FLYING CLOUD AIRPORT

LONG-TERM PLAN 2040

CHAPTER 1

INVENTORY OF EXISTING CONDITIONS

SEPTEMBER 2025

List of Figures

List of Tables

1.0 Inventory of Existing Conditions

1.1 Introduction

This chapter summarizes the existing airside and landside facilities, land use, infrastructure, and environmental data that is relevant to the preparation of this LTP. The information presented in this chapter is current as of the completion of the inventory in September 2022, except where noted otherwise.

1.2 Airport Setting

1.2.1 History and Location

Flying Cloud Airport (FCM) is one of seven airports owned and operated by the Metropolitan Airports Commission (MAC). FCM is considered one of three primary reliever airports for the Minneapolis – Saint Paul International Airport. Since opening in 1943, FCM has played an important role in the Twin Cities. Located approximately 14 miles from downtown Minneapolis in the southwest corner of the Twin Cities metro area, FCM is the busiest airport in the MAC's reliever airport system and is home base for many corporate aircraft and flight schools. According to MAC's 2020 Annual Report, FCM ranked 2nd for based aircraft among MAC's reliever airports. In a 2018 report prepared by InterVISTAS, FCM's total economic output was estimated to be $229 million.

The Airport is in Hennepin County, in the south-central area of the City of Eden Prairie **(See Figure 1.1)**. Multiple nearby highways provide regional access to FCM: Interstate 494 to the northeast (3 miles), U.S. Route 212 to the northwest (2 miles), and U.S. Route 169 to the east (2.5 miles). Roadway access to the Airport primarily comes from County Road 61 (Flying Cloud Drive) to the east and Pioneer Trail and Victor Lane in the north. Mitchell Road and Spring Road bound portions of the airport on the west. Charlson Road bounds a portion of the airport to the south.

1.2.2 Role and Classification

Various agencies define airport classification slightly differently, including FAA, MAC, Metropolitan (Met) Council, and Minnesota Department of Transportation (MnDOT).

FAA

The FAA classifies airports based on the size and type of aircraft it serves and specific characteristics for those planes. FCM has a legacy Airport Reference Code of B-II which means it was designed, constructed, and maintained to serve airplanes with Aircraft Approach Category (AAC) of "B" and Airplane Design Group (ADG) of "II". AAC of "B" refers to aircraft with an approach speed of 91 knots or more but less than 121 knots. ADG II aircraft have wingspans of less than 79 feet and tail heights less than 30 feet. Reference **Table 1-1** and **Table 1-2** for more information about AAC and ADG. In recent years, the FAA has acknowledged that the Airport currently is operating as a C-II airport. AAC of "C" refers to aircraft with an approach speed greater than 121 knots but less than 141 knots. The study reviews the existing airfield as a C-II airport.

694
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35W
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212
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DRAWING LEGEND

MINNESOTA STATE HIGHWAY	xxx
US HIGHWAY	xxx
INTERSTATE	xxx
FLYING CLOUD AIRPORT	
OTHER REGIONAL AIRPORTS	
COUNTY BOUNDARY	
MAJOR HIGHWAY	

FCM

MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION MAC

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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SCALE IN MILES

FINAL DOCUMENT

HNTB

FIGURE 1-1 SEPTEMBER 2025

VICINITY MAP

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Metropolitan (Met) Council

The Metropolitan Council uses four facility classifications: Major Airport, Intermediate Airport, Minor Airport, and Special Purpose. According to the Regional 2040 Transportation Policy Plan published in November 2020, FCM falls into the Minor Airport classification. Under this definition, the airport has a primary runway length between 2,500 and 5,000 feet, with either a precision or non-precision approach. FCM also has system role as a Business Jet Reliever with a focus on accommodating air taxi and business jet traffic, but can also accommodate personal use and recreational aircraft, and flight training operations. The Met Council is planning to update their regional system plan and FCM's classification may be subject to change.

MnDOT

The Minnesota State Aviation System Plan (MnSASP) published by MnDOT in May 2022 updated the state airport classification methodology to include the following classifications:

- Key Commercial Service – airports having a Part 139 certificate and paved runway greater than 4,900 feet, primarily supporting commercial and GA jets
- Key General Aviation – airports having a paved runway greater than 4,900 feet, primarily used for business jets, single and multiengine aircraft
- Intermediate Large / Intermediate Small – airports having a runway less than 4,900 feet, with small airports having a runway less than 3,800 feet
- Landing Strip Turf / Landing Strip Seaplane Base – airports having an unpaved or water runway

Under the updated classification, FCM is listed as a Key General Aviation airport, due to its largest paved runway of 5,000 feet and primary aircraft operations of business and GA aircraft.

1.2.3 On-Airport Land Use

FCM has three separate land uses within the airport property as shown in **Figure 1.2**. The airfield aeronautical use and airfield operations area encompasses 178 acres and includes all runways, taxiways, taxilanes, and aprons as well as any safety areas recommended per FAA criteria. Additional aeronautical use, including landside area, encompasses 135 acres and includes hangars and support facilities, as well as roadway access and parking. Non-aeronautical land use encompasses 530 acres and is the remainder of the airport property, where other sensitive off-airport land uses are prohibited due to operational safety and environmental concerns.

1.2.4 Surrounding Land Use

As shown in **Figure 1.3**,[1] the Airport is surrounded by large areas of park and open space, residential area, and small pockets of mixed commercial. MAC owned land extends to the west and east of the airfield to include land within runway RPZs.

