
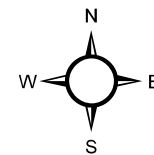


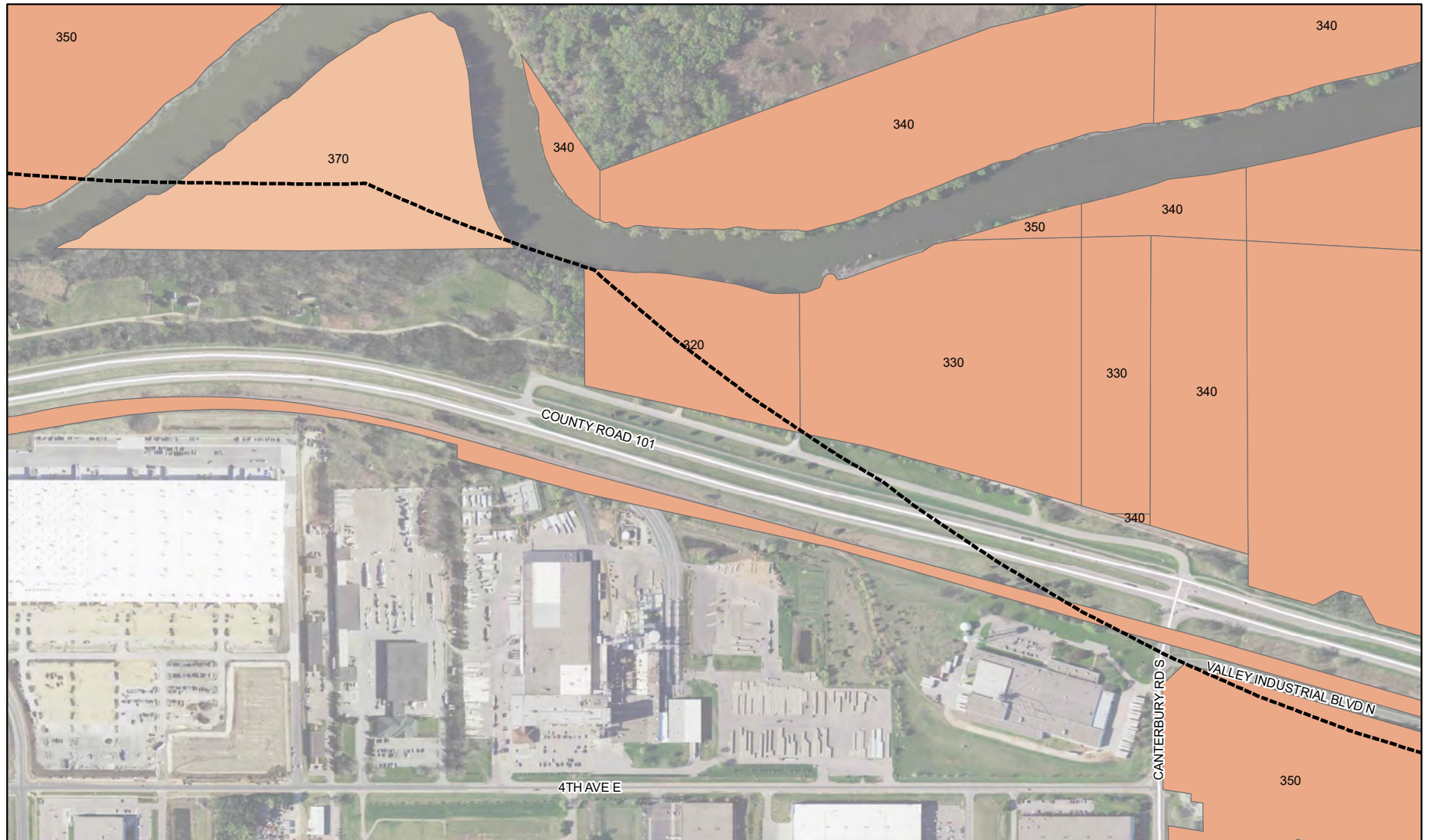
## FCM Maximum Construction Heights Without Permit Within Zoning Limits

MCH - F2



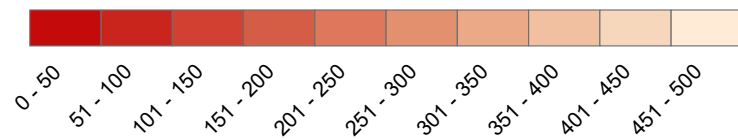
FCM Zoning Ordinance Update



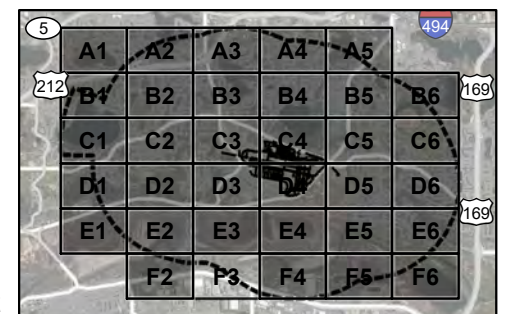
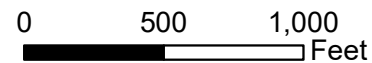
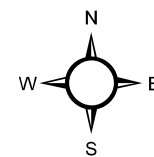


### FCM Maximum Construction Heights Without Permit Within Zoning Limits

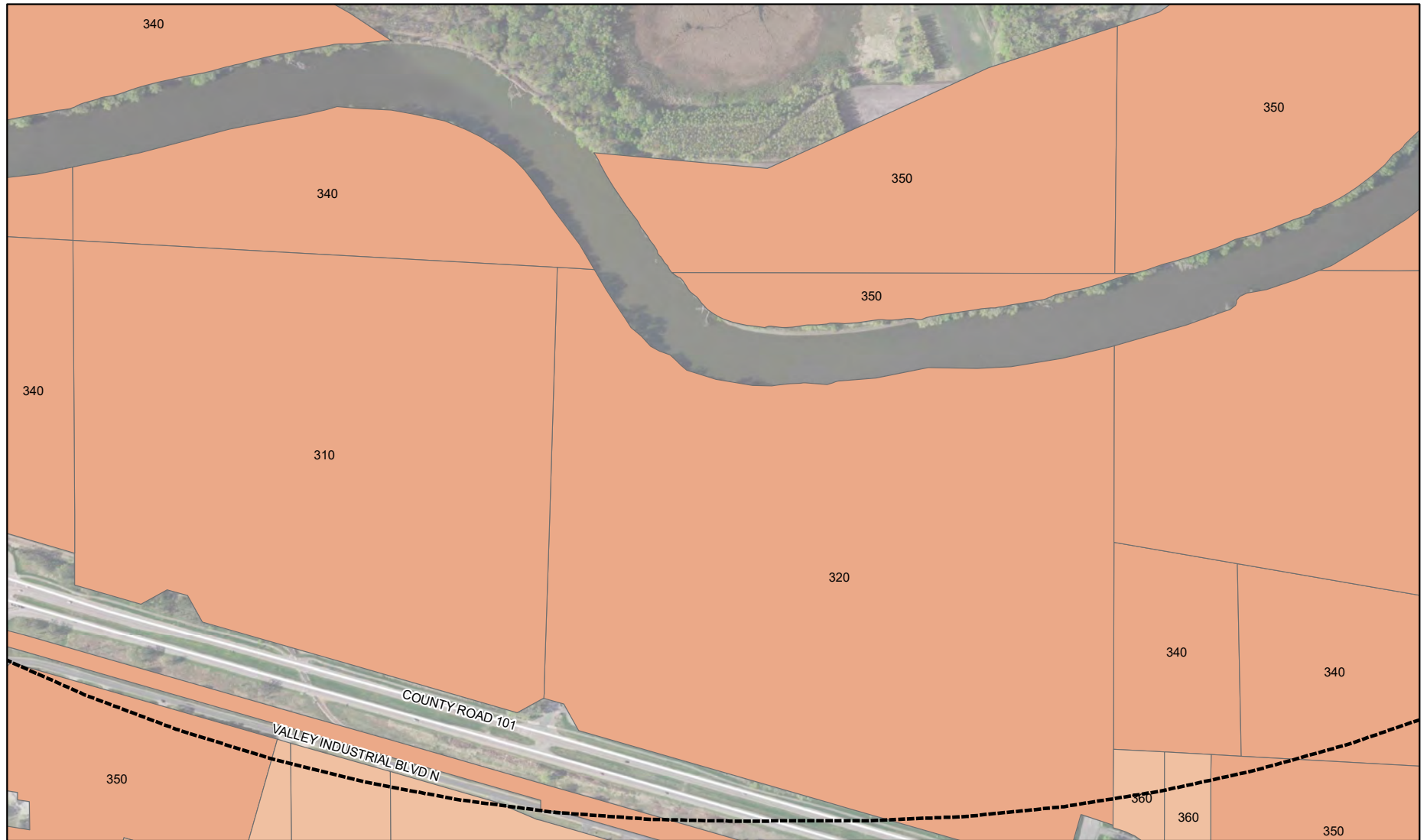
MCH - F3



FCM Zoning Ordinance Update

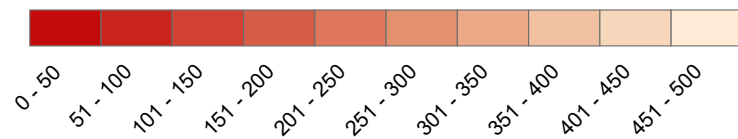




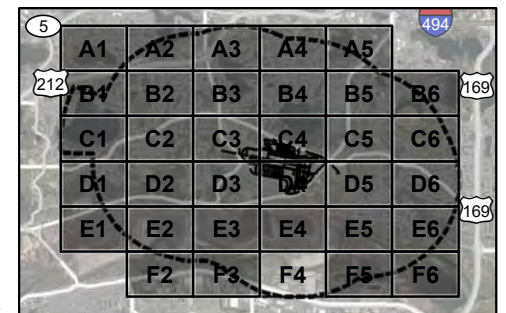
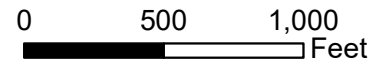
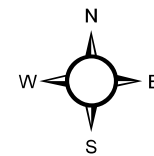


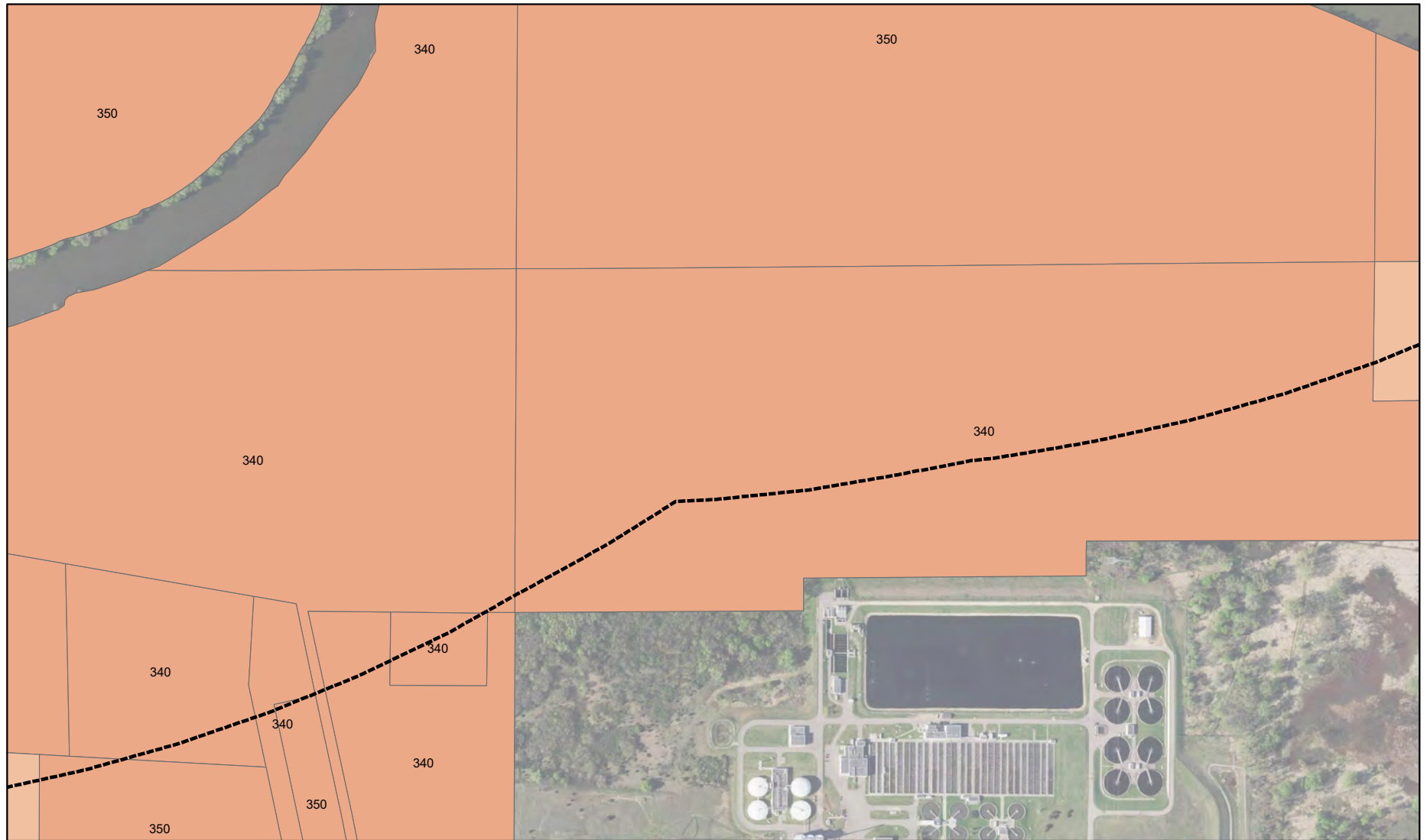
### FCM Maximum Construction Heights Without Permit Within Zoning Limits

MCH - F4



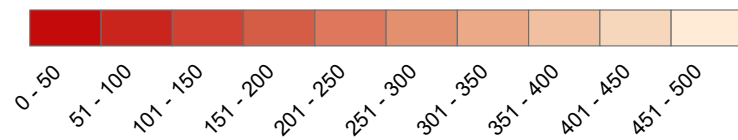
FCM Zoning Ordinance Update



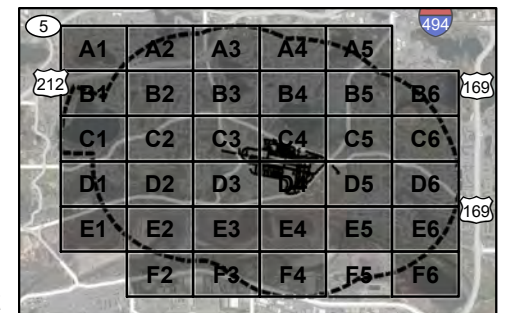
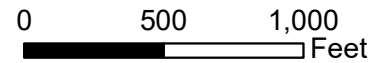
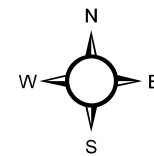


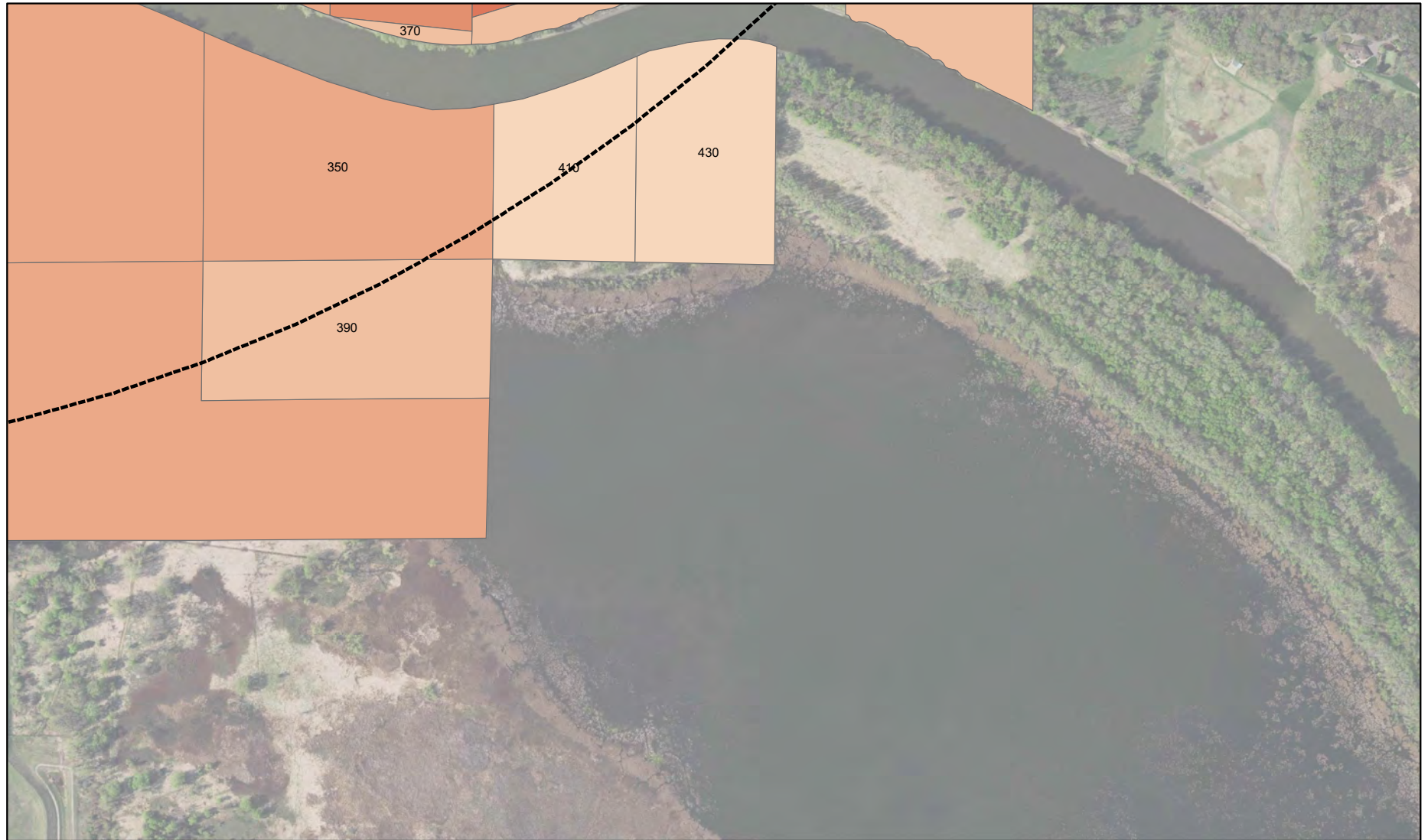
**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