[1] Minnesota Geospatial Commons, https://gisdata.mn.gov/dataset/us-mn-state-metc-plan-generl-lnduse2020

DRAWING LEGEND

AIRFIELD OPERATIONS AREA		AERONAUTICAL USE	
SUPPORT FACILITIES		BUILDING ON-AIRPORT	
RUNWAY PAVEMENT		AIRCRAFT MOVEMENT AREA (AMA)	
RUNWAY SAFETY AREA (RSA)	RSA	AIRPORT PROPERTY BOUNDARY	
RUNWAY OBSTACLE FREE ZONE (OFZ)	OFZ	NAVAID CRITICAL AREA	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	AIRCRAFT OPERATIONS AREA (AOA) FENCE	x x
RUNWAY PROTECTION ZONE (RPZ)	RPZ	AIRSIDE GATE	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	NON-AERONAUTICAL USE	

FCM

MAC — Minneapolis Saint Paul Metropolitan Airports Commission

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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0 1,000' 2,000'

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FIGURE 1-2 SEPTEMBER 2025

ON-AIRPORT LAND USE

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STARING LAKE

PIONEER TRAIL

SPRING ROAD

CHARLSON ROAD

FLYING CLOUD DRIVE

GRASS LAKE

MINNESOTA RIVER

Maxar

SOURCE

LAND USE DATA FROM MINNESOTA GEOSPATIAL COMMONS, ACCESSED APRIL 2022.

DRAWING LEGEND

PARK / OPEN SPACE	
RESIDENTIAL	
AIRPORT PROPERTY BOUNDARY	
MIXED COMMERCIAL	
INDUSTRIAL	

FCM

MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION MAC

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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FINAL DOCUMENT

HNTB

FIGURE 1-3 SEPTEMBER 2025

SURROUNDING LAND USE

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1.3 Existing Airside Facilities

1.3.1 Airfield

The current Airport Reference Code is B-II, with the legacy critical design aircraft at FCM identified as follows:

- Runway 10L-28R is a B-II Small, utility runway – critical aircraft is the King Air B200
- Runway 10R-28L is a B-II runway – critical aircraft is the Citation III
- Runway 18-36 is a B-I Small runway – critical aircraft is the Beech Baron 58

However, in recent years the Airport has seen growth in the number of operations by C-II aircraft. Based on the number of annual operations, the critical design aircraft is now a C-II aircraft. Recognition of the Airport as an existing C-II airport has been adopted by the FAA and MAC. Therefore, this chapter presents data for an Airport Reference Code of C-II.

1.3.2 Runways

1.3.2.1 Runway System

The existing runway system at FCM consists of a three-runway configuration, including one set of parallel runways and a crosswind runway. Parallel Runways 10L-28R and 10R-28L are oriented in an east-west alignment and crosswind Runway 18-36 is oriented in a north-south direction. Runway 10L-28R measures 3,898 feet long by 75 feet wide, Runway 10R-28L measures 5,000 feet long by 100 feet wide, and Runway 18-36 measures 2,690 feet long by 75 feet wide. The layout of the airfield is illustrated in the FAA published Airport Diagram in **Figure 1.4**. Pilots have access to the full published lengths of all three runways as there are no existing published declared distances limiting available runway length for any of the runways. The parallel (10-28) runway spacing is 500 feet centerline to centerline. There are multiple operational restrictions on the runways including the closure of Runway 10L-28R when the Air Traffic Control Tower (ATCT) is closed, and FCM is unavailable for use by aircraft with certified maximum takeoff weight (MTOW) greater than 60,000 pounds. Simultaneous operations on the parallel runways are also required to be dependent of each other due to the close spacing of the two runways.

23334

AIRPORT DIAGRAM

AL-5094 (FAA)

FLYING CLOUD (FCM)
MINNEAPOLIS, MINNESOTA

ATIS
124.9
FLYING CLOUD TOWER ★
119.15
GND CON
121.7
CLNC DEL
121.7 (When Tower Closed)

VAR 0.3° E

JANUARY 2020
ANNUAL RATE OF CHANGE
0.1° W

44°50′N

FBO RAMP
FBO RAMP
FBO RAMP

HS 2
HS 1

ELEV 896
ELEV 906
ELEV 899
ELEV 900
ELEV 898
ELEV 905

10R
10L
8L
28R
28L

100.7°
280.7°
185.7°
005.7°

5001 X 100
3901 X 75
2690 X 75

A
A1
A2
A3
B
B PAD
B4
C
D
D1
D2
E
E1
E2
F
G
H

SPRING
MINNESOTA
MICHIGAN
LOUISIANA
KENTUCKY
KANSAS
IOWA

FIELD ELEV 906

PUBLIC AIRCRAFT WASH PAD

TWR 988 ±

36

RWY 10L-28R
S-12.5
RWY 10R-28L
S-30, D-60
RWY 18-36
S-12.5

NON-MOVEMENT AREA

44°49′N

CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES.
READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.

93°28′W
93°27′W

AIRPORT DIAGRAM
23334

MINNEAPOLIS, MINNESOTA
FLYING CLOUD (FCM)

NC-1, 25 JAN 2024 to 22 FEB 2024

NC-1, 25 JAN 2024 to 22 FEB 2024

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1.3.2.2 Airport Design Standards

FAA airport design standards provided in Advisory Circular (AC) 150/5300-13B, *Airport Design*, published on March 31, 2022, provide guidelines for a safe and efficient airport system. General conformity to the FAA's standards ensures that an aircraft in a particular category can safely operate at the Airport.

The Aircraft Approach Category (AAC) and Airplane Design Group (ADG) are groupings of aircraft used to establish design standards that apply to airfield elements, such as runways, taxiways, and apron areas. Design standards vary throughout the airfield based on the size and operational characteristics of aircraft expected to operate in any given area.