**MCH - F5**



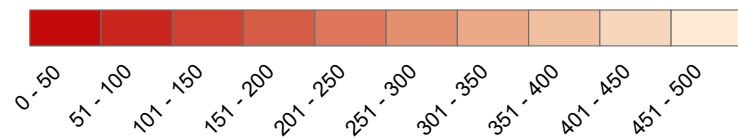
FCM Zoning Ordinance Update



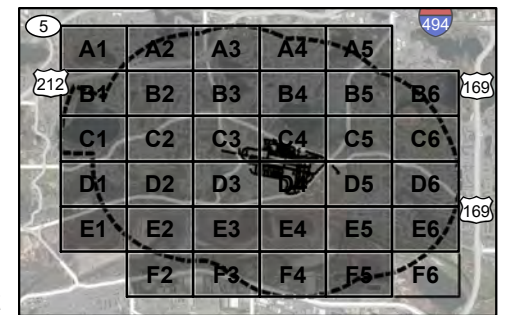
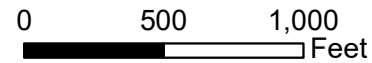
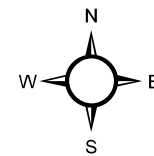


**FCM Maximum Construction Heights Without Permit  
Within Zoning Limits**

**MCH - F6**



FCM Zoning Ordinance Update



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**Appendix 11: Public Hearing Report**

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# Draft Flying Cloud Airport Zoning Ordinance

## Public Hearing Report

### First Public Hearing

### February 27, 2018

A public hearing was conducted at 6:30 p.m. on February 27, 2018 at the Eden Prairie City Center, City Council Chambers, to receive verbal and written comments about the draft Airport Zoning Ordinance for Flying Cloud Airport. Public notice of the hearing was provided (**Item A**).

Present at the public hearing were the following Joint Airport Zoning Board (JAZB) members, who served as Hearing Officers: Brad Aho (Chair, Eden Prairie), Kate Aanenson (Chanhassen), Keith Tschohl (Eden Prairie), Julie Klima (Eden Prairie), Michael Beard (Shakopee), Eric Weiss (Shakopee), Rick King (MAC), and Katie Clark Sieben (MAC). MAC staff present at the public hearing included Bridget Rief (Vice President, Planning and Development), Neil Ralston (Airport Planner), Evan Wilson (Senior Attorney), Shelly Cambridge (Administrative Assistant and JAZB Board Secretary), Mike Wilson (FCM Airport Manager), Gary Schmidt (Director of Reliever Airports), and Jenn Felger (Planning and Environment Coordinator).

Twelve people signed in on the attendance sheets (**Item B**).

The proceedings of the Public Hearing were transcribed by a qualified court reporter (**Item C**).

Neil Ralston, Airport Planner, provided an overview presentation of the draft Airport Zoning Ordinance for Flying Cloud Airport (**Item D**). Several members of the public asked verbal questions about the proposed airport zoning ordinance after the presentation but before the start of the public hearing. These comments are recorded on the official Public Hearing Transcript.

Exhibits A through I were entered into the record by MAC during the public meeting. Exhibits A through I are listed as **Item E** and are available upon request to Shelly Cambridge, JAZB Secretary, at 612-726-8144 or via email at [Shelly.Cambridge@mspmack.org](mailto:Shelly.Cambridge@mspmack.org).

All persons in attendance and wishing to do so were given the opportunity to testify and introduce evidence regarding the issues set forth in the Notice of Public Hearing. No testimony was given.

The public hearing record was kept open until 5:00 p.m. on Wednesday, March 14, 2018, to receive written comments from interested parties. Four (4) written comments were received during the public comment period. These comments, along with responses, are included as **Item F**.

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## **Item A –**

# Notice of Public Comment Period and Public Hearing for Draft Flying Cloud Airport Zoning Ordinance

## NOTICE OF PUBLIC COMMENT PERIOD AND PUBLIC HEARING FOR DRAFT FLYING CLOUD AIRPORT (FCM) ZONING ORDINANCE

The Joint Airport Zoning Board (JAZB) for Flying Cloud Airport (FCM) is developing an *Airport Zoning Ordinance* for land uses around FCM. This is a continuation of the airport zoning effort started in 2009-2010 but not finalized. Similar to the previous zoning proposal, the *Draft FCM Zoning Ordinance (Zoning Ordinance)* limits the height of structures and vegetation and prohibits certain land uses in an area extending approximately 2 miles from the outer boundaries of FCM. The zoning is being conducted as required by Minnesota Statutes 360.061 – 360.074 and Minnesota Rules 8800.1200 and 8800.2400. Maps that are part of the proposed *Zoning Ordinance* show the precise boundaries for application of the *Zoning Ordinance* and the associated proposed restrictions. A summary map showing the proposed Safety Zones is shown on the reverse side of this notice.

The proposed *Zoning Ordinance* would:

- Limit the height of structures and vegetation out to approximately 2 miles to the west of FCM, and out to approximately 1.5 miles in all other areas around the airport. In most cases, however, the airport zoning height limitations would be less restrictive than maximum heights allowed in the municipal zoning code.
- Prohibit the development of structures in Safety Zone A, which is mostly contained to airport-owned property;
- Prohibit, in Safety Zone B, the construction of amphitheaters, hospitals, nursing homes, residential uses, schools, stadiums and ponds or other features which might attract waterfowl or other birds, with the exception that the proposed restrictions in Safety Zone B do not affect additions to existing residences, residential redevelopment or future residential development in certain Permitted Residential Areas;
- Require a contiguous open space within Safety Zone B of either 20% of the total Safety Zone B acreage or 20 acres, whichever is larger; and
- Prohibit, in Safety Zones A, B and C, the use of land that creates or causes interference with the operations of radio or electronic facilities on FCM or with radio or electronic communications between FCM and aircraft, makes it difficult for pilots to distinguish between Airport lights and other lights, results in glare in the eyes of pilots using FCM, impairs visibility in the vicinity of FCM, or otherwise endangers the landing, taking off, or maneuvering of aircraft in the runway approach areas.

THE PUBLIC COMMENT PERIOD ON THE PROPOSED ZONING ORDINANCE WILL COMMENCE AT 8:00 A.M. ON MONDAY, FEBRUARY 12, 2018, AND CLOSE AT 5:00 P.M. ON WEDNESDAY, MARCH 14, 2018. During this period, written comments will be accepted and must be addressed to:

Secretary to the FCM Joint Airport Zoning Board  
Metropolitan Airports Commission  
6040 28th Avenue South  
Minneapolis, MN 55450

Comments can also be emailed to [fcm.zoning@mspm.com](mailto:fcm.zoning@mspm.com)

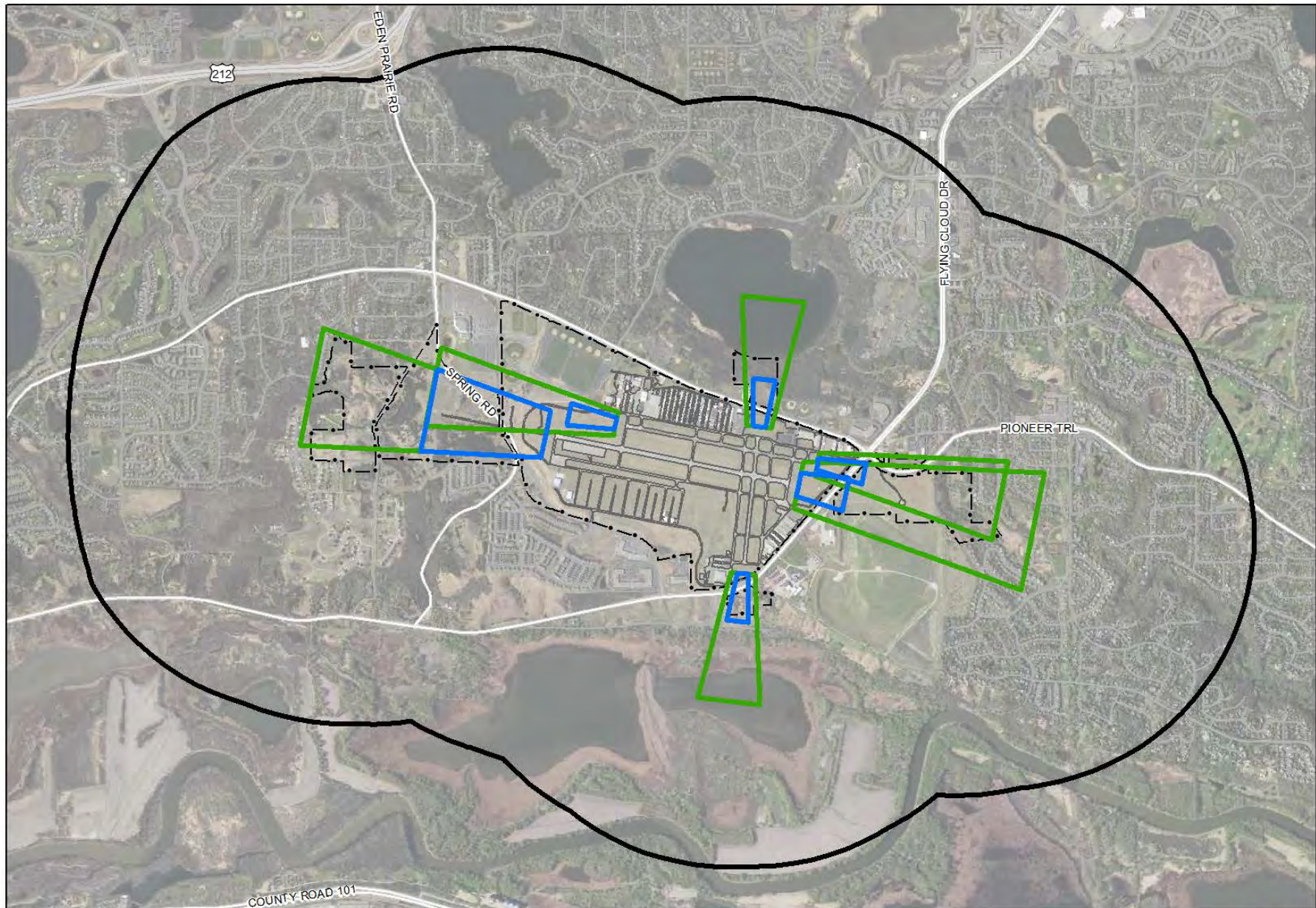
A PUBLIC HEARING ON THE PROPOSED ZONING ORDINANCE IS SCHEDULED FOR TUESDAY, FEBRUARY 27, 2018, AT THE EDEN PRAIRIE CITY HALL COUNCIL CHAMBERS, 8080 MITCHELL ROAD, EDEN PRAIRIE, MN. THE PUBLIC HEARING WILL BEGIN AT 6:30 P.M. AND LAST UNTIL ALL PERSONS WISHING TO ADDRESS THE BOARD HAVE BEEN HEARD. AN OPEN HOUSE WILL BE HELD PRIOR TO THE PUBLIC HEARING STARTING AT 5:00 P.M. FOLLOWED BY A PUBLIC PRESENTATION FROM 6:00 P.M. TO 6:30 P.M.

Copies of the proposed *Zoning Ordinance* will be available for review beginning on Monday, February 12, 2018, at the following locations: the Metropolitan Airports Commission's Main Office, 6040 28<sup>th</sup> Avenue South, Minneapolis; the City Halls of the cities of Eden Prairie, Shakopee, and Chanhassen; and the Eden Prairie Library, 565 Prairie Center Drive, Eden Prairie. The proposed Zoning Ordinance will also be available for review beginning February 12, 2018 on the MAC website at:

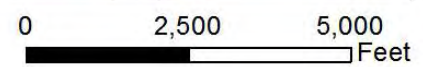
<https://metroairports.org/General-Aviation/Airports/Flying-Cloud/Joint-Airport-Zoning-Board-Flying-Cloud.aspx>

For further information about the public comment period, the open house or the public hearing, please call Shelly Cambridge, Secretary to the FCM Joint Airport Zoning Board, at (612) 726-8144.

# DRAFT FLYING CLOUD AIRPORT ZONING ORDINANCE – PROPOSED SAFETY ZONES



--- FCM Property Line     JAZB Safety Zone A     JAZB Safety Zone B     JAZB Safety Zone C



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**Item B –**  
**Public Hearing Attendance Sheets**

# PLEASE SIGN IN

## Flying Cloud Airport (FCM) Joint Airport Zoning Board Draft Airport Zoning Ordinance

### Open House and Public Hearing Eden Prairie City Hall Council Chambers Tuesday, February 27, 2018 5:00 – 8:00 p.m.

<u>Name</u>	<u>Address</u>	<u>E-Mail Address</u>
Ken Reineccius	12100 Pioneer Trail EP 55347	KReineccius@psychist.com
Terry Schneider	15333 Boulder Cr. Dr. MTKA.	terry@projectdevelopersinc.com
John Fedora	9870 Tree Farm Rd	JPFedora@icloud.com
MARY STOECKER	12107 CARTWAY CURVE EP 55347	mstoeckfl@comcast.net
Macy Misick	9523 Grey Widgeon Place	macmisick@gmail.com
David Kraemer	9017 Victoria Dr	
John Kirk	15365 Village Wood Dr EP	<del>john</del> enterprise.z.kirk@quik.com
Mark UMHOLTZ	139 W DIAMOND LK RD NPLS	MARK.UMHOLTZ@STATE.MN.US
TOM TRAUGOLDEN	8500 MONTGOMERY CT	TRAUGOLDEN@KSHI.COM
Mark Freiberg	10425 Buckingham Dr EP 55347	protyme@aol.com
Sandy Langsdorf	10291 Winter Pl.	



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**Item C –**  
Public Hearing Transcript

1	METROPOLITAN AIRPORTS COMMISSION
2	
3	<hr/>
4	
5	PUBLIC HEARING
6	RE:
7	DRAFT FLYING CLOUD AIRPORT (FCM)
8	ZONING ORDINANCE
9	
10	ORIGINAL
11	HELD ON
12	FEBRUARY 27, 2018
13	6:00 p.m.
14	EDEN PRAIRIE CITY HALL COUNCIL CHAMBERS
15	8080 MITCHELL ROAD, EDEN PRAIRIE, MINNESOTA
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18	
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25	REPORTED BY: CAITLIN J. ALBRECHT

800-545-9668  
612-339-0545

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APPEARANCES

FLYING CLOUD AIRPORT

JOINT AIRPORT ZONING BOARD MEMBERS:

Brad Aho, JAZB Chair

Kate Aanenson, Chanhassen

Keith Tschohl, Eden Prairie

Julie Klima, Eden Prairie

Michael Beard, Shakopee

Eric Weiss, Shakopee

Rick King, Metropolitan Airports Commission

Katie Clark Sieben, Metropolitan Airports Commission

METROPOLITAN AIRPORTS COMMISSION STAFF:

Bridget Rief, Vice President - Planning &  
Development

Neil Ralston, Airport Planner

Evan Wilson, Senior Attorney

Shelly Cambridge, Board Secretary

1 CHAIR AHO: I'll call the meeting to  
2 order, then. My name is Brad Aho and I am the chair of  
3 the Flying Cloud Airport Joint Airport Zoning Board,  
4 and I welcome all of you to tonight's meeting. This is  
5 a public meeting, and it's a public hearing on the  
6 proposed airport zoning ordinance.

7 Board members, why don't we go around and  
8 introduce ourselves. We'll start down here with Katie.

9 MS. SIEBEN: I'm Katie Clark Sieben. Do I  
10 need to --

11 CHAIR AHO: So make sure that your  
12 microphone says live and that's green.

13 MS. SIEBEN: Thank you.

14 Katie Clark Sieben with Metropolitan Airports  
15 Commission.

16 MR. WEISS: Eric Weiss, long-range  
17 planner, City of Shakopee.

18 MR. BEARD: I'm Mike Beard, Scott County  
19 Commissioner. I'm here representing Shakopee this  
20 evening.

21 CHAIR AHO: So I serve on the city council  
22 in Eden Prairie and am currently chair.

23 MR. KING: Rick King. I'm on the  
24 Metropolitan Airports Commission, and my area includes  
25 Eden Prairie, and I live here.

1 MR. TSCHOHL: I'm Keith Tschohl. I'm  
2 chair of the Flying Cloud Airport Advisory Commission  
3 for the City of Eden Prairie.

4 MS. KLIMA: I'm Julie Klima. I'm the city  
5 planner for the City of Eden Prairie.

6 MS. AANENSON: Kate Aanenson. I'm the  
7 community development director for the City of  
8 Chanhassen.

9 MS. RIEF: And I am Bridget Rief with the  
10 Metropolitan Airports Commission. I am the staff  
11 liaison at the airport.