The AAC classifies aircraft by their final approach speed and is a key factor in defining the length and width of certain aircraft protection areas such as the Runway Safety Area (RSA) and Runway Object Free Area (ROFA). Approach speeds are categorized into one of five categories identified using an alphabetical reference consisting of A through E as delineated in **Table 1-1.**

Table 1-1: Aircraft Approach Category (AAC) Criteria

AAC	VREF / Approach Speed
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more, but less than 121 knots
C	Approach speed 121 knots or more, but less than 141 knots
D	Approach speed 141 knots or more, but less than 166 knots
E	Approach speed of more than 166 knots

Source: FAA Advisory Circular 150/5300-13B

The ADG is a function of the wingspan and tail height dimensions, whichever is greatest, of the largest aircraft (critical aircraft) to regularly operate at the airport. The FAA utilizes six ADG categories, identified by Roman numerals, to categorize aircraft. These are summarized in **Table 1-2**.

Table 1-2: Airplane Design Group (ADG) Criteria

CATEGORY	WINGSPAN	TAIL HEIGHT
ADG I	Less than 49'	Less than 20'
ADG II	49' but less than 79'	20' but less than 30'
ADG III	79' but less than 118'	30' but less than 45'
ADG IV	118' but less than 171'	45' but less than 60'
ADG V	171' but less than 214'	60' but less than 66'
ADG VI	214' but less than 262'	66' but less than 80'

Source: FAA Advisory Circular 150/5300-13B

The Runway Design Code (RDC) establishes multiple design standards that apply to each runway end at FCM based on the critical aircraft currently operating or forecast to operate on the runway. Airports use these RDC codes to establish existing and planned runway elements. The critical aircraft is defined as being

the most demanding aircraft that conducts 500 or more operations annually on a runway. The most demanding aircraft can either be a single aircraft or a grouping of similar aircraft. The RDC is specific to each runway end and is comprised of three elements: AAC, ADG, and approach visibility minimums.

The third component of the RDC consists of the visibility minimum for each runway end as expressed in Runway Visual Range (RVR) values. Applicable RVR visibility values include 1,200', 1,600', 2,400', 4,000', 5,000', and VIS (Visual). The RVR values and their corresponding relationship to instrument flight visibility minimums are presented in **Table 1-3**.

Table 1-3: Approach Visibility Minimums (Runway Visual Range - RVR)

RVR	INSTRUMENT FLIGHT VISIBILITY CATEGORY (STATUTE MILE)
VIS	Visual approach
5,000	Not lower than 1 mile
4,000	Lower than 1 mile, but not lower than ¾ mile
2,400	Lower than ¾ mile, but not lower than ½ mile
1,600	Lower than ½ mile, but not lower than ¼ mile
1,200	Lower than ¼ mile

Source: FAA Advisory Circular 150/5300-13B

The Approach Reference Code (APRC) and the Departure Reference Code (DPRC) identify the operational capabilities of each runway and adjacent taxiway where no special operating procedures or restrictions are necessary. APRC and DPRC do not consider runway length; they are only a measurement of ideal operational characteristics as they relate to runway-taxiway separation (APRC and DPRC), and visibility minimums (APRC only). The APRC and DPRC can be used to determine what aircraft can operate on a runway under irregular usage. APRC classifications are based on the AAC, ADG, and Visibility Minimums, while DPRC only utilizes the AAC and ADG. These codes are assigned to each runway end and can be different between runway ends on the same runway. **Table 1-4** summarizes the APRC and DPRC codes for each runway at FCM.

The Taxiway Design Group (TDG) establishes design standards for taxiway and taxilane facilities, comprised of taxiway width, taxiway shoulder width, taxiway edge safety margin (TESM), and taxiway fillet design. A combination of the Main Gear Width (MGW) and Cockpit-to-Main Gear (CMG) dimensions determine the Taxiway Design Group (TDG) classification.

1.3.2.3 Runway Design Standards

To maintain a safe airfield environment for aircraft to operate, the FAA established safety and design standards for runway surfaces, adjacent airfield pavements, and adjacent land surrounding the runway system. The standards vary based on the critical aircraft and RDC of each runway and runway end and are summarized in **Table 1-4**.

Runway Safety Area (RSA) – The RSA is a defined area surrounding the runway consisting of a prepared surface suitable for reducing the risk of damage to an aircraft in the event of an undershoot, overshoot, or excursion from the runway. Each runway at FCM has different RSA dimensions. For Runway 10L-28R

the RSA is 150 feet wide (75 feet on either side of the runway centerline) and extends 300 feet beyond the runway pavement on each end of the runway. For Runway 10R-28L the RSA is 500 feet wide (250 feet on either side of the runway centerline) and extends 1,000 feet beyond the runway pavement on each end of the runway. For Runway 18-36 the RSA is 120 feet wide (60 feet on either side of the runway centerline) and extends 240 feet beyond the runway pavement on each end of the runway.

Runway Object Free Area (ROFA) – The object free area is an area centered on the surface of the runway provided to enhance the safety of aircraft by remaining clear of objects, except for objects that are fixed-by-function in the OFA for air navigation or aircraft ground maneuvering purposes. Each runway at FCM has different ROFA dimensions. For Runway 10L-28R the ROFA is 500 feet wide (250 feet on either side of the runway centerline) and extends 300 feet beyond the runway pavement on each end of the runway. For Runway 10R-28L the ROFA is 800 feet wide (400 feet on either side of the runway centerline) and extends 1,000 feet beyond the runway pavement on each end of the runway. For Runway 18-36 the ROFA is 250 feet wide (125 feet on either side of the runway centerline) and extends 240 feet beyond the runway pavement on each end of the runway

Runway Obstacle Free Zone (ROFZ) – The runway obstacle free zone is the three-dimensional airspace centered along the runway and extended runway centerline that is clear of obstacles for the protection of aircraft landing or taking off from the runway and for missed approaches. The ROFZs for Runways 10L-28R and 18-36 are 250 feet wide and extend 200 feet beyond each physical runway end point. The Runway 10R-28L ROFZ is 400 feet wide and extends 200 feet beyond the end of each physical runway end.