12 CHAIR AHO: Great. Well, thank you, all.

13 So the structure of the Board meeting and the  
14 public hearing is going to be as follows this evening:

15 So, first, we're going to have -- Neil Ralston,  
16 who is the planner for the Metropolitan Airports  
17 Commission, is going to provide an overview of the  
18 Flying Cloud Airport Zoning Ordinance.

19 Second, we're going to have exhibits for the  
20 hearing entered into the record starting at 6:30.

21 And, third, the Board will take testimony from  
22 the public on the proposed Flying Cloud Airport Zoning  
23 Ordinance. So if anyone has a prepared statement or  
24 document, you may read it into the record or submit it  
25 or both, and we'll make it part of the record. And the

1 Board just asks that you limit your statement to no  
2 more than 5 minutes so that everyone gets a chance to  
3 speak. I don't think it's going to be a problem  
4 tonight. But if you wish to testify, please fill out a  
5 speaker card and hand it to the Board secretary,  
6 Ms. Shelly Cambridge.

7 And, Shelly, do you want to stand so everyone  
8 can see? Is she -- where is she?

9 MS. RIEF: She's in the back, standing by  
10 the table.

11 CHAIR AHO: She's in the back. Okay.

12 All right. So if you have any questions, go  
13 back there and fill out a card, please. And -- let's  
14 see.

15 So this is a public hearing about zoning and  
16 not about airport noise -- I just want to make that  
17 very clear so that everyone understands why we're here  
18 tonight -- and adoption of the zoning ordinance will  
19 not alter the number, frequency, or noise level of  
20 traffic at the airport. Any zoning ordinance would  
21 affect the land use surrounding the airport.

22 And we will have a -- we have a court reporter  
23 here tonight who is going to take notes on all the  
24 proceedings. Other than that, the meeting is not  
25 televised, nor is it recorded.

1           So, Mr. Ralston, will you take it away, please,  
2           and give us the presentation.

3           MR. RALSTON: Thank you, Chair Aho. And  
4           good evening, everyone. Thank you for taking the time  
5           to join us tonight.

6           As I said, my name's Neil Ralston. I'm the  
7           airport planner for the airport's commission.

8           Can everybody hear me okay? Excellent.

9           CHAIR AHO: Those microphones should work.  
10          Just make sure that they're on.

11          MR. RALSTON: Yeah, I think we're good.

12          CHAIR AHO: Okay. Good.

13          MR. RALSTON: Excellent.

14          I'm here tonight to give a brief overview of  
15          the draft airport zoning ordinance that is being  
16          developed for Flying Cloud Airport. I'm going to begin  
17          with presenting the purpose and goals for the Joint  
18          Airport Zoning Board, along with the timeline of this  
19          Board's activity going back to 2009.

20          Then I'll move into a summary of the draft  
21          airport zoning ordinance itself.

22          And finally, we'll talk about the next steps in  
23          the process to advance the draft ordinance towards  
24          approval and final adoption.

25          Before going any further, however, I'd like to

1 define a few of the terms and acronyms that I'll be  
2 using tonight both in my presentation and that you'll  
3 see on the slides.

4 First, the three letters "FCM" refer to Flying  
5 Cloud Airport. That is the official airport identifier  
6 that pilots use when they're flying into the airport.

7 Second, the term "JAZB," which I'll pronounce  
8 as JAZB (pronounced JAZZ-bee), that refers -- that's  
9 the shorthand version of Joint Airport Zoning Board.

10 Next, "MnDOT" refers to the Minnesota  
11 Department of Transportation, Office of Aeronautics.

12 And finally, "FAA" is used to reference the  
13 Federal Aviation Administration.

14 So why is it important for the JAZB to pursue  
15 airport zoning for Flying Cloud Airport now? First,  
16 and perhaps foremost, zoning remains a requirement of  
17 state law. MnDOT's expectation is that the JAZB will  
18 successfully develop zoning for the airport in order to  
19 avoid potential airport improvement grant funding  
20 implications.

21 Second, the pace of development around Flying  
22 Cloud Airport is only increasing, and the lack of an  
23 adopted airport zoning ordinance is creating  
24 uncertainty and some level of confusion about possible  
25 land use controls in the area of the airport.



1 Third, the Metropolitan Airports Commission  
2 would like to continue to pursue non-aeronautical  
3 commercial use of some airport parcels of land that are  
4 within the designated safety zones. Uncertainty  
5 regarding zoning is holding up the approval process for  
6 these parcels, and that's a hurdle that we'd like to  
7 remove.

8 Last but not least, it is time to finish what  
9 was started back in 2009, to provide a level of  
10 certainty to all stakeholders about airport zoning  
11 requirements around the airport.

12 So at a high level, this group, the JAZB's  
13 purpose, is to collaboratively develop an airport  
14 zoning ordinance that achieves a balance between  
15 providing for a reasonable level of public safety while  
16 allowing for compatible community development to occur.  
17 To achieve this, Minnesota state statutes provide  
18 guidance to consider the social and economic cost of  
19 restricting land uses versus the benefits that would be  
20 derived from a strict application of the state's model  
21 airport zoning ordinance. The state's model zoning  
22 ordinance is a template provided by MnDOT that provides  
23 a common approach to developing zoning for all airports  
24 in Minnesota.

25 The overarching goal for this JAZB is to

1 develop an airport zoning ordinance for review and  
2 approval by the MnDOT Commissioner of Transportation  
3 that would subsequently be adopted by the Board, and  
4 then by local communities.

5 Supporting goals for this JAZB include updating  
6 the relevant sections of the draft ordinance to reflect  
7 current conditions and trends, and to ensure that an  
8 appropriate level of stakeholder and community  
9 engagement occurs. Tonight's hearing, of course, is an  
10 important step in achieving that goal.

11 Next, I'd like to take a quick trip down memory  
12 lane to help provide some context for where we are  
13 headed next. This Joint Airport Zoning Board was stood  
14 up back in 2009 and first met in July of that year. By  
15 April of 2010, the group had done a lot of heavy  
16 lifting and developed a draft airport zoning ordinance  
17 that was ready for public review.

18 A public hearing, much like this one, for the  
19 ordinance was held on April 29th of 2010. The draft  
20 airport zoning ordinance was then finalized and  
21 submitted to the MnDOT Commissioner of Transportation  
22 for review and action in December 2010. However, in  
23 early 2011, MAC requested on behalf of the JAZB that  
24 MnDOT temporarily suspend review of the draft ordinance  
25 due to legal uncertainties surrounding airport

1 zoning-related litigation that was pending in the state  
2 at the time.

3 Fast-forwarding to 2016, that litigation had  
4 been settled, and it was becoming increasingly apparent  
5 that there was a need to move forward with completing  
6 the zoning effort due to the pace of development  
7 activity around the airport. Based on coordination  
8 with MnDOT, it was determined that too much time had  
9 passed just to pick up where we had left off in early  
10 2011 without reconvening the Board and reengaging with  
11 stakeholders.

12 To accomplish this, the first meeting of the  
13 reconvened Joint Airport Zoning Board was held in  
14 September of 2017. Between then and now, the JAZB has  
15 been working to update the draft airport zoning  
16 ordinance and supporting studies, which include a  
17 safety/risk study and an economic impact analysis.  
18 These updates validate the original JAZB  
19 recommendations pertaining to the major elements of the  
20 proposed zoning ordinance, so only minor updates are  
21 being proposed at this time, and we'll go through what  
22 those are here in a few moments.

23 At its meeting a few weeks ago on January 18th,  
24 the JAZB formally approved an updated version of the  
25 zoning ordinance for formal public review and comment,

1 and that is serving as the basis for this public  
2 hearing tonight.

3 So moving into the ordinance itself. This  
4 slide shows the airfield configuration that served as  
5 the basis for the updated draft ordinance. Runway  
6 18-36, which is the north-south crosswind runway -- if  
7 you can see the cursor moving here -- was incorporated  
8 into the ordinance at its current length of 2,691 feet.  
9 In the previous version of the ordinance, this runway  
10 was shown to be extended to a slightly longer length.

11 Meanwhile, the north parallel runway 10L-28R  
12 here was incorporated as a utility category runway,  
13 whereas in the previous ordinance, it had a different  
14 designation. The distinction between the designations  
15 has to do with the types and the weights of aircraft  
16 that use the runway on a regular basis. Since the  
17 north parallel runway does not accommodate a lot of  
18 larger, heavier aircraft types, the utility runway  
19 designation is appropriate. The length, width, and  
20 operational characteristics of the north parallel  
21 runway are not affected by the change.

22 From a zoning and land use perspective, the  
23 change results in a smaller protection zone at the end  
24 of the north parallel runway -- at each end of the  
25 north parallel runway. From an airspace and height

1 limitation perspective, it also results in a steeper or  
2 less restrictive approach surface slope. As noted on  
3 the slide, these configuration changes from the 2010  
4 draft ordinance result in less restrictive zoning  
5 areas.

6 The draft airport zoning ordinance continues to  
7 have two primary components: Height limitations and  
8 land use limitations. We'll cover both, starting with  
9 the height limitations item.

10 The draft zoning ordinance establishes an  
11 airspace zone to limit the height of structures and  
12 vegetation out to approximately 2 miles to the west of  
13 the airport and out to approximately 1 1/2 miles around  
14 the airport and other areas. The airspace zone heights  
15 are based on the FAA's airspace criteria.

16 If a proposed development seeks to penetrate  
17 the height limitations stipulated by an airspace zone,  
18 a variance will have to be granted for that penetration  
19 by a Board of Adjustment. The Board of Adjustment is  
20 proposed to be comprised of members of the Metropolitan  
21 Airports Commission.

22 The ordinance does provide for an exception  
23 from seeking a variance for an airspace surface  
24 penetration. If the applicant submits an aeronautical  
25 study review case to the FAA and the FAA determines

1 that the object penetrating the surface would not be a  
2 hazard to air navigation and would not require changes  
3 to airport operations, and the proponent complies with  
4 any conditions included in the FAA's determination,  
5 then no variance would be required.

6 Now, the draft ordinance includes a set of grid  
7 maps that show the airspace zone heights in 10-foot  
8 intervals for areas surrounding the airport. As an  
9 example, what's on the slide shows grid location C3,  
10 which is on the northwest side of the airport. Just  
11 for orientation purposes, each of the graphics in the  
12 zoning ordinance has an index at the bottom that shows  
13 the geographic grid of the spreads -- geographic spread  
14 of the grids -- I'm sorry -- each of which has its own  
15 grid map in the document. The heights on these grid  
16 maps are expressed as above mean sea level, not above  
17 ground level, so to calculate the height above the  
18 ground of this airspace zone, one must subtract the  
19 ground elevation from the airspace elevation.

20 To provide more specificity and perhaps clarity  
21 on the allowable heights for each parcel, we have  
22 created another set of grid maps called "Maximum  
23 Construction Heights Without Permit." These maps  
24 establish a height per parcel up to which an airport  
25 zoning permit is not needed.

1           Now, as a point of clarification, an airport  
2 zoning permit is different than a variance issued by  
3 the Board of Adjustment. For example, if a proposed  
4 development does not exceed the maximum construction  
5 height without permit elevation, no zoning permit or  
6 variance is needed; however, an FAA airspace review may  
7 still be required. If a proposed development exceeds  
8 the maximum construction height without permit  
9 elevation, but does not penetrate an airspace zone, the  
10 applicant will need to obtain an airport zoning permit  
11 from the city zoning administrator, but not a variance.

12           The maximum construction heights without permit  
13 are intended to provide a buffer below the airspace  
14 surfaces -- I'm sorry -- the airspace zones, and we  
15 think it's prudent for the city zoning professionals to  
16 review proposed developments that are getting close to  
17 penetrating the airspace zones. If a proposed  
18 development exceeds both the maximum construction  
19 height without permit elevation and penetrates the  
20 airspace zone, then both an airport zoning permit and a  
21 variance would be needed.

22           The draft ordinance also contains a series of  
23 grid maps showing the maximum construction heights  
24 without a permit that have been calculated for each  
25 parcel within the zoning area. This example continues

1 to use the grid section C3, again, on the northwest  
2 side of the airport. Each of the heights shown is  
3 expressed as above ground level, making it easier to  
4 interpret views in the previous airspace zone grid  
5 maps.

6 These heights were calculated by identifying  
7 the location of each parcel where the highest ground  
8 level was under the lowest airspace zone elevation. We  
9 then subtracted the ground elevation from the airspace  
10 height and then rounded it down to the nearest 10-foot  
11 interval. In the vast majority of cases, we found that  
12 the airport zoning height limitations would be less  
13 restrictive than the maximum structure heights allowed  
14 in municipal zoning codes.

15 Next we'll move on to the land use safety  
16 zones. The draft ordinance provides three safety  
17 zones, Zones A, B, and C. JAZB Safety Zone A is the  
18 most restrictive zone, and that's located immediately  
19 off the ends of the runways and prohibits structures  
20 and trees.

21 JAZB Safety Zone B is a less restrictive zone,  
22 located further off the runway ends, that contains  
23 prohibitions against certain land uses. Residential  
24 development is allowed in permanent residential areas  
25 within JAZB Safety Zone B.



1 JAZB Safety Zone C is the least restrictive  
2 zone and contains general land use restrictions against  
3 interfering with flight activity at Flying Cloud  
4 Airport.

5 Next, I'm going to go into a little more detail  
6 on each of those zones, starting with Zone C and then  
7 working back in towards Zone A.

8 JAZB Safety Zone C is shown by the black  
9 ellipsoid line on the slide. It's established by  
10 drawing radiuses of specified distances from the runway  
11 ends. Again, it is the least restrictive safety zone  
12 in that it calls for general prohibitions that would  
13 interfere with flight activity at Flying Cloud Airport.

14 Even though the language here may seem a bit  
15 technical, the uses prohibited in Zone C are generally  
16 commonsense items that the vast majority of people  
17 wouldn't partake in anyway. For example, use of a  
18 high-powered radio transmitter that would interfere  
19 with navigational aids at the airport or would  
20 interfere with communications between aircraft and air  
21 traffic controllers would be a use that we would be  
22 trying to prevent. Another example of an undesirable  
23 use would be bright uplighting, like searchlights or  
24 lasers pointed into the sky that could blind pilots.

25 We did receive a question via e-mail from an

1 area resident asking if we were seeking to prohibit the  
2 use of rooftop solar panels on homes within Zone C due  
3 to glare concerns. In response, we want to clarify  
4 that the draft ordinance does not seek to prohibit  
5 residential solar installations. If a particular solar  
6 installation is determined to cause glare issues for  
7 pilots, using the airport, we would want to work with  
8 that property owner to mitigate to the extent practical  
9 that visual impairment. However, based on operational  
10 experience, the likelihood of a typical residential  
11 rooftop solar installation to cause a glare problem is  
12 expected to be a very rare occasion.

13 In the event that a property owner wishes to be  
14 proactive about the potential of glare concerns from a  
15 specific solar installation, there is an option of  
16 submitting an airspace review case to the appropriate  
17 agencies to take a look at it in advance.

18 And finally, the land use controls established  
19 for JAZB Zone C apply to the other two JAZB safety  
20 zones as well.

21 Next, we'll move inward to Safety Zone B, which  
22 is shown on this graphic as green trapezoids. JAZB  
23 Safety Zone B is more restrictive than C but less  
24 restrictive than A. It prohibits certain land uses,  
25 such as amphitheaters and theaters, churches,

1 hospitals, nursing homes, schools, stadiums, and  
2 wildlife attractants, particularly those attractants  
3 that would attract waterfowl like the Canada goose.

4 The length and outer width of the proposed JAZB  
5 Safety Zone B is based on MnDOT's state model zone  
6 dimensions; however, the draft JAZB ordinance is  
7 proposing less stringent land use controls than those  
8 prescribed by MnDOT's state model. For example, JAZB  
9 Safety Zone B does not prescribe a minimum parcel size  
10 for development, nor does it limit site populations  
11 based on site acreage. These limitations were relaxed  
12 in the JAZB ordinance based on the results of a  
13 detailed safety/risk study and economic impact analysis  
14 that were specific to the conditions at Flying Cloud  
15 Airport.

16 As another feature, the proposed JAZB Safety  
17 Zone B allows for the improvement, expansion of  
18 existing, and development of new residential uses in  
19 areas guided for residential development and designated  
20 in the ordinance as permitted residential areas. These  
21 permitted residential areas, as shown with green  
22 shading on this slide, are recognized and treated as  
23 conforming land uses in the draft ordinance.

24 Finally, JAZB Safety Zone B contains a  
25 requirement to provide a minimum of 20 percent of the

1 total Zone B acreage or 20 acres, whichever is greater,  
2 to remain as continuous open space. The purpose for  
3 the open space is to provide an extra margin of safety  
4 by providing a large area for the pilot of a disabled  
5 aircraft to be able to make an emergency landing,  
6 should that be needed. The open space requirement  
7 applies to the totality of the proposed JAZB Safety  
8 Zone B area and does not apply to each parcel within  
9 the zone.

10 As shown on the yellow shading on the slide,  
11 the Zone B open space requirement is easily met by  
12 existing airport-owned land, along with other  
13 off-airport property guided to remain as open space or  
14 otherwise not expected to be regularly occupied.

15 Lastly, JAZB Safety Zone A is shown by the blue  
16 trapezoid on the slide. As mentioned before, it's the  
17 most restrictive safety zone, that structures are  
18 prohibited unless needed for aviation purposes.

19 JAZB Safety Zone A is the same shape and size  
20 as the FAA-defined runway protection zone, or RPZ, off  
21 the ends of each runway. The runway protection zone  
22 has very similar land use restrictions mandated by the  
23 FAA, so it makes sense to pair the RPZ and Safety  
24 Zone A together.

25 The joint runway protection zone in Safety

1 Zone A are smaller than the Zone A prescribed in  
2 MnDOT's state model. Again, the results of the  
3 detailed safety/risk study and economic impact analysis  
4 suggests that the draft JAZB ordinance provides the  
5 reasonable level of safety that we are seeking.

6 Regarding the actual ordinance itself, we  
7 reviewed the draft language from 2010 to see if any  
8 elements needed to be updated. We did make a few minor  
9 text updates, primarily to update the zone descriptions  
10 and dimensions that changed the airfield configuration  
11 items that we previously discussed.

12 We also made a few other minor edits, such as  
13 removing the City of Bloomington from the list of JAZB  
14 participants since the proposed zoning surfaces do not  
15 extend into the municipal boundary, and also clarified  
16 a few items related to airspace evaluations and  
17 judicial review procedures. Other than these minor  
18 edits and clarifications, there were no substantial  
19 differences between the draft ordinance moving forward  
20 now and the one that moved forward back in 2010. We do  
21 have a track-changed version of the draft ordinance  
22 language available, so anyone interested to see the  
23 exact edits that have been made to the previous version  
24 of the ordinance can see them.

25 Which brings us to the next steps for the

1 process. This public comment period is open until  
2 Wednesday, March 14th. If you would like to provide  
3 written comments beyond any verbal testimony that you  
4 make here tonight, you can either fill out a comment  
5 form before you leave -- and Shelly in the back can  
6 point you to those if you're interested in that -- you  
7 can mail comments to us at the address in the notice or  
8 on the slide, or you can send them via e-mail as well.  
9 The e-mail address is in the notice for your use.

10 After the public comment period closes, the  
11 JAZB will review all testimony and comments submitted,  
12 then it will schedule its next meeting to discuss any  
13 proposed changes to the draft ordinance based on public  
14 input and the timeline for submittal to MnDOT.

15 After submitting the draft ordinance to MnDOT,  
16 the Board will await their comments and then work to  
17 address any feedback items that they have. We do  
18 expect that MnDOT will provide comments relative to  
19 areas where the draft JAZB ordinance deviates from the  
20 state model, and we look forward to productive dialogue  
21 with them about the justifications for those deviations  
22 based on the robust technical work of this group.

23 After MnDOT approves the airport zoning  
24 ordinance, we will hold another public hearing to  
25 present the final version to interested community

1 members, then the JAZB will take action to formally  
2 adopt the final ordinance, to be followed by formal  
3 adoption and implementation by the participating  
4 municipalities. We hope to finalize these steps yet  
5 during 2018.

6 So, Chair Aho, that concludes my presentation,  
7 but I would be happy for a few minutes to take  
8 questions until the public hearing starts at 6:30, if  
9 that would be something you would like to do.

10 CHAIR AHO: Yeah. So that gives about 5  
11 minutes. So if anyone has questions, now would be a  
12 good time, because during the public testimony, we're  
13 really just receiving testimony. We're not here to  
14 answer questions as part of this. We're just going to  
15 read -- or hear the testimony and read it into the  
16 record.

17 So if anyone has a question for Mr. Ralston,  
18 now would be a great time to do that.

19 MR. TRAUGHBER: Hi. My name is Tom  
20 Traughber. I live on Red Rock Lake, and I have a  
21 federally licensed amateur radio station with a 60-foot  
22 radio tower, and I do emit electronic emissions. It  
23 seems like this --

24 (Interruption in proceedings.)

25 MR. TRAUGHBER: So I'm wondering, given

1 that my station has a federal license, how is this  
2 Zone C going to impact my operation?

3 MR. RALSTON: Sir, it will not. If you  
4 have a federal license and it doesn't have any -- your  
5 activity does not have any adverse impact on flight  
6 activity at the airport, which if you've been doing  
7 this for a while, it sounds like --

8 MR. TRAUGHBER: Twenty years.

9 MR. RALSTON: -- it hasn't, it's not going  
10 to impact it.

11 MR. TRAUGHBER: Thank you.

12 MR. RALSTON: You're welcome.

13 CHAIR AHO: Anyone else have any questions  
14 that they'd like to ask?

15 MS. LANGSDORF: Does it affect any  
16 cellular towers or radio station -- you know, us  
17 getting service?

18 MR. RALSTON: No. No. I mean, we're  
19 trying to protect against things that would interfere  
20 with the use of the existing equipment on the airport  
21 or the communications between pilots and air traffic  
22 controllers, and, I mean, these things are all going on  
23 today. So cell phones' frequencies tend to be on a  
24 completely different frequency spectrum than aviation  
25 frequencies. There's not going to be any changes. We



1 just want to be able to address any issues that come up  
2 with somebody using some very specialized equipment  
3 that would start having interference. It's highly  
4 unlikely to happen, but it's one of those things we  
5 want to protect against.

6 MS. LANGSDORF: Thank you.

7 MR. RALSTON: You're welcome.

8 CHAIR AHO: Any other questions?

9 (No response.)

10 CHAIR AHO: It looks like you did a great  
11 job and you've answered all the questions, and I think  
12 everyone is happy.

13 So at this time -- well, at 6:30, we've got  
14 2 minutes left, then we'll start taking public  
15 testimony.

16 Mr. Beard.

17 MR. BEARD: Well, Mr. Chairman, as long as  
18 we're kind of running in place waiting for the clock to  
19 wind down ...

20 CHAIR AHO: Yep.

21 MR. BEARD: Neil, I'm interested in Safety  
22 Zone A. It's smaller than MnDOT's -- what MnDOT likes  
23 to see. Can you talk about how the commissioners are  
24 going to react to that, or have we had any experience  
25 with dealing with that? I've had some past experience

1 with that thousand-foot RPZ, they're pretty proud of  
2 that, and we're asking, I think, for a variance from  
3 that, if I'm not mistaken.

4 MR. RALSTON: Yeah, Commissioner, Board  
5 members, we are proposing that the Safety Zone A in the  
6 JAZB ordinance is a concurrent full size and shape with  
7 the FAA's runway protection zone. We do have that in  
8 place at MSP. That was part of the zoning ordinance at  
9 the Minneapolis-St. Paul International Airport. We  
10 believe that, you know, the FAA's criteria related to  
11 the RPZ is very consistent with what MnDOT would have  
12 in Zone A, and that it makes a lot of sense to pair  
13 them together. We hope MnDOT agrees that it's  
14 reasonable to make that correlation.

15 MR. BEARD: So, Mr. Chairman, then to be  
16 clear, Neil, what you're proposing in this revised  
17 zoning ordinance here comports with the FAA's  
18 protection zone; MnDOT's is a little more expansive  
19 than what the FAA is subscribing -- or prescribing?

20 MR. RALSTON: That's --

21 MR. BEARD: Okay.

22 MR. RALSTON: Sir, that is correct.

23 MR. BEARD: Thanks.

24 CHAIR AHO: Great. Thank you.

25 Any other questions from commissioners or

1 anyone in the audience?

2 Go ahead, sir.

3 MR. WINGERT: I have a question. I  
4 apologize, I was late.

5 You know, when we had the Super Bowl here, we  
6 had planes everywhere in Flying Cloud and there was a  
7 lot of noise. Do you -- is this a proposal to expand  
8 the runways and have bigger aircraft?

9 MR. RALSTON: No, sir. This has to do  
10 with -- the zoning ordinance has to do with land use  
11 and height restrictions around the airport to provide a  
12 balance between protecting pilots and people on the  
13 ground. It has nothing to do with expanding the  
14 airport.

15 MR. WINGERT: Larger aircraft coming here?  
16 It has nothing to do with larger aircraft?

17 MR. RALSTON: That is correct.

18 MR. WINGERT: Okay.

19 MR. RALSTON: This is purely to protect  
20 the existing infrastructure.

21 MR. TSCHOHL: Mr. Chair?

22 CHAIR AHO: Yes.

23 MR. TSCHOHL: One more question. There  
24 were two questions from the public about radio  
25 transmitters, other sources of interference. Just for

1 the record, would anything licensed by the FCC not be  
2 affected by this? Is that your understanding?

3 MR. RALSTON: My understanding is anything  
4 licensed by the FCC would have that review built in to  
5 make sure that it would not interfere with aviation  
6 frequencies.

7 MR. TSCHOHL: Thank you.

8 CHAIR AHO: All right. Well, it is 6:30  
9 now, so now I'd like to open the floor up to comments  
10 by the public.

11 So we'll now take public testimony. Again,  
12 speaker cards are located at the entrance to this room,  
13 so if you've not filled out a card but would like to  
14 speak, please raise your hand and a card will be  
15 brought to you. We will not be answering any more  
16 public questions tonight. Really, this is just about  
17 hearing from the public on the Joint Airport Zoning  
18 Board proposed zoning.

19 And so we are not going to be taking any action  
20 or making any recommendation tonight. All of the  
21 verbal and written comments will be taken into  
22 consideration before taking final action at a future  
23 meeting of the Joint Airport Zoning Board.

24 So a reminder to all of the JAZB members,  
25 tonight's hearing is primarily for the public to

1 provide comments. Once the hearing is complete and all  
2 comments are received, we, the JAZB members, will have  
3 our chance to review the public record and deliberate  
4 before voting. While the chair does not wish to  
5 discourage JAZB members' questions or discussion today,  
6 it might be better to hold them for a later meeting  
7 when we have the benefit of the full public record.

8 And again, the public record is open, as  
9 Mr. Neil said, until 5 p.m. on Wednesday, March 14th,  
10 2018. So there's a few weeks for people to get their  
11 notes into the public record, and if you want to -- oh,  
12 entering -- so, yeah. Let's see here.

13 If you want to deliver materials, you may make  
14 it a part of the record. Deliver them to the Board  
15 secretary at the Metropolitan Airports Commission,  
16 which is located at 6040 28th Avenue South,  
17 Minneapolis, Minnesota 55450, or you may transmit them  
18 by e-mail to fcm.zoning@mspamc.org [sic]. And if you  
19 need that again, talk to someone and we'll get that for  
20 you.

21 But finally, the Board requests that the public  
22 testimony focus on the proposed Flying Cloud Airport  
23 Zoning Ordinance. And again, let me note that this is  
24 not a public hearing on airport noise.

25 So at this time I don't have any cards for

1 requested speakers. I see we do have some back in the  
2 back. Would you mind bringing those forward, and then  
3 I will call the people forward as --

4 MS. CAMBRIDGE: These are blanks.

5 MR. RALSTON: Mr. Chair, while we're doing  
6 that, I have a couple exhibits I'd like to enter into  
7 the formal public meeting record, if that would be  
8 okay.

9 CHAIR AHO: Okay. Oh, I see.

10 I'm sorry, say that again.

11 MR. RALSTON: I have a couple exhibits  
12 that I'd like to enter into the public record before we  
13 go into public testimony, so --

14 CHAIR AHO: Yes, I see that. I skipped  
15 that part. I apologize.

16 MR. RALSTON: It's okay. Not to worry.

17 CHAIR AHO: So, yes, please -- at this  
18 time, Mr. Ralston, please proceed with entering those  
19 into the public record.

20 MR. RALSTON: All right. Thank you, Chair  
21 Aho.

22 Notice of this public hearing was published in  
23 several places: First of all, the Star Tribune  
24 newspaper on February 12th and February 19th, 2018; it  
25 was published in the Eden Prairie News newspaper on

1 February 15th; and in the State Register on February  
2 12th. In addition, notices were mailed to the  
3 governing boards of the JAZB members' cities, Hennepin  
4 and Scott Counties, to property owners within  
5 approximately 1 mile of the Flying Cloud Airport  
6 boundary as determined by the City of Eden Prairie, and  
7 distributed electronically to persons subscribing to  
8 the Metropolitan Airports Commission GovDelivery news  
9 service.

10 Notice was also posted on the Flying Cloud  
11 Airport JAZB page of the MAC website. The notice and  
12 proposed Flying Cloud Airport Zoning Ordinance were  
13 made available for public inspection at the following  
14 locations: The Metropolitan Airports Commission main  
15 office, the city halls of the cities of Eden Prairie,  
16 Shakopee, and Chanhassen, and at the Eden Prairie  
17 Library.

18 The following exhibits that are part of the  
19 public hearing record at this point in time will be  
20 entered into the formal record.

21 First is Exhibit A, which is the Draft Flying  
22 Cloud Airport Zoning Ordinance that's dated January  
23 18th, 2018.

24 Exhibit B is the Draft Flying Cloud Airport  
25 Zoning Ordinance Technical Report, dated January 18th,

1 2018, and updated on February 6th, 2018.

2 Exhibit C is the public presentation that I  
3 made this evening here at the public hearing.

4 Exhibit D is the notice of public comment  
5 period and public hearing for the Draft Flying Cloud  
6 Airport Zoning Ordinance. That's the letter that most  
7 of you should have received in the mail.

8 Exhibit E is the affidavits of publication on  
9 the public notice -- of the public notice in the Star  
10 Tribune, Eden Prairie News, and State Register, dated  
11 February 23rd, February 21st, and February 12th, 2018,  
12 respectively.

13 Exhibit F is the affidavit of mailing of the  
14 public notice, dated February 12th, 2018.

15 Exhibit G is the affidavit of web posting of  
16 the public notice, dated February 26th, 2018.

17 Exhibit H is the affidavit of GovDelivery  
18 distribution of the public notice, dated February 26th,  
19 2018.

20 And last but certainly not least, Exhibit I is  
21 the Flying Cloud Airport Joint Airport Zoning Board  
22 record for the meeting held on January 18th, 2018.

23 CHAIR AHO: All right. Thank you,  
24 Mr. Ralston, for reading that into the record. Sorry I  
25 missed you the first time.



1           Okay. Now we are open to comments by the  
2 public. So is there anyone that wishes to speak and  
3 make comments on the proposed Flying Cloud Airport  
4 Zoning Ordinance?

5           (No response.)

6           CHAIR AHO: And again, if you don't want  
7 to make them tonight formally at this meeting, you have  
8 until March 14th to do so, and that can be through  
9 e-mail, and the e-mail address was in the presentation.  
10 What I read just a moment ago was incorrect. It should  
11 be fcm.zoning@mspmac.org, mspmac.org. So that's the  
12 correct e-mail address. So if anyone wants to --  
13 wishes to do that, you can do it by e-mail or you can  
14 do it by mailing it in or stopping in at the  
15 commission.

16           So is there any -- I'll give you another  
17 opportunity. Anyone that wishes to make public comment  
18 on the proposed zoning?

19           (No response.)

20           CHAIR AHO: All right. I'll ask one more  
21 time. Any further comments? Anyone like to make any  
22 comments?

23           (No response.)

24           CHAIR AHO: Seeing none, I will close the  
25 public hearing, and I'd like to remind everyone that

1 the hearing record will remain open until 5 p.m.,  
2 Wednesday, March 14th, 2018. You may mail or deliver  
3 the materials that you wish to make a part of the  
4 record to the Board secretary at the Metropolitan  
5 Airports Commission, located at 6040 28th Avenue South,  
6 Minneapolis, Minnesota 55450, or you may transmit them  
7 by e-mail to [fc.m.zoning@mspm.ac.org](mailto:fc.m.zoning@mspm.ac.org).

8 Under state law, there's a number of additional  
9 steps that must take place prior to the adoption of a  
10 zoning ordinance, and Mr. Ralston went over those steps  
11 just previously. After the close of the comment  
12 period, this JAZB Board will meet again and we will  
13 review those public comments and decide whether to make  
14 any changes to this draft zoning airport -- airport  
15 zoning ordinance.

16 This ordinance would then be submitted to the  
17 commissioner for the Minnesota Department of  
18 Transportation for review and approval. After the  
19 commissioner's review, the JAZB will hold a second  
20 public hearing and submit the proposed ordinance to the  
21 Commissioner of Transportation a second time prior to  
22 adopting a zoning ordinance at the subsequent meeting.

23 So I'd like to just take this opportunity to  
24 thank everyone for your attention, thank you for coming  
25 out and participating, and we appreciate the interest

1 in our airport and the zoning around it.

2 So thank you for attending, and the public  
3 hearing is now closed, and the meeting of the Joint  
4 Airport Zoning Board is adjourned.

5 Thank you.

6 (Proceedings concluded at 6:40 p.m.)