Precision Obstacle Free Zone (POFZ) – A POFZ is an 800-foot wide by 200-foot long area centered on the runway centerline, starting at the runway threshold, designed to protect aircraft on their precision approaches from ground vehicles and other aircraft. The POFZ is applicable to any precision runway with approach minimums less than 250 feet or visibility less than ¾ mile. Runway 10R has approach minimums of 200 feet and ½ mile, which requires the protection of a POFZ surface.

Inner Approach Obstacle Free Zone (IAOFZ) – The IAOFZ applies only to runways with an approach lighting system and begins 200 feet from the runway threshold, at the same elevation as the runway threshold, and extends 200 feet beyond the last light unit in the Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR). The IAOFZ width is the same as the ROFZ and rises at a slope of 50:1. The IAOFZ applies to the approach end of Runway 10R.

Inner Transitional Obstacle Free Zone (ITOFZ) – The ITOFZ is a defined volume of airspace along the sides of the ROFZ and IAOFZ. It applies only to runways with lower than 3/4 statute mile visibility minimums. The ITOFZ applies to the approach end of Runway 10R.

Runway Protection Zone (RPZ) – The RPZ is a 2-dimensional trapezoidal area which is intended for land-use compatibility control. The function of the RPZ is to protect people and property on the ground due to undershoots and overshoots of aircraft arriving and departing the runway. As such, there are both approach and departure RPZs. Approach RPZ dimensions are a function of the aircraft approach category and approach visibility minimums associated with the approach runway end. Departure RPZ dimensions are a function of the aircraft approach category and departure procedures associated with the runway. RPZ dimensions are shown in **Table 1-4**.

Table 1-4: Existing Runway Design Standards

RUNWAY	10L-28R		10R-28L		18-36	
Length	3,898 FT		5,000 FT		2,690 FT	
Width	75 FT		100 FT		75 FT	
Surface	Asphalt		Asphalt		Asphalt	
Treatment	None		Grooved		None	
Pavement Strength	Utility		Other-Than-Utility		Utility	
Critical Aircraft	King Air B200		Challenger 30/35		Beech Baron 58	
Runway End	10L	28R	10R	28L	18	36
RDC	B/II(S)/5000	B/II(S)/5000	C/II/2400	C/II/5000	B/I(S)/VIS(1)	B/I(S)/5000
APRC	B/II/4000	B/II/4000	D/V/2400	D/V/4000	B/II/VIS	B/II/4000
DPRC	B/II	B/II	D/V	D/V	B/II	B/II
Markings	Non-Precision	Non-Precision	Precision	Non-Precision	Non-Precision	Non-Precision
Displaced Threshold	None	None	None	None	None	None
Runway Centerline to Holdbars	125 FT	125 FT	250 FT	250 FT	125 FT	125 FT
RSA Width	150 FT	150 FT	500 FT	500 FT	120 FT	120 FT
RSA Length Beyond Runway End	300 FT	300 FT	1,000 FT	1,000 FT	240 FT	240 FT
RSA Length Prior to Landing Threshold	300 FT	300 FT	600 FT	600 FT	240 FT	240 FT
ROFA Width	500 FT	500 FT	800 FT	800 FT	250 FT	250 FT
ROFA Length Beyond Runway End	300 FT	300 FT	1,000 FT	1,000 FT	240 FT	240 FT
ROFA Length Prior to Landing Threshold	300 FT	300 FT	600 FT	600 FT	240 FT	240 FT
ROFZ Width	250 FT	250 FT	400 FT	400 FT	250 FT	250 FT
ROFZ Length Beyond Runway End	200 FT	200 FT	200 FT	200 FT	200 FT	200 FT
Approach RPZ (IW x OW x L) (2)	250' x 450' x 1,000'	250' x 450' x 1,000'	1,000' x 1,750' x 2,500'	500' x 1,010' x 1,700'	250' x 450' x 1,000'	250' x 450' x 1,000'
Departure RPZ (IW x OW x L) (2)	250' x 450' x 1,000'	250' x 450' x 1,000'	500' x 1,010' x 1,700'	500' x 1,010' x 1,700'	250' X 450' x 1,000'	250' x 450' x 1,000'

(1) Circle-to-land on Runway 18 available via other runway approaches
(2) Inner Width (IW), Outer Width (OW), Length (L)

Source: HNTB Analysis

1.3.2.4 Meteorological Data, Wind Coverage, and Runway Orientation

Weather conditions play a vital role in airfield operations. Temperature, visibility, and wind are three primary weather factors that pilots must plan for. Temperature affects aircraft performance which in turn dictates the amount of runway required for takeoff and landing. Poor visibility can affect airport capacity by reducing the number of operations within a given timeframe and can also cause ground delays, diversions, and cancellations. Aviation operations are broken up into three main categories in relation to the weather: Visual Meteorological Conditions (VMC), Marginal Visual Meteorological Conditions (marginal VMC), and Instrument Meteorological Conditions (IMC). Marginal VMC conditions exist when the visibility is between 3 and 5 statute miles and ceiling is between 1,000 – 3,000 feet. IMC exist when the visibility is less than 3 statute miles or ceilings are below 1,000 feet AGL. Pilots and aircraft need to be rated and/or equipped for flight in IMC conditions. Basic weather characteristics for FCM are listed in **Table 1-5**

Table 1-5: Weather Characteristics

CONDITION	EXISTING
Hottest Month	July
Mean Max. Temp (Hottest)	75 degrees
Coldest Month	January
Mean Min. Temp (Coldest)	17 degrees
Average Annual Precipitation	31.5 inches

Source: NOAA National Centers for Environmental Information, 2006-2020

Wind direction and speed is a key factor which influences the orientation and number of runways at an airport. Ideally, a runway should be aligned with the prevailing wind. Aircraft operating on a runway generally need to take off and land into the wind (headwind) to maximize lift and minimize takeoff and landing ground roll. Aircraft of all sizes are affected when operating on a runway when a crosswind is present. The FAA recommends evaluating the need for a crosswind runway when primary runway provides less than 95% wind coverage. "Wind Coverage" is calculated based on the crosswind component not exceeding allowable values. These values are provided in **Table 1-6**.

Table 1-6: Allowable Crosswind Component per Airport Reference Code (ARC)

ARC	ALLOWABLE CROSSWIND COMPONENT
A-I and B-I [1]	10.5 knots
A-II and B-II	13 knots
A-III, B-III, C-I through D-III, D-I through D-III	16 knots
A-IV, B-IV, C-IV through C-VI, D-IV through D-VI	20 knots
E-I through E-VI	20 knots

(1) Includes A-I and B-I small aircraft

Source: Advisory Circular 150/5300-13B

Weather data was reviewed for 10 years spanning January 2011 through December 2020 for FCM. Wind coverage for VMC, IMC, and All Weather was calculated for each runway configuration and is presented in **Table 1-7**.

Table 1-7: Runway Wind Coverage

RUNWAY	AAC	CROSSWIND COMPONENT	VMC	IMC	ALL WEATHER
10L – 28R 10R – 28L	A	10.5 knots	90.64%	90.18%	90.57%
	B	13.0 knots	95.14%	94.75%	95.08%
	C	16.0 knots	98.89%	98.72%	98.68%
18 - 36	A	10.5 knots	89.66%	90.62%	89.85%
	B	13.0 knots	94.44%	94.80%	94.51%
	C	16.0 knots	98.46%	98.36%	98.43%
ALL RUNWAYS	A	10.5 knots	98.95%	98.62%	98.89%
	B	13.0 knots	99.78%	99.63%	99.76%
	C	16.0 knots	99.97%	99.94%	99.97%

Source: HNTB Analysis; NOAA Station Minneapolis Flying Cloud, MN

The primary runways at FCM, Runways 10R-28L and 10L-28R, provide adequate wind coverage for AAC C for VMC, IMC and all weather. Adequate coverage is provided for AAC B except for IMC. Since wind coverage for AAC A falls below 95% for all conditions and AAC B in IMC conditions, the crosswind runway is warranted at FCM per FAA guidance.

1.3.2.5 Runway Use

The Airport Traffic Control Tower (ATCT) at FCM is open from 6:00 AM to 9:00 PM in the winter months (November through March) and from 6:00 AM to 10:00 PM in the summer (April through October). During the hours the ATCT is attended, the Tower controls runway usage. When the ATCT is unattended, pilots follow recommended operations and communications procedures and choose which runway to use based on wind and weather conditions. The airspace surrounding the airport is classified as Class D when the ATCT is open and Class E when it is closed. See **Section 1.3.10** for additional airspace discussion. Runway 10L-28R is closed when the ATCT is unattended. According to historical MAC Noise and Operations Monitoring System (MACNOMS) data beginning in July 2021 through December 2021, Runway 10L-28R was the busiest runway, accounting for 55% of total operations, which includes aircraft performing touch-and-go's and low approaches. This was followed by Runway 10R-28L accounting for 38% of total operations and Runway 18-36 accounting for 7% of total operations. The primary runway usage percentages are presented in **Table 1-8** and **Table 1-9**. Runways 10L, 28R, 18 and 36 follow a standard left traffic pattern, while Runways 10R and 28R use a right traffic pattern.