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1	REPORTER'S CERTIFICATE
2	
3	
4	I, Caitlin J. Albrecht, Notary Public of and
5	for the State of Minnesota, do hereby certify that the
6	foregoing pages of typewritten material constitutes an
7	accurate verbatim stenographic record taken by me of
8	the Arbitration Proceedings aforementioned on the 27th
9	day of February, 2018, at the times and place
10	specified.
11	
12	
13	DATED: March 8, 2018.
14	
15	
16	
17	_____ Caitlin J. Albrecht
18	
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**Item D –**  
Public Presentation Slides

# Flying Cloud Airport

## Joint Airport Zoning Board



27 February 2018

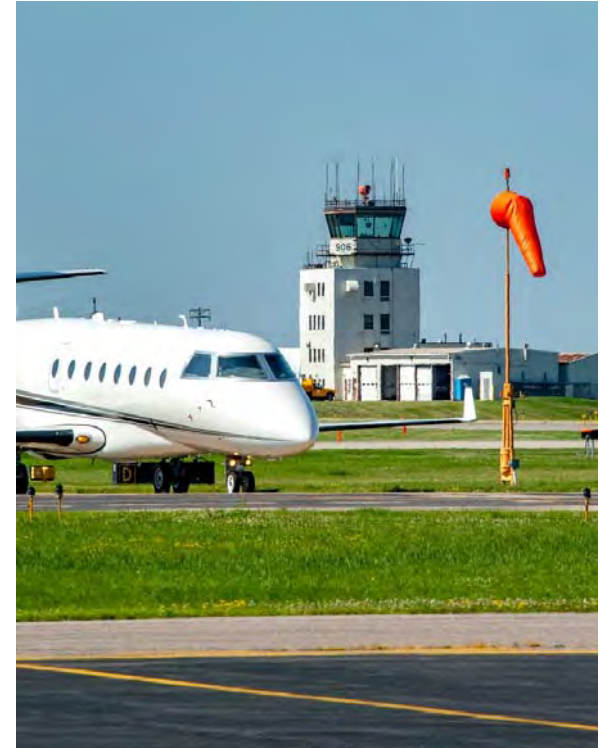
Public Hearing #1 – Overview of Proposed Airport Zoning Ordinance

# Presentation Agenda

- Purpose & Goals
- Review of FCM Zoning Historical Timeline
- Summary of Draft FCM Airport Zoning Ordinance
- Next Steps

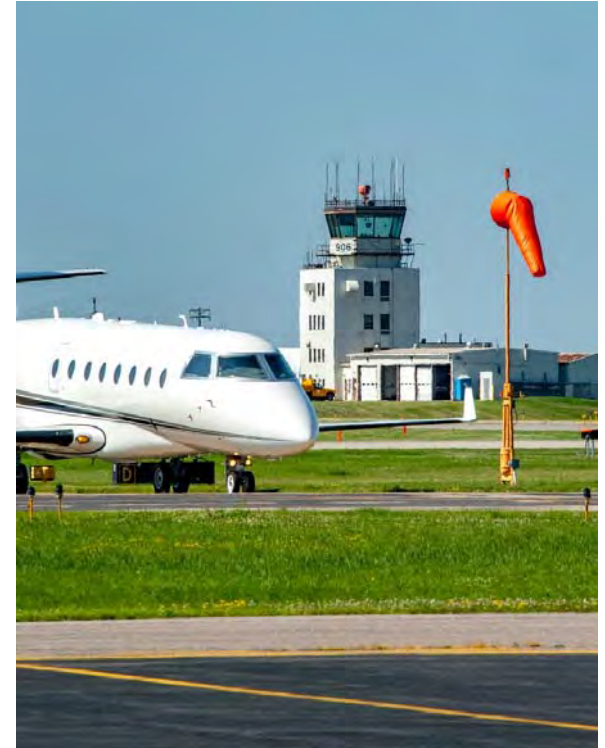
**Terminology Key:**

- Flying Cloud Airport = FCM
- Joint Airport Zoning Board = JAZB
- Minnesota Department of Transportation, Office of Aeronautics = MnDOT
- Federal Aviation Administration = FAA



# Presentation Agenda

- **Purpose & Goals**
- Review of FCM Zoning Historical Timeline
- Summary of Draft FCM Airport Zoning Ordinance
- Next Steps





# JAZB Purpose & Goals

## Why is airport safety zoning important now?

- State requirements/expectations and funding implications
- Pace of development in the vicinity of Flying Cloud Airport is increasing
- Revenue-generating use opportunities on airport property
- Certainty for surrounding community
- Finish what was started in 2009



# JAZB Purpose & Goals

Through a collaborative process, the JAZB seeks to develop an airport zoning ordinance that achieves a **balance** between a reasonable level of **public safety** and compatible **community development**.



In determining what minimum airport zoning regulations to adopt, Minnesota State Statutes guide the JAZB to consider the **social and economic costs of restricting land uses** versus the **benefits derived from a strict application of the standards of the commissioner** (the State Model Zoning Ordinance).

# JAZB Purpose & Goals

Goals for the FCM JAZB include:

- Develop an FCM zoning ordinance for review and approval by the Commissioner of Transportation for subsequent adoption by the Board and then by local communities
- Update relevant sections of 2010 draft Zoning Ordinance to reflect current conditions
- Ensure appropriate level of stakeholder/community engagement



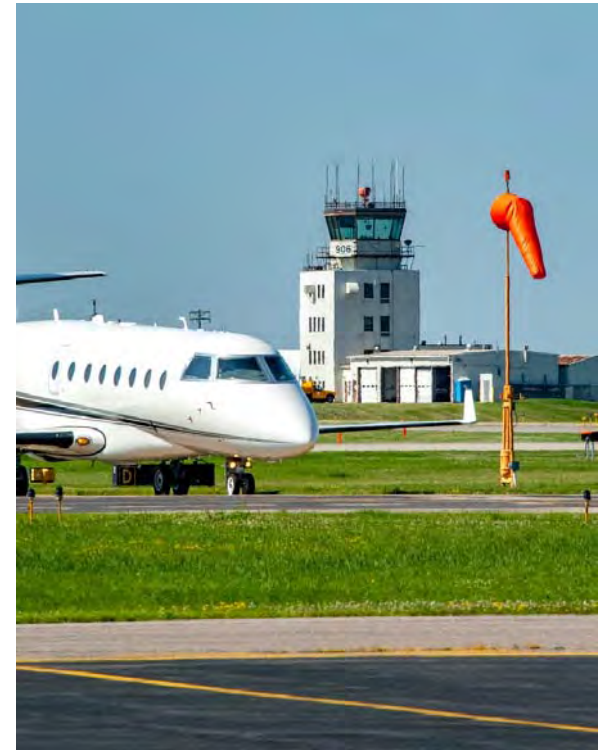
## JAZB Participants

City of Eden Prairie  
City of Shakopee

City of Chanhassen  
Metropolitan Airports Commission

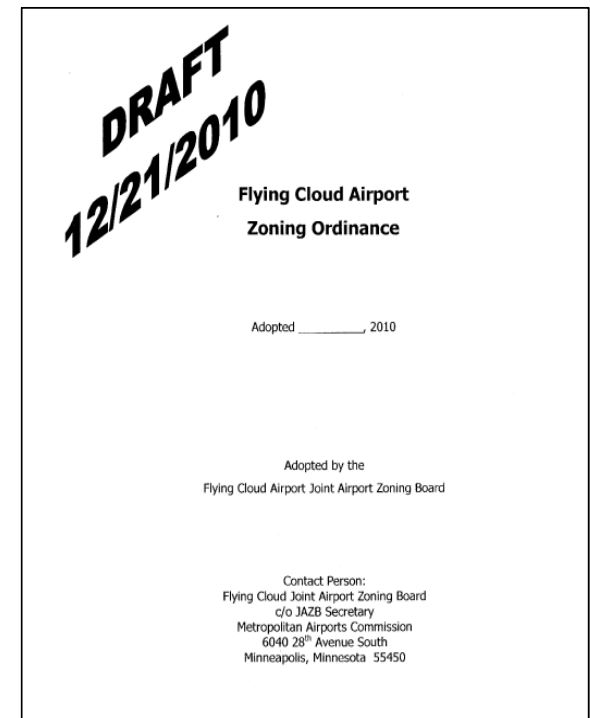
# Presentation Agenda

- Purpose & Goals
- **Review of FCM Zoning Historical Timeline**
- Summary of Draft FCM Airport Zoning Ordinance
- Next Steps



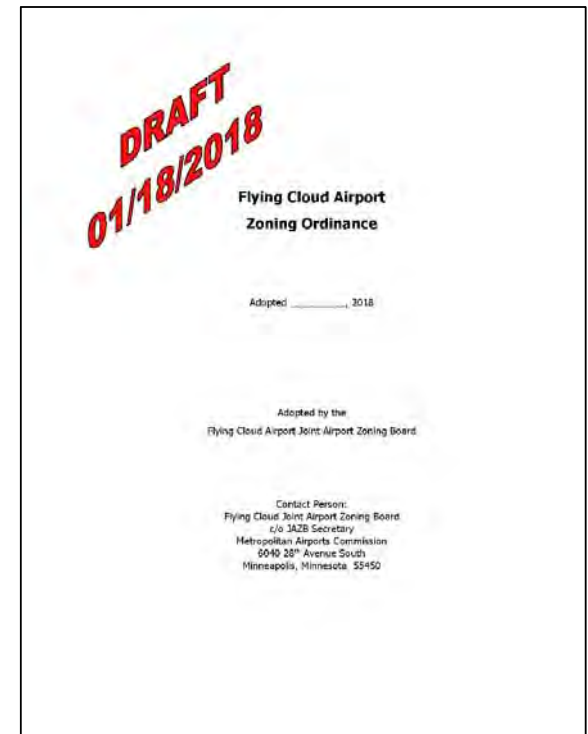
# JAZB Historical Timeline and Accomplishments

- **July 2009:** First FCM JAZB meeting
- **August 2009 – April 2010:** JAZB develops Draft Airport Zoning Ordinance
- **April 2010:** First Public Hearing for the draft Ordinance
- **December 2010:** JAZB approves submittal of Draft Airport Zoning Ordinance to MnDOT Commissioner
- **Early 2011:** MAC requests that MnDOT temporarily suspend Ordinance review due to legal uncertainties surrounding airport zoning related litigation pending at the time
- **2011 – 2015:** Court cases resolved
- **2016:** Decision made to re-convene FCM JAZB to move forward with the Draft Airport Zoning Ordinance



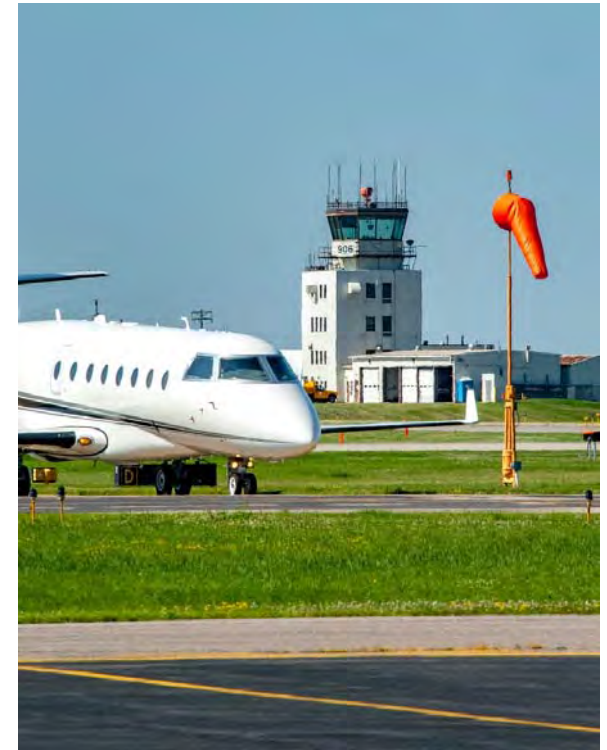
# JAZB Historical Timeline and Accomplishments

- **September 2017:** First meeting of the re-convened FCM JAZB
- **October 2017 – January 2018:** JAZB reviews/updates Draft Airport Zoning Ordinance
  - Included updates to supporting studies: Safety/Risk Study and Economic Impact Analysis
- **January 18, 2018:** FCM JAZB formally approves updated Draft FCM Airport Zoning Ordinance for public review, comment, and hearing
- **February 27, 2018:** Public Hearing for updated Draft Airport Zoning Ordinance



# Presentation Agenda

- Purpose & Goals
- Review of FCM Zoning Historical Timeline
- **Summary of Draft FCM Airport Zoning Ordinance**
- Next Steps



# FCM Airfield Configuration



FCM Property Line Runway Protection Zones (RPZ)

## Runway 18-36 Length

- Updated Zoning Ordinance – 2,691 feet (existing length)
  - 2010 Draft Zoning Ordinance – 2,800 feet

## Runway 10L-28R (north parallel)

- Updated Zoning Ordinance – “Utility” designation
  - 2010 Draft Zoning Ordinance – “Other Than Utility” designation
  - No change to length or width

## Runway 10R-28L (south parallel)

- No change

*Airfield configuration changes from the 2010 Draft Zoning Ordinance result in less restrictive zoning areas*



# Airport Zoning Ordinance Overview

## Two primary components

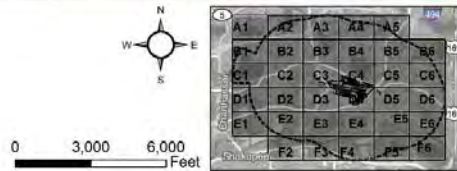
### Height Limitations



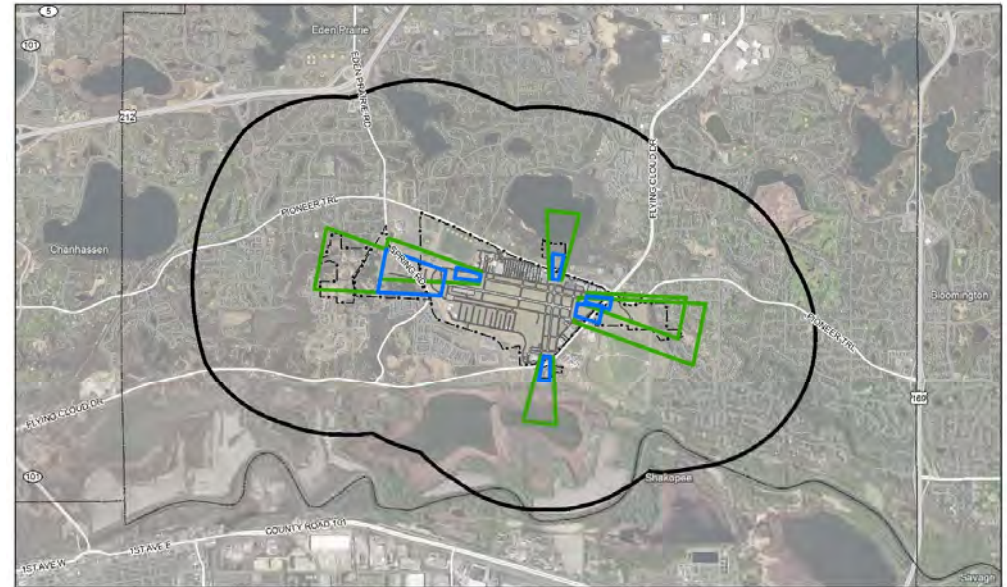
#### FCM Safety Zones Within Zoning Limits

#### MCH - Airspace

- FCM Property Line
- Part 77 Contours
- Airspace Zoning Limit



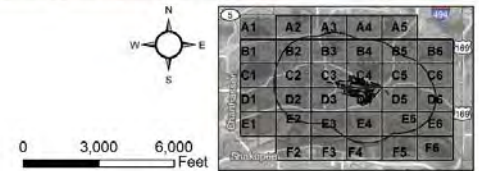
### Land Use Limitations



#### FCM Safety Zones Within Zoning Limits

#### SZ - Index Sheet

- FCM Property Line
- JAZB Zone A
- JAZB Zone B
- JAZB Zone C



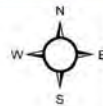
# FCM Airspace Zones (Height)



## FCM Safety Zones Within Zoning Limits

### MCH - Airspace

- FCM Property Line
- Part 77 Contours
- Airspace Zoning Limit



0 3,000 6,000 Feet

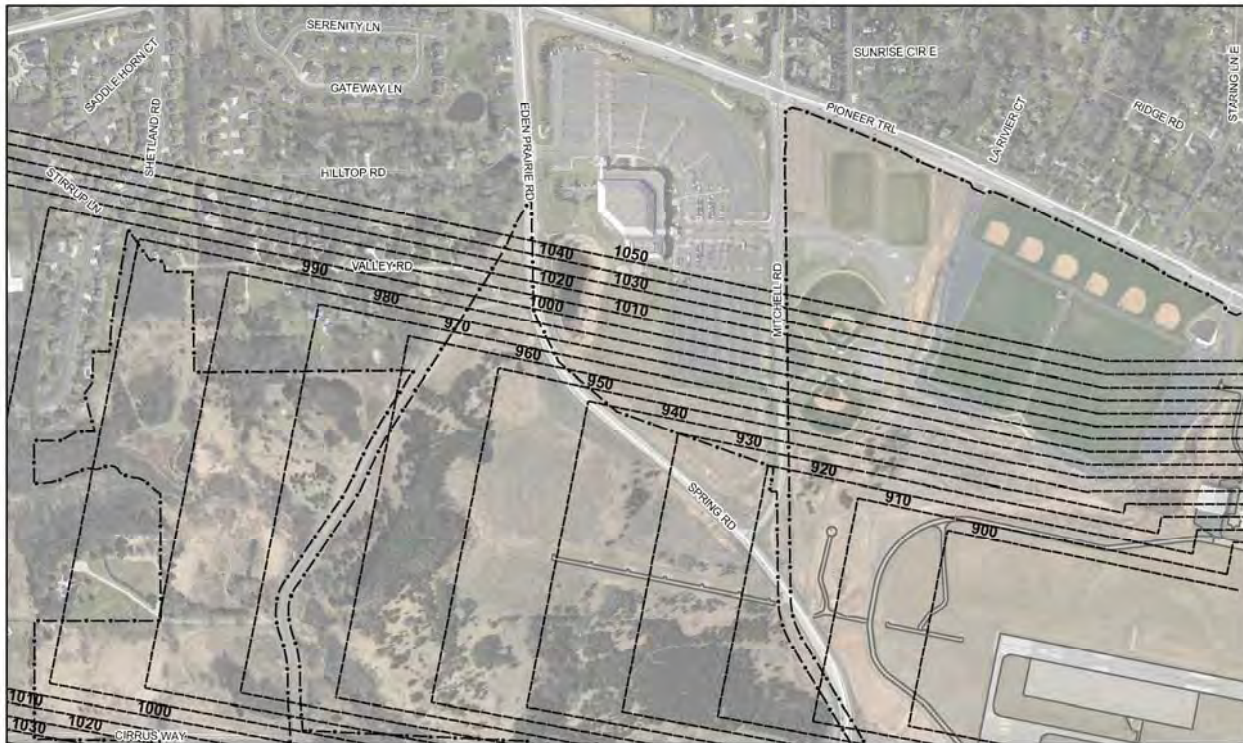


## Height limitations imposed by Zoning Ordinance

Based on FAA Airspace criteria




- Limits the height of structures and vegetation under FCM airspace surfaces.
- Penetrations to the Airspace Zones will require a variance issued by a Board of Adjustment
  - Exception – no variance required if the FAA issues a No Hazard airspace determination