Table 1-8: East Flow

RUNWAY	ARRIVALS	DEPARTURES
10L	48%	69%
10R	52%	31%

Source: MACNOMS data, HNTB Analysis

Table 1-9: West Flow

RUNWAY	ARRIVALS	DEPARTURES
28L	50%	31%
28R	50%	69%

Source: MACNOMS data, HNTB Analysis

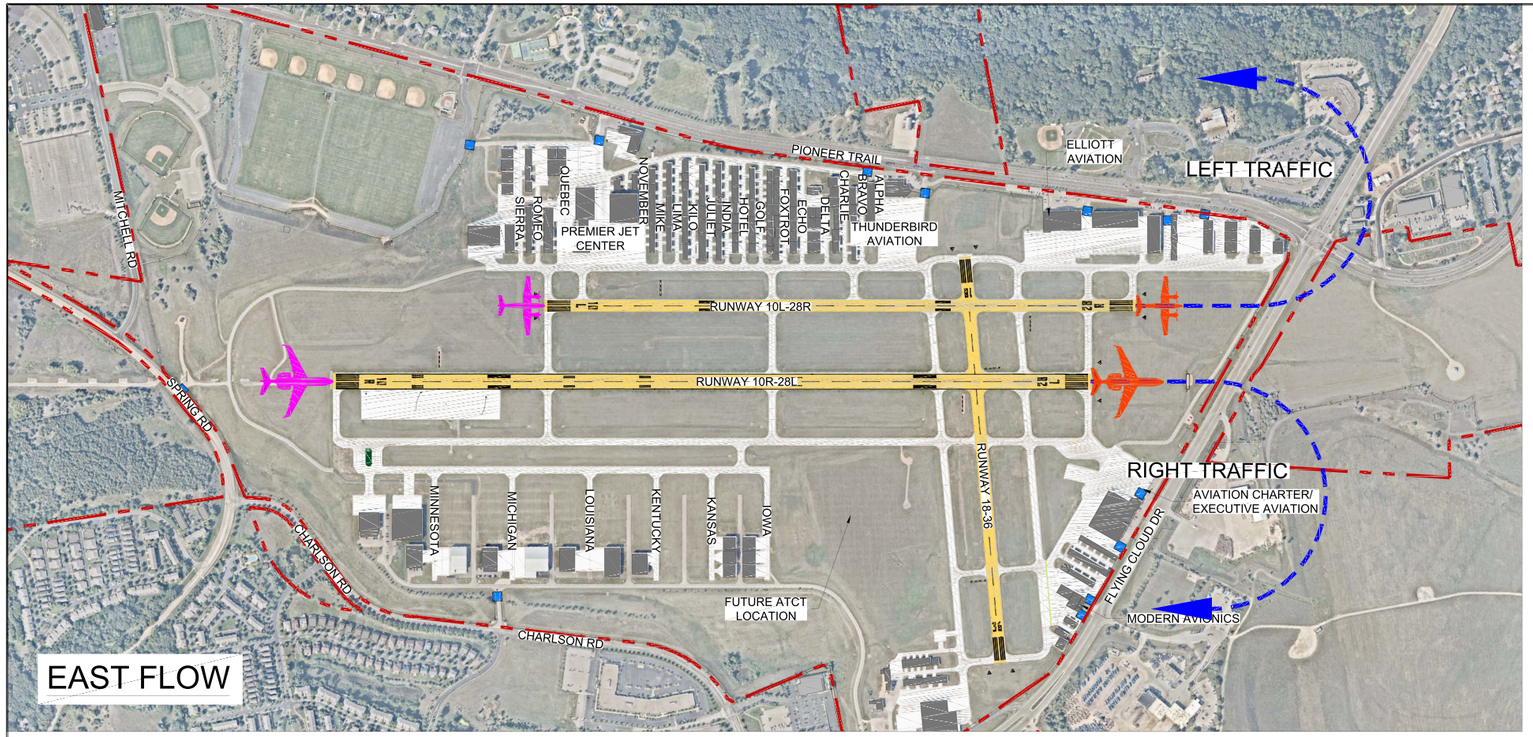
Runway 10L-28R's proximity to hangar space and FBOs may contribute to it being the preferred departure runway, despite the shorter length than Runway 10R-28L. The instrument approach procedures and installed navaids on Runway 10R-28L may contribute to it being the preferred arrival runway.

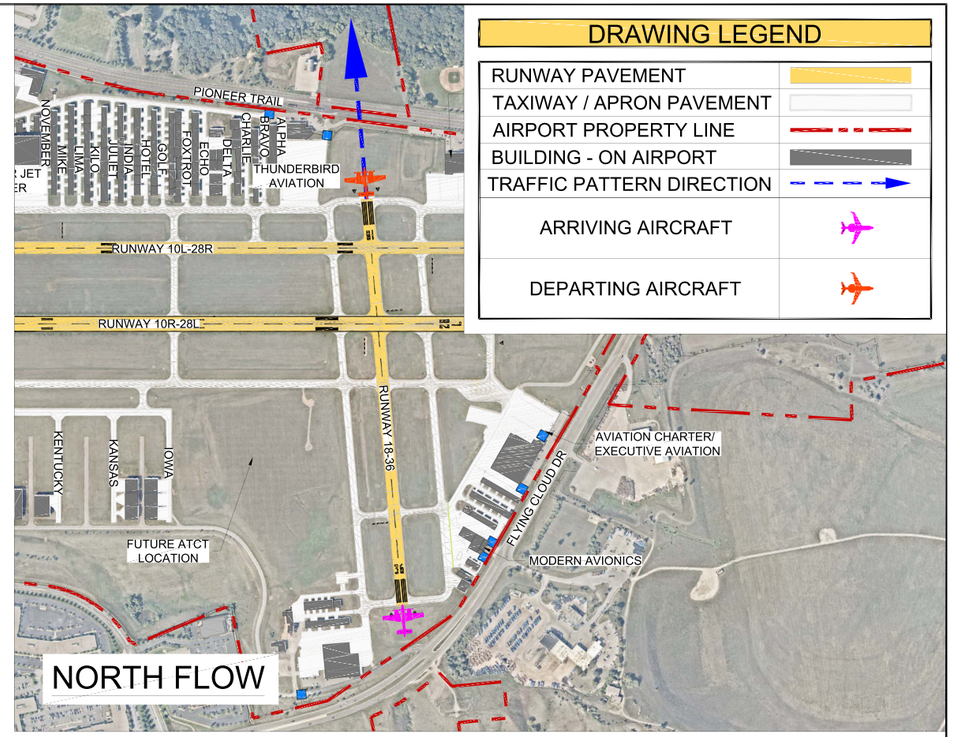
Figure 1.5 shows runway use and traffic patterns for the primary runway configurations. Runway 18-36 typically is not used when the wind favors the parallel runways due to the possibility of conflicting traffic patterns. However, the ATCT has allowed use of Runway 18-36 for crosswind training if there is little or no traffic in the pattern for the parallel runways.

1.3.3 Taxiways

The taxiway system shown in **Figure 1.6** provides aircraft connection between the runways and aprons throughout the airfield. Taxiways must conform to separation standards to other airfield pavements (runways, taxiways, taxilanes, aprons, and vehicle service roads) and must maintain sufficient protection surfaces, such as the Taxiway Safety Area (TSA) and the Taxiway/Taxilane Object Free Area (TOFA/TLOFA). The dimensions for required separations and safety areas are dependent upon the critical aircraft for the taxiway. The TSA and TOFA criteria are derived from the ADG, while the combination of the Main Gear Width (MGW) and Cockpit-to-Main Gear (CMG) dimensions determine the Taxiway Design Group (TDG) classification. The TDG establishes standards for taxiway width, taxiway shoulder width, taxiway edge safety margin (TESM), and taxiway fillet design.

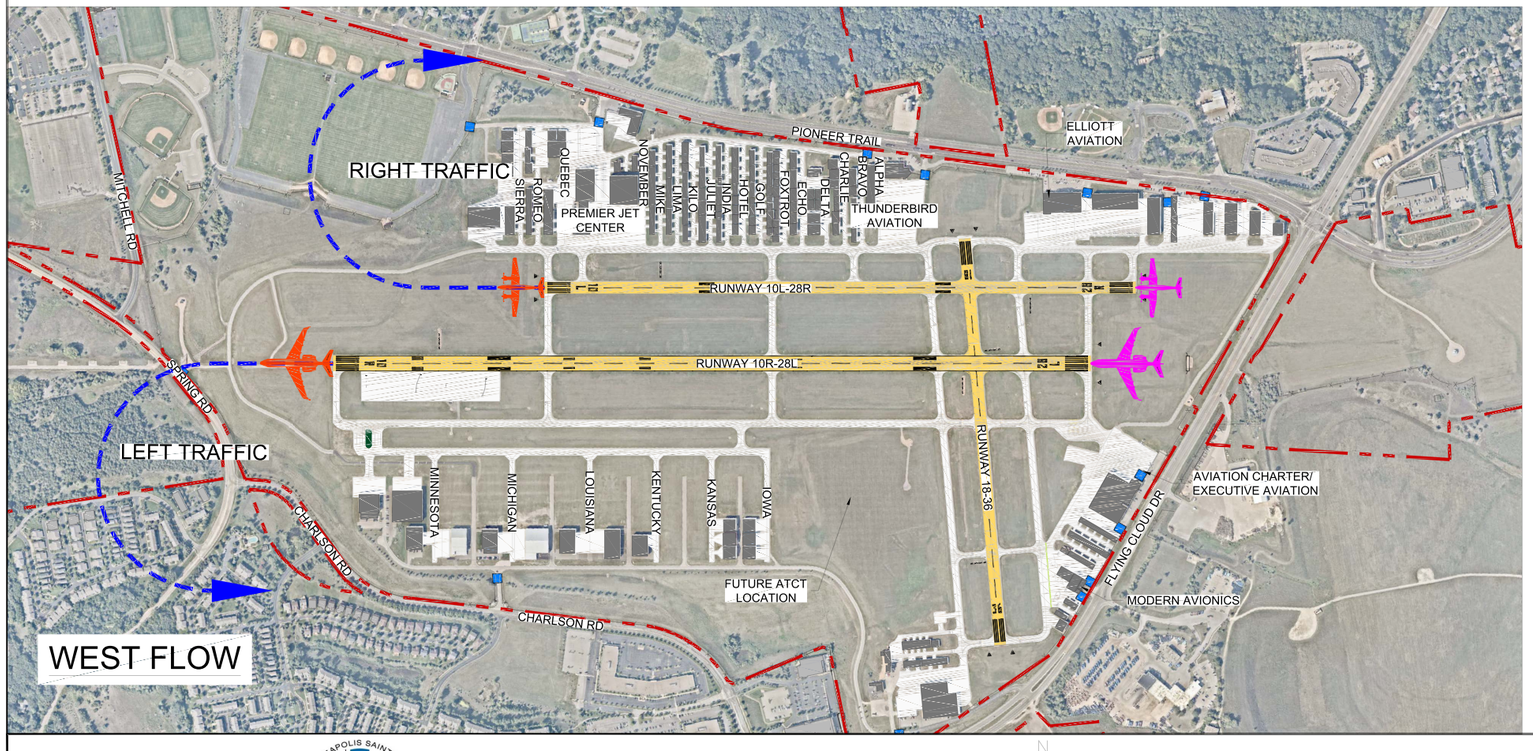
FCM serves a mixture of ADG I and ADG II aircraft with all taxiways designed to accommodate the maximum ADG II / TDG 2 aircraft, except for Taxiways D2 and E2 which are designed to TDG 1. Outside of the movement area, taxilanes between hangars have a minimum design to accommodate ADG I aircraft. The specific taxiway/taxilane design criteria for the representative ADG I / ADG II and TDG 2 aircraft are shown in **Table 1-10** and **Table 1-11**.





DRAWING LEGEND

RUNWAY PAVEMENT	
TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
BUILDING - ON AIRPORT	
TRAFFIC PATTERN DIRECTION	
ARRIVING AIRCRAFT	
DEPARTING AIRCRAFT	