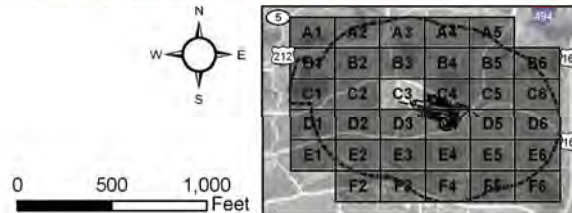
# FCM Airspace Zones (Height)



**FCM Airspace Zones  
Within Zoning Limits**

**A - C3**

-  FCM Property Line
-  Airspace Zoning Limit
-  Part 77 Contours



## Height limitations imposed by Zoning Ordinance

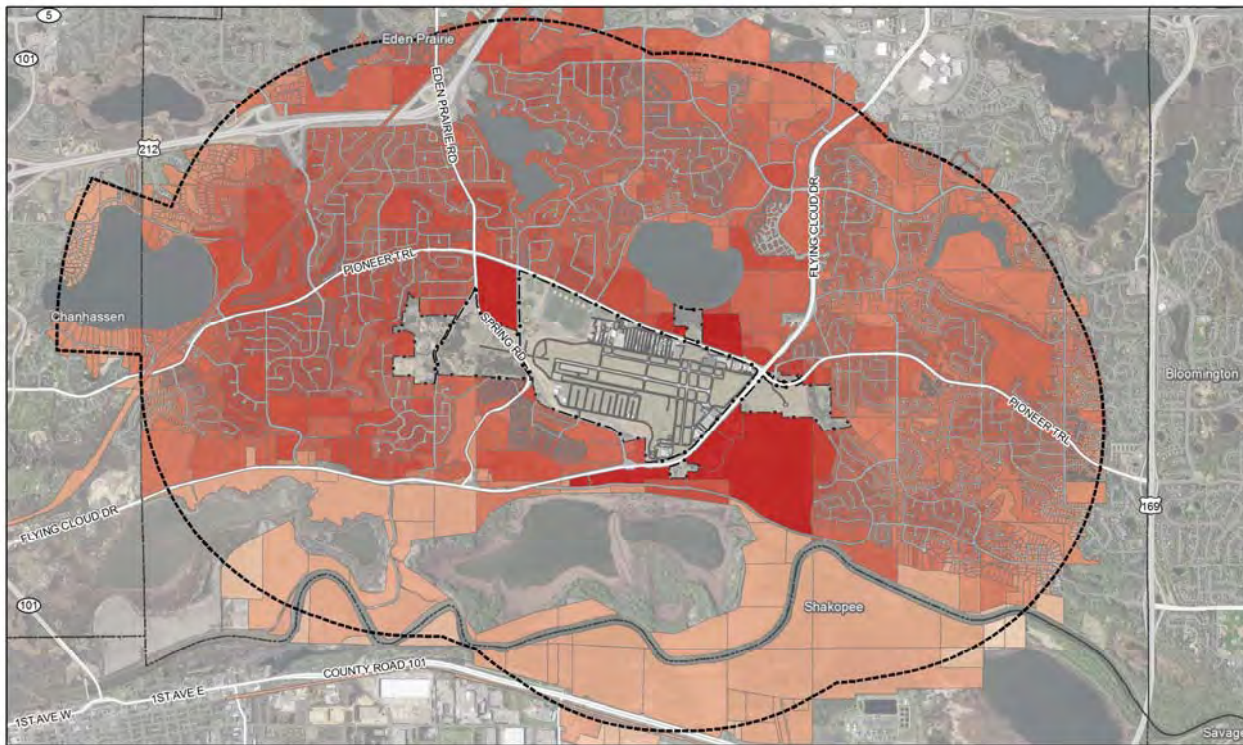
Based on FAA Airspace criteria

- Grid maps in the Draft Ordinance show airspace surface heights in 10-foot intervals
- Heights are expressed as mean sea level, not above ground level
- More specificity provided on Maximum Construction Height Without Permit maps

# FCM Maximum Construction Height Without Permit (Height)

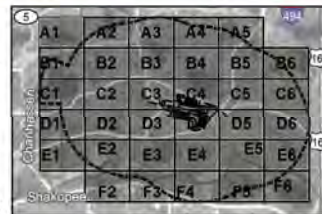
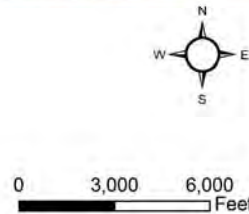
**Establishes a height per parcel up to which an airport zoning permit is not needed**

- Used updated 1-foot airspace contours and more precise ground elevation contours
- Provides a buffer to Airspace Zones
- Exceeding the Maximum Construction Height Without Permit will require an Airport Zoning Permit from the City Zoning Administrator

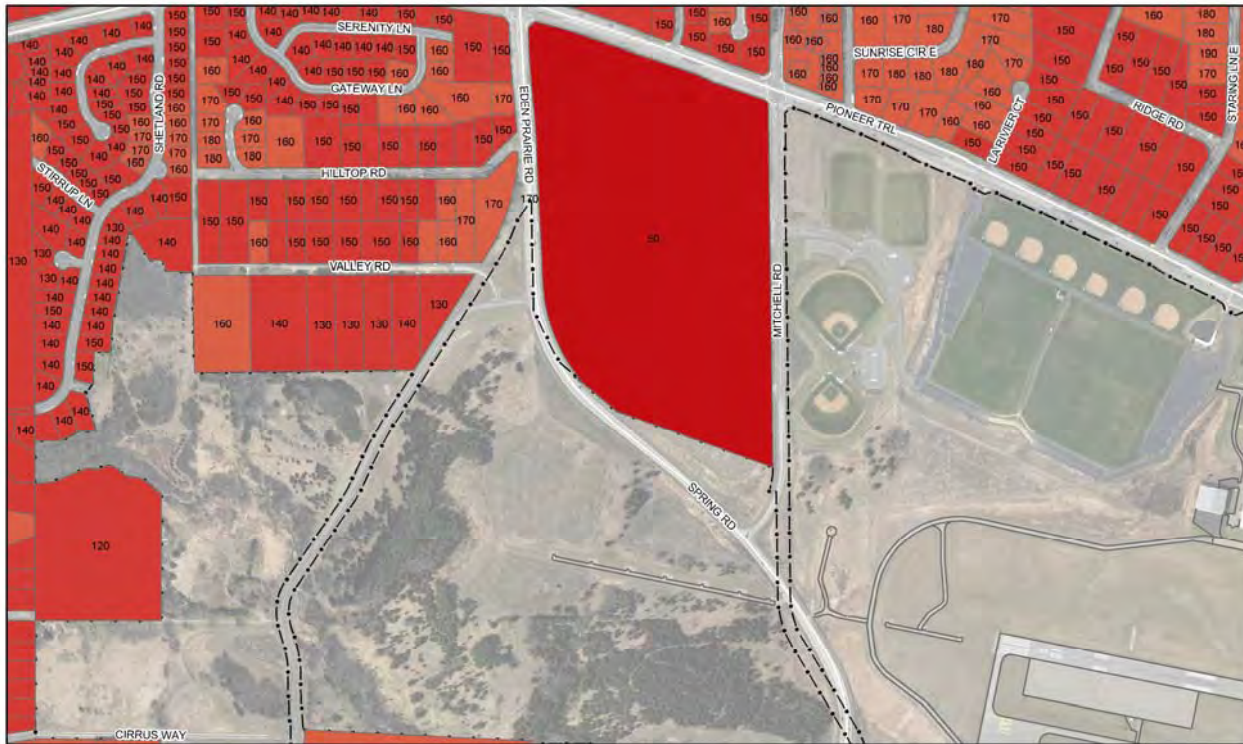


**FCM Safety Zones  
Within Zoning Limits**

**MCH - Index Sheet**

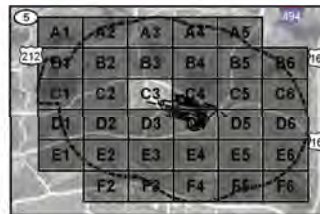
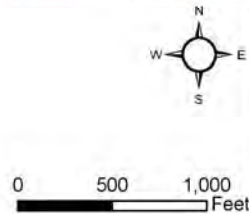


# FCM Maximum Construction Height Without Permit (Height)



FCM Maximum Construction Heights Without Permit Within Zoning Limits

MCH - C3



**Establishes a height per parcel up to which an airport zoning permit is not needed**

- Grid maps in the Draft Ordinance show Maximum Construction Heights Without Permit for each parcel
- Heights are expressed above ground level
- In most cases, the airport zoning height limitations would be less restrictive than maximum heights allowed in the municipal zoning code.

# FCM Safety Zones (Land Use)

## JAZB Safety Zones Overview

### JAZB Safety Zone A

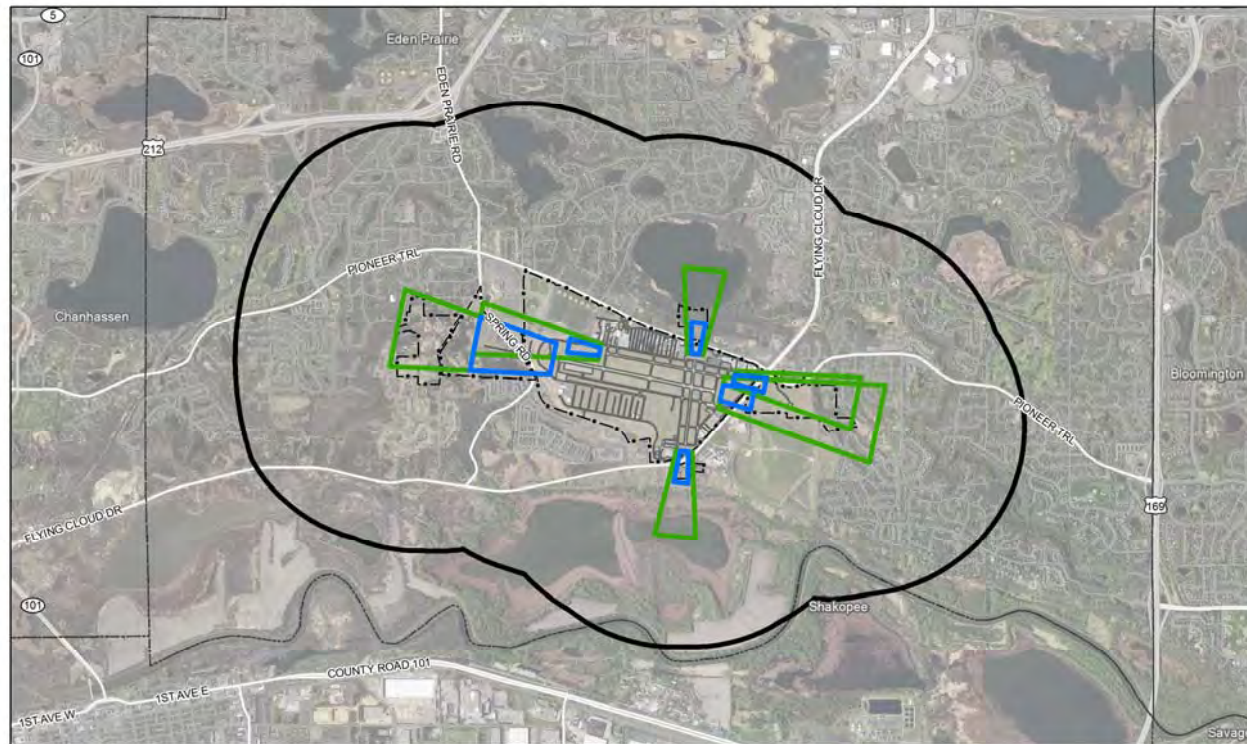
- Most restrictive safety zone
- Prohibits the development of structures

### JAZB Safety Zone B

- Less restrictive zone
- Prohibits certain land uses
- Allows residential development in Permitted Residential Areas
- Requires contiguous open space

### JAZB Safety Zone C

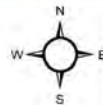
- Least restrictive zone
- General land use restrictions against flight interference



**FCM Safety Zones  
Within Zoning Limits**

SZ - Index Sheet

- FCM Property Line
- JAZB Zone A
- JAZB Zone B
- JAZB Zone C



0 3,000 6,000  
Feet



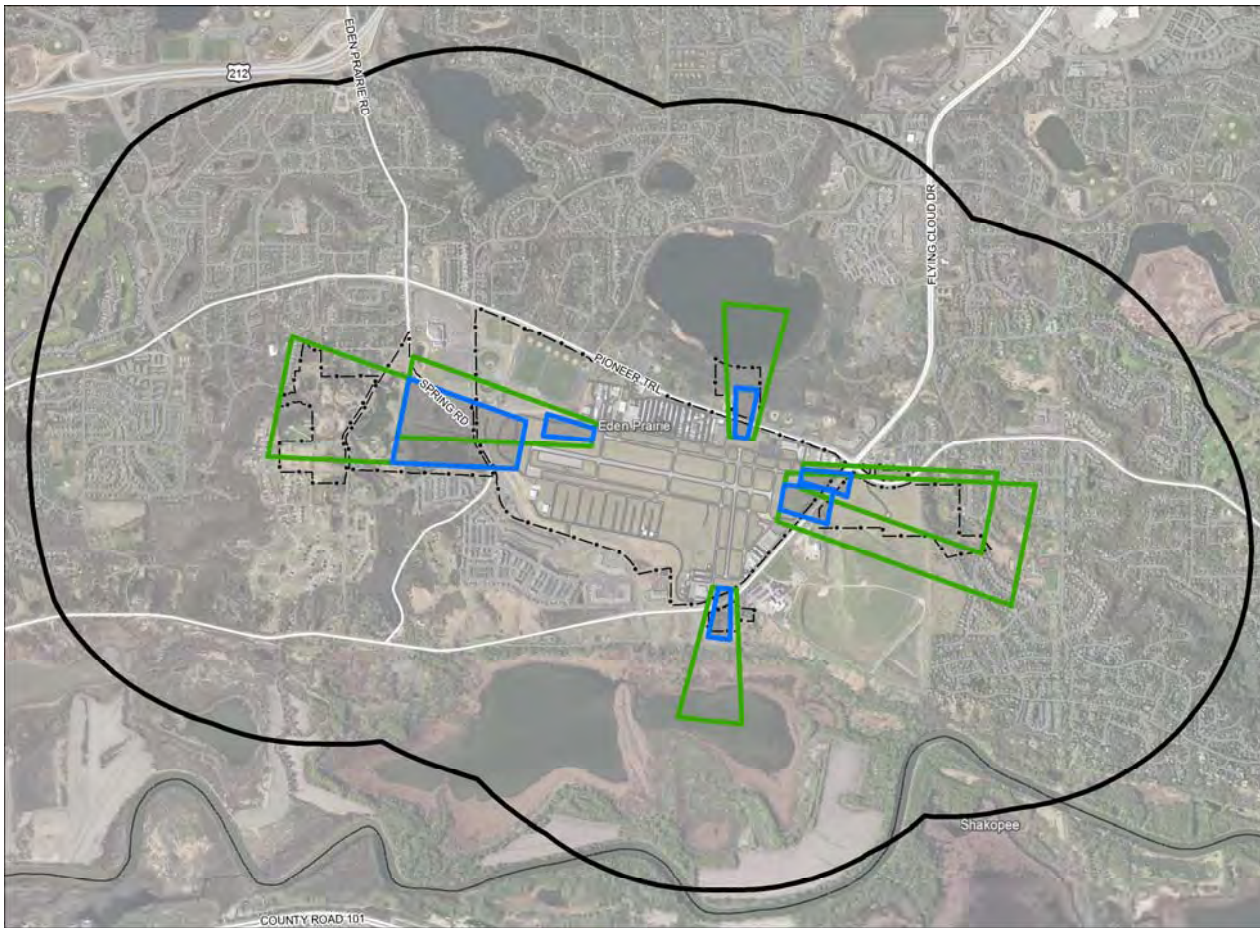
# FCM Safety Zones (Land Use)

## JAZB Safety Zone C

Black ellipsoid line

- Least restrictive safety zone
- General prohibitions against land uses that would:
  - Create or cause interference with the operations of radio or electronic facilities
  - Create or causes interference with radio or electronic communications between FCM and aircraft
  - Make it difficult for pilots to distinguish between Airport lights and other lights
  - Result in glare in the eyes of pilots using FCM
  - Impair visibility in the vicinity of FCM
  - Otherwise endanger the landing, taking off, or maneuvering of aircraft in the runway approach areas.
- These apply to Zones A & B as well

18



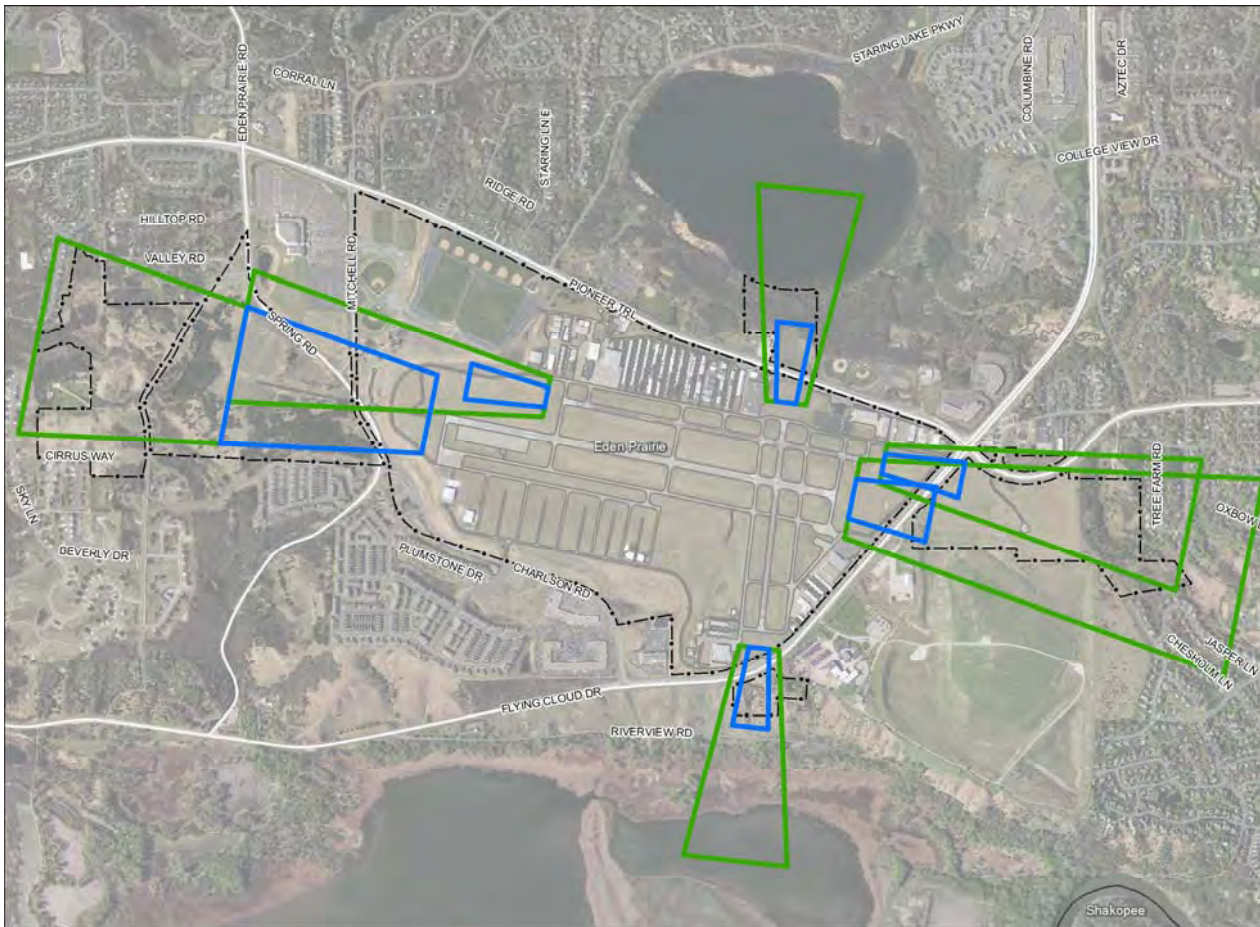
  FCM Property Line  
  Runway Protection Zones (RPZ)  
   JAZB Zone A  
   JAZB Zone B  
   JAZB Zone C

# FCM Safety Zones (Land Use)

## JAZB Safety Zone B

### Green trapezoid

- More restrictive safety zone
- Prohibits certain land uses
  - Amphitheaters, churches, hospitals, nursing homes, schools, stadiums, theaters, wildlife attractants
- Based on State Model Zone dimensions
- Less restrictive land use controls than State Model Zone B
  - No minimum parcel size for development
  - No site population restrictions based on site acreage
  - Based on detailed safety/risk study and economic impact analysis



FCM Property Line
  JAZB Zone A
  JAZB Zone B



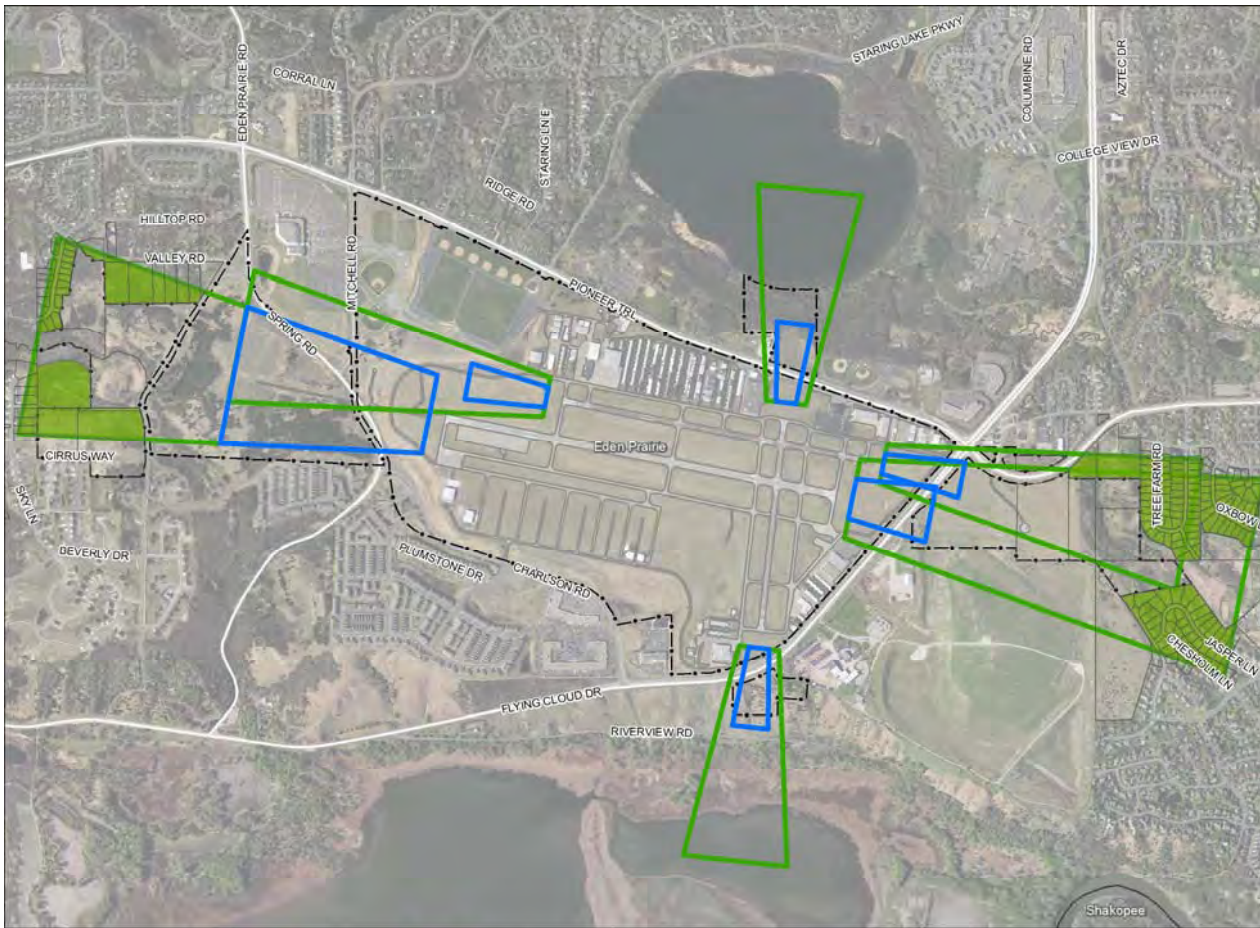
# FCM Safety Zones (Land Use)

## JAZB Safety Zone B

Green trapezoid

### Permitted Residential Areas

- Allows for the improvement, expansion, and development of new residential uses in areas guided for residential development
- These Permitted Residential Areas are recognized and treated as conforming land uses



  FCM Property Line  
   JAZB Zone A  
   JAZB Zone B  
   Parcel Boundary  
   Permitted Residential

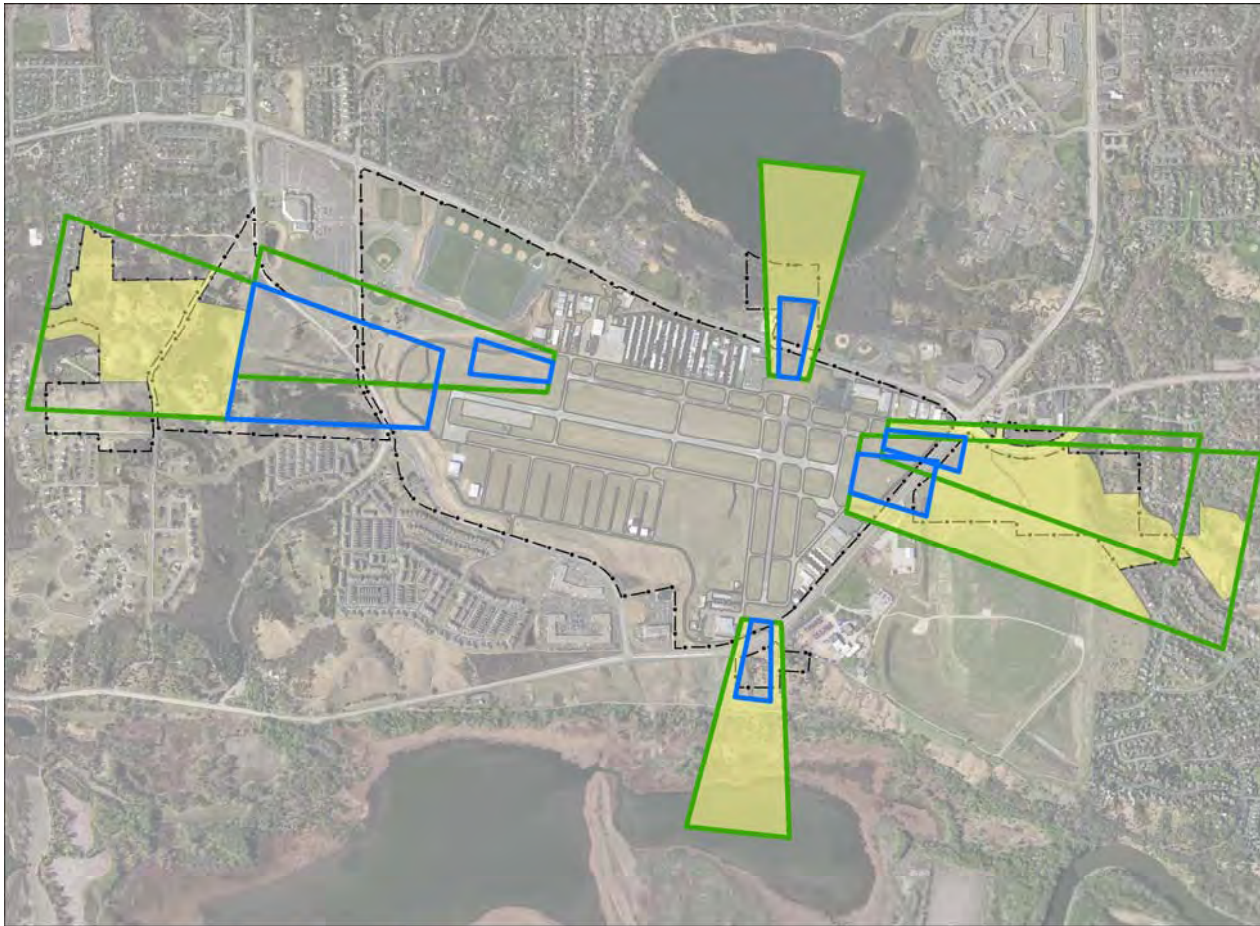
# FCM Safety Zones (Land Use)

## JAZB Safety Zone B

Green trapezoid

### Contiguous Open Space

- Requires a minimum of 20% of total Zone B acreage or 20 acres, whichever is greater, to remain as contiguous open space
  - Applies to the totality of Zone B, not per parcel
  - Requirement easily met by existing airport land and other land guided to remain as open space or not regularly occupied



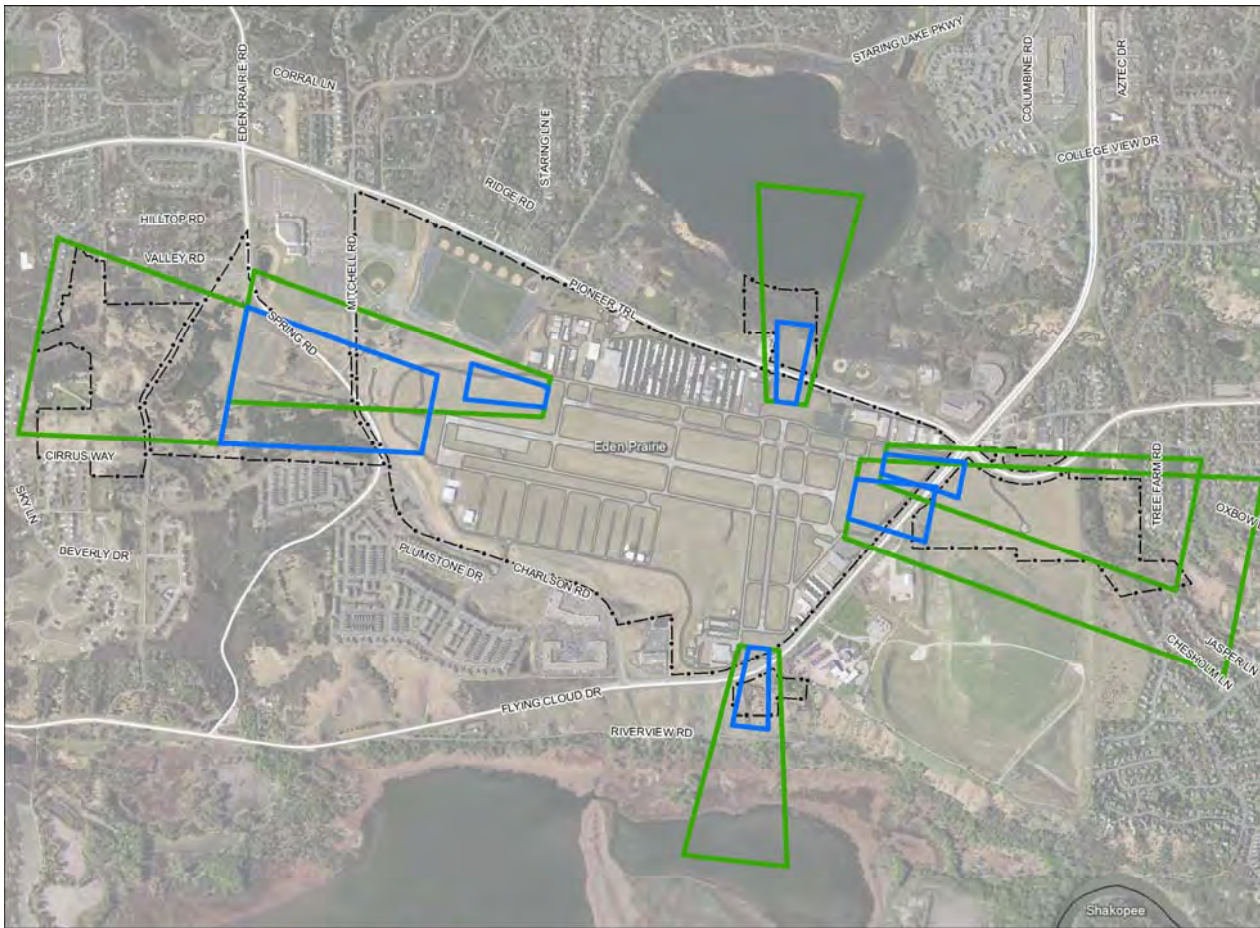
FCM Property Line JAZB Zone A JAZB Zone B Contiguous Open Area

# FCM Safety Zones (Land Use)

## JAZB Safety Zone A

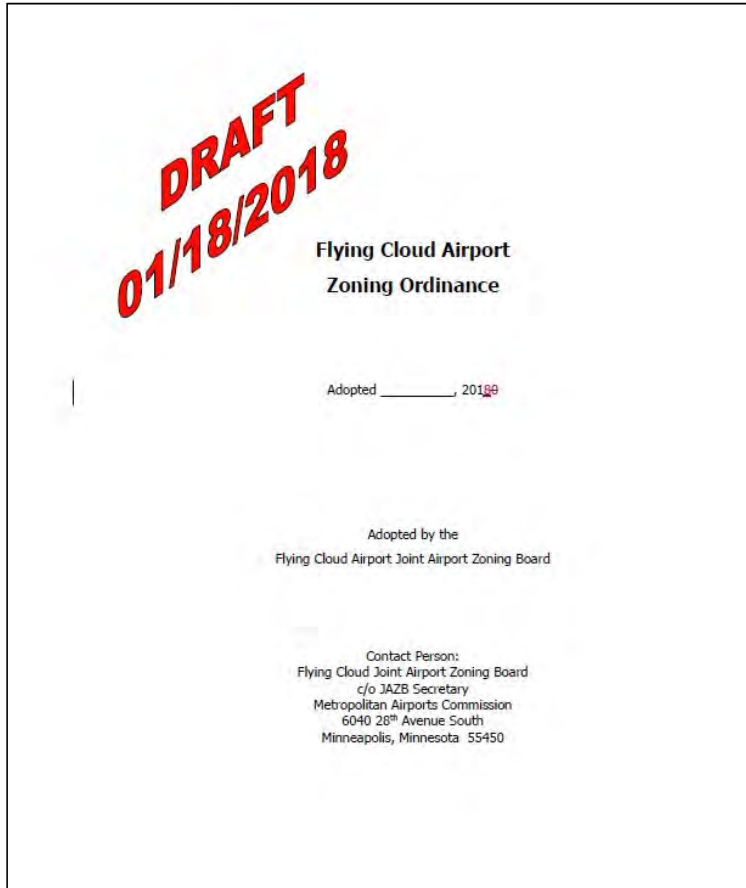
Blue trapezoid

- Most restrictive safety zone
- Prohibits the development of structures
- Co-terminus with FAA Runway Protection Zones (RPZ)
  - The RPZ has similar land use restrictions
  - Mostly contained to airport-owned property
- Smaller than State Model Zone A
  - Based on detailed safety/risk study and economic impact analysis



FCM Property Line
  JAZB Zone A
  JAZB Zone B

# FCM Draft Zoning Ordinance Language

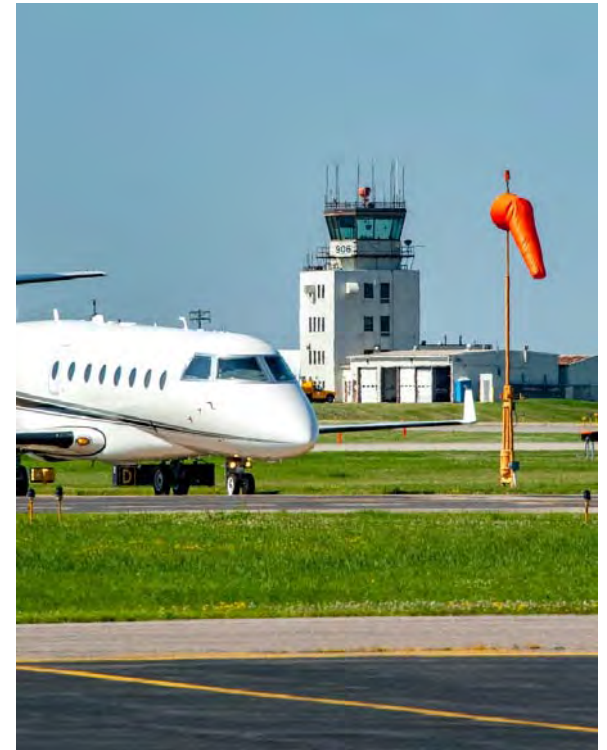


## Minor updates and clarifications from 2010 draft language

- Mostly updates to zone descriptions and dimensions based on minor airfield configuration changes
- Removed City of Bloomington from the list of JAZB participants
- Adding clarifying language about airspace evaluation process
- Clarified judicial review language

# Presentation Agenda

- Purpose & Goals
- Review of FCM Zoning Historical Timeline
- Summary of Draft FCM Airport Zoning Ordinance
- **Next Steps**



# Next Steps / Timeline

## Next Steps

- Public comment period ends on March 14, 2018
- JAZB reviews comments submitted during public comment period
- JAZB schedules next meeting to:
  - Review public comments and proposed responses
  - Approve submittal of Updated Draft FCM Airport Zoning Ordinance to MnDOT for review
- Submit Draft Flying Cloud Zoning Ordinance to MnDOT
- Receive MnDOT comments and submit response
- Hold 2<sup>nd</sup> Public Hearing after MnDOT approval
- Final adoption of the Zoning Ordinance by JAZB
- Adoption and enforcement of the FCM Airport Zoning Ordinance by participating municipalities



**Comments can be sent to:**  
Secretary to the FCM Joint Airport Zoning Board  
Metropolitan Airports Commission  
6040 28th Avenue South  
Minneapolis, MN 55450  
-- or --  
emailed to: [fcz.zoning@mspmact.org](mailto:fcz.zoning@mspmact.org)

# Flying Cloud Airport

## Joint Airport Zoning Board



Thank you for your participation!

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## **Item E –**

### List of Exhibits Entered into the Public Hearing Record

## List of exhibits entered into the record during the Public Hearing:

- Exhibit A – Draft Flying Cloud Airport Zoning Ordinance dated January 18, 2018
- Exhibit B – Draft Flying Cloud Airport Zoning Ordinance Technical Report dated January 18, 2018 and updated on February 6, 2018
- Exhibit C – Public Presentation by Neil Ralston, Airport Planner, Metropolitan Airports Commission
- Exhibit D – Notice of Public Comment Period and Public Hearing for Draft Flying Cloud Airport Zoning Ordinance
- Exhibit E – Affidavits of Publication of the Public Notice in the *Star Tribune*, *Eden Prairie News*, and *State Register*, dated February 23, February 21, and February 12, 2018 respectively
- Exhibit F – Affidavit of Mailing of the Public Notice, dated February 12, 2018
- Exhibit G – Affidavit of web posting of the Public Notice, dated February 26, 2018
- Exhibit H – Affidavit of GovDelivery distribution of the Public Notice, dated February 26, 2018
- Exhibit I – Flying Cloud Airport Joint Airport Zoning Board meeting record for January 18, 2018

These exhibits are available upon request to Shelly Cambridge, JAZB Secretary, at 612-726-8144 or via email at [Shelly.Cambridge@mspmack.org](mailto:Shelly.Cambridge@mspmack.org).

**Item F –**  
**Written Public Comments and Responses**

## FLYING CLOUD AIRPORT DRAFT AIRPORT ZONING ORDINANCE PUBLIC COMMENTS AND RESPONSES

### RESPONSES TO PUBLIC COMMENTS

This section contains responses to comments received about the Draft Flying Cloud Airport Zoning Ordinance.

Commenter	ID	Subject	Response
<b>Written Comments Received During the Public Comment Period (February 12 – March 14, 2018)</b>			
Gary Hammer Eden Prairie, MN  Email dated February 11, 2018	1	<p>My only comment about the proposal is that the airport has taken over our neighborhood over the years. Typical of Minnesota planning, development occurs after residential neighborhoods have been built and then the people living there are expected to go along with every proposal.</p> <p>The MAC needs to work in its website for reporting noise violations (it didn't work for me the last time a jet flew over our home at 3:00 am) and acknowledge calls made to its telephone center reporting violations. Last time, I left a voice mail and received nothing back. That indicates to me that there isn't much interest in violations.</p> <p>Other than that we don't mind the air traffic at Flying Cloud and actually enjoy watching it.</p>	<p>The JAZB's purpose is to collaboratively develop an airport zoning ordinance that achieves a balance between providing for a reasonable level of public safety while allowing for compatible community development.</p> <p>The implementation of airport zoning remains important for FCM for the following reasons:</p> <ul style="list-style-type: none"> <li>• Airport safety zoning accomplishes the state law direction to prevent airport hazards, and MnDOT's expectation is that the JAZB will successfully zone FCM in order to avoid potential airport grant funding implications;</li> <li>• The pace of development around FCM is only increasing and the lack of an adopted airport safety zoning ordinance is creating uncertainty and confusion about possible land use controls and/or restrictions;</li> <li>• MAC would like to continue to pursue non-aeronautical uses of some FCM parcels located within designated safety zones. Uncertainty regarding zoning is holding up land release approvals.</li> </ul> <p>Adoption of an Airport Zoning Ordinance will not alter the number, frequency or noise level of traffic at Flying Cloud Airport. The present zoning effort underway is not being conducted to justify future airport expansion or to increase the size of aircraft operating at FCM.</p> <p>The portion of the comment pertaining to the noise complaint reporting system was</p>

			forwarded to the MAC Noise Program Office Specialist who followed up with the commenter.
Dan Blake Eden Prairie, MN  Email dated February 12, 2018	2	Can you please tell me if my property is within the proposed JAZB Safety Zone B?	Responded as follows via email:  <i>Good afternoon, and thank you for your inquiry.</i>  <i>Your property is not within the proposed JAZB Safety Zone B.</i>
Tyler Stevenson  Email dated February 11, 2018	3	Does the prohibition of land use that results in glare in the eyes of pilots using FCM apply to the use of solar panels on the roof of a homestead within safety zone C?	Responded as follows via email:  <i>Thank you for your question.</i>  <i>The proposed Flying Cloud Airport Zoning Ordinance does not seek to prohibit the installation of solar panels on residential rooftops within Safety Zone C. If a particular solar installation is determined to cause glare issues for pilots using the airport, we would want to work with the property owner to mitigate the visual impairment. However, based on operational experience, the likelihood of a residential rooftop solar installation to cause a serious glare problem is expected to be a rare occasion.</i>  <i>In the event that a property owner wishes to be proactive about the potential from glare from a specific solar installation, there is an option of submitting an airspace review case to the Federal Aviation Administration (FAA) so they can take a look at it. Please let me know if you would like any further information about this process.</i>  <i>Again, thank you for your question.</i>
Cynthia Pierce Magellan Midstream Partners, L.P. Tulsa, OK  Email dated March 9, 2018	4	Magellan Pipeline maintains a 12-inch high-pressured petroleum products pipeline and associated easements across the proposed Flying Cloud Airport zoning area. Please see attached GIS drawing showing the approximate location of the pipeline to the zoning area. While Magellan has no comments at this time, please continue to notify Magellan at the address and e-mail cited below of all activity.  Please acknowledge receipt of this e-mail. Thank you!	Comment acknowledged.

## Cambridge, Shelly

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**From:** Gary Hammer <sledgehammer1951@gmail.com>  
**Sent:** Sunday, February 11, 2018 7:26 AM  
**To:** fcm.zoning@mspmac.org  
**Subject:** Proposal on Flying Cloud

My only comment about the proposal is that the airport has taken over our neighborhood over the years. Typical of Minnesota planning, development occurs after residential neighborhoods have been built and then the people living there are expected to go along with every proposal.

The MAC needs to work in its website for reporting noise violations (it didn't work for me the last time a jet flew over our home at 3:00 am) and acknowledge calls made to its telephone center reporting violations. Last time, I left a voice mail and received nothing back. That indicates to me that there isn't much interest in violations.

Other than that we don't mind the air traffic at Flying Cloud and actually enjoy watching it.

Gary Hammer  
9841 Laguna Cir  
Eden Prairie, MN

**Cambridge, Shelly**

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**From:** Dan Blake <danblake.ep@gmail.com>  
**Sent:** Monday, February 12, 2018 5:09 PM  
**To:** fcm.zoning@mspmac.org  
**Subject:** Eden Prairie zoning proposal

Can you please tell me if my property is within the proposed JAZB Safety Zone B?  
PID: 2911622210050  
16831 Cedarcrest Dr  
Eden Prairie, MN 55347

Thank you

Dan Blake  
612.282.5482

## Cambridge, Shelly

---

**From:** Tyler Stevenson <tyler.stevenson1@gmail.com>  
**Sent:** Monday, February 12, 2018 8:02 PM  
**To:** fcm.zoning@mspmac.org  
**Subject:** Flying Cloud Zoning Hearing

Hello,

Does the prohibition of land use that results in glare in the eyes of pilots using FCM apply to the use of solar panels on the roof of a homestead within safety zone C?

Thank you,  
Tyler

Tyler Stevenson  
Cell: 612-251-3990



## Cambridge, Shelly

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**From:** Pierce, Cynthia <Cynthia.Pierce@magellanlp.com>  
**Sent:** Friday, March 09, 2018 4:17 PM  
**To:** fcm.zoning@mspmac.org; mnmac@public.govdelivery.com  
**Cc:** Smith, Brian D.; Boudreaux, Scott; Ward, Leah  
**Subject:** 18-519: Flying Cloud Airport (FCM) Zoning Ordinance - Hennepin County, MN  
**Attachments:** 18-519.pdf

**Importance:** High

**Follow Up Flag:** Follow up

**Flag Status:** Completed

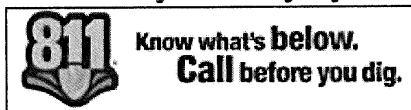
Metropolitan Airports Commission Zoning Board:

Magellan Pipeline maintains a **12-inch high-pressured petroleum products pipeline and associated easements** across the proposed Flying Cloud Airport zoning area. Please see attached GIS drawing showing the approximate location of the pipeline to the zoning area. While Magellan has no comments at this time, please continue to notify Magellan at the address and e-mail cited below of all activity.

Please acknowledge receipt of this e-mail. Thank you!

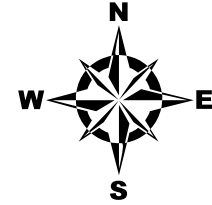
~Cynthia Pierce  
H. Cynthia Pierce  
Magellan Midstream Partners, L.P.  
PO Box 22186, MD OTC-8  
Tulsa, OK 74121-2186  
Office: 918-574-7464  
Fax: 918-574-7885  
[cynthia.pierce@magellanlp.com](mailto:cynthia.pierce@magellanlp.com)

**Make Safety An Everyday Priority!**



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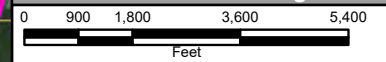
# HENNEPIN COUNTY, MINNESOTA



### Legend

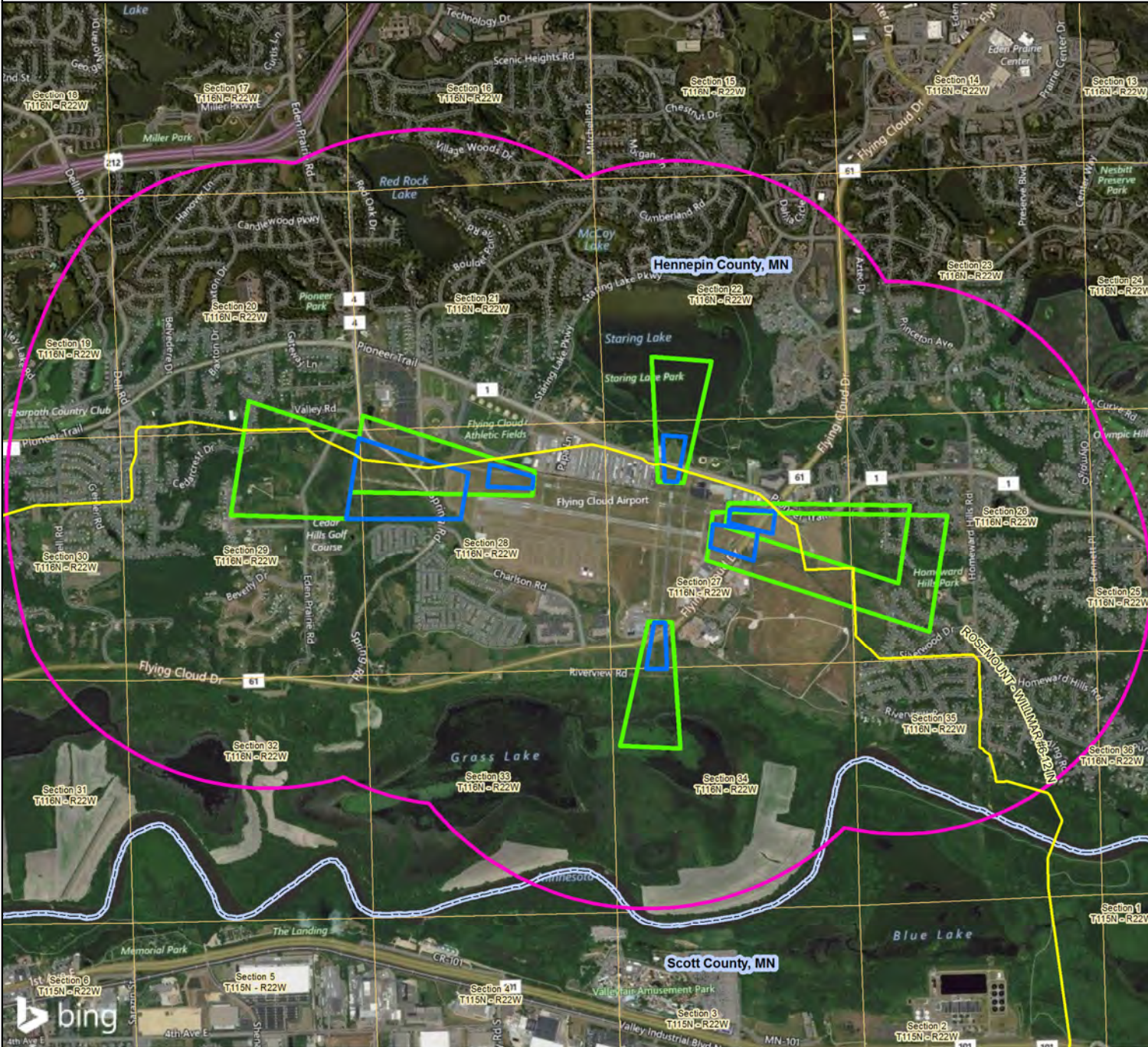
- Magellan Pipeline (Approx. Location)
- Safety Zone A
- Safety Zone B
- Safety Zone C
- County
- Section

**For Actual Pipeline Location  
Contact Local Field Rep.**



This copy is not a survey and has been furnished by Magellan Pipeline Company, L.P. (Magellan) for information as to approximate locations only of any pipelines or other facilities shown thereon. Magellan disclaims any representations as to accuracy or completeness of the information depicted on this copy and makes no warranties regarding accuracy or completeness of such information depicted hereon. Actual locations of pipelines and facilities must be determined on-site through timely contact with the appropriate One Call agency - Call 811 - and coordination with Magellan. Excavation, grading, construction and/or vehicle traffic in the vicinity of the pipeline(s) and facilities shown on this copy are prohibited without written permission from Magellan or other owners of pipelines or facilities depicted hereon.

Drawn By:	Latonya Schlecht
Real Estate Rep:	Cynthia Pierce (918) 574-7464
Local Field Rep:	Brian Smith (612) 759-3047
MPL Project #:	18-519
Date:	02-14-2018







**Flying Cloud Airport  
Joint Airport Zoning Board**

**City of Chanhassen  
City of Eden Prairie  
City of Shakopee  
Metropolitan Airports Commission**

<https://metroairports.org/General-Aviation/Airports/Flying-Cloud/Joint-Airport-Zoning-Board-Flying-Cloud.aspx>