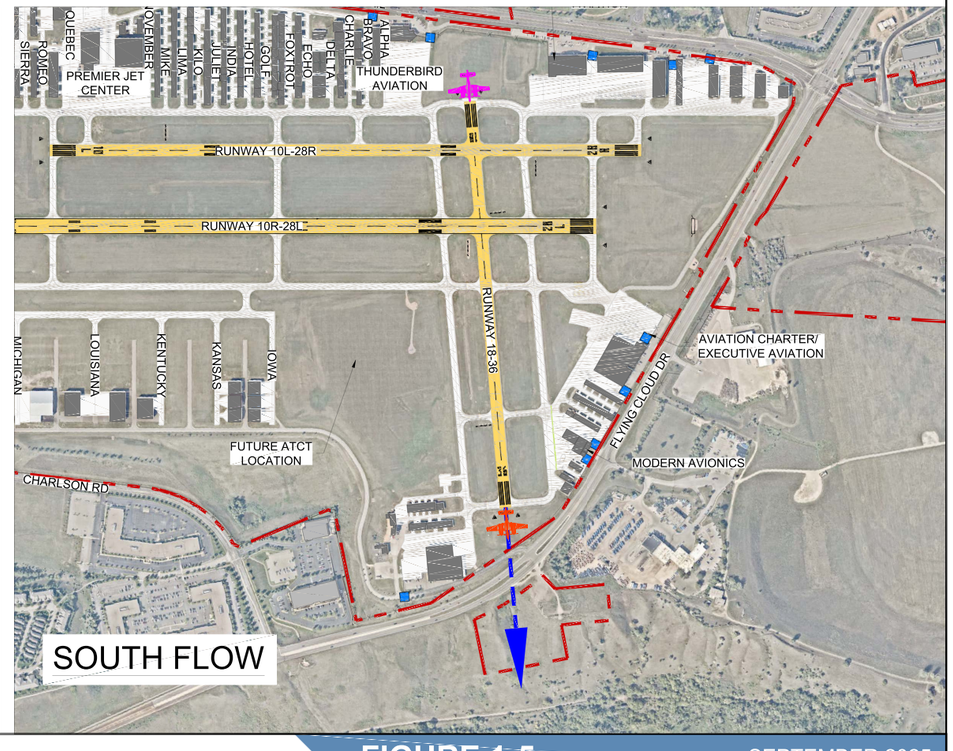


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FIGURE 1-5 SEPTEMBER 2025

PRIMARY RUNWAY OPERATING CONFIGURATIONS

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Table 1-10: Taxiway Design Standards based on ADG

DESIGN COMPONENT (REPRESENTATIVE AIRCRAFT)	ADG I (BEECH BARON 58)	ADG II (CHALLENGER 30/35)
Taxiway to Parallel Taxiway Centerline	70’	102’
Taxiway/Taxilane Safety Area Width	49’	79’
Taxiway Object Free Area Width	89’	124’
Taxilane Object Free Area Width	79’	110’
Taxiway Centerline to Fixed or Moveable Object	44.5’	62’
Taxilane Centerline to Parallel Taxilane Centerline	64’	94’
Taxilane to Fixed or Moveable Object	39.5’	55’

Source: FAA Advisory Circular 150/5300-13B

Table 1-11: Taxiway Design Standards based on TDG

DESIGN COMPONENT (REPRESENTATIVE AIRCRAFT)	TDG 2 (CHALLENGER 30/35)
Taxiway Width	35’
Taxiway Edge Safety Margin Width	7.5’
Taxiway Shoulder Width	15’

Source: FAA Advisory Circular 150/5300-13B

1.3.3.1 Taxiway / Taxilane Safety Areas

The Taxiway / Taxilane Safety Area (TSA) is a defined area surrounding the taxiway / taxilane that is prepared to be capable of supporting an aircraft, snow removal, or aircraft rescue and firefighting (ARFF) equipment and reduce the risk for damage to an aircraft deviating from the taxiway or taxilane. The TSA is centered on the taxiway or taxilane centerline and determined by the critical aircraft ADG. The TSA must be cleared and graded to remove any potentially hazardous surface variations and should be free of nonconforming objects. At FCM all taxiways are designed to ADG II standards and have a TSA width of 79 feet. Taxilanes between hangars have a reduced design standard of ADG I with a TSA width of 49 feet.

1.3.3.2 Taxiway Object Free Areas

The Taxiway Object Free Area (TOFA) is a defined area surrounding the taxiway that enhances the safety of aircraft operations by maintaining an area near the taxiway clear of nonconforming objects. Any objects that must be located within the TOFA for air navigation or aircraft ground maneuvering purposes should be mounted on Low Impact Resistant (LIR) frangible couplings. The TOFA is centered on the taxiway centerline and determined by the taxiway ADG. At FCM all taxiways are designed to ADG II standards and have a TOFA width of 124 feet.

1.3.3.3 Taxilane Object Free Areas

Similar to the TOFA, the Taxilane Object Free Area (TLOFA) is a defined area, centered on the taxilane centerline, that maintains the area near the taxilane clear of nonconforming objects. At FCM the taxilanes south of Taxiway B are designed to ADG II standards with a TLOFA width of 110 feet. The taxilanes between hangars north of Runway 10L-28R is reduced to ADG I, which results in a TLOFA width of 79 feet.

1.3.3.4 Taxiway / Taxilane Width

The pavement width required for taxiing aircraft is based on the Taxiway Design Group (TDG), which is based on the aircraft's Cockpit-to-Main Gear (CMG) distance and Main Gear Width (MGW). The taxiways at FCM follow the MAC standard taxiway design width of 40 feet, which is suitable for the entirety of FCM's expected aircraft fleet mix and TDG 2 design standards. The exceptions are Taxiways D2 and E2 which have a pavement width of 28 feet, restricting use on those taxiways to TDG 1 aircraft. The taxilane system at FCM maintains a pavement width of 20-25 feet in the hangar complex north of Taxiway A and a pavement width of 30 feet in the hangar complex south of Taxiway B. FCM does not have paved shoulders.

1.3.3.5 Taxiway and Taxilane Overview and Descriptions

The taxiway system at FCM consists of four parallel Taxiways (A, B, D, and E), each of which have entrance/exit taxiways connecting to the adjacent runway. Three crossing Taxiways (C, F, and G) provide connection between the north and south portions of the airfield. A network of taxilanes provide aircraft access from hangars to taxiways. **Figure 1.6** depicts the locations of these taxiways and taxilanes and **Table 1-12** and **Table 1-13** summarizes the key characteristics of each taxiway and taxilane, respectively.

Taxiways A and B are full-length taxiways parallel to Runways 10L-28R and 10R-28L, with Taxiway A offset 250 feet north of the Runway 10L-28R centerline and Taxiway B offset 400 feet south of the Runway 10R-28L centerline. Effective as of March 24, 2022, Taxiway A between the Premier Jet Center ramp and the Thunderbird Aviation ramp is closed to aircraft with wingspans of 56 feet or greater. Additionally, the portion of Taxiway A east of Baron Lane is closed to aircraft with wingspans of 54 feet or greater. Taxiways A1, A2, and A3 are runway entrance/exit taxiways connecting between Taxiway A and Runway 10L-28R, with Taxiway A1 located at the Runway 28R end, Taxiway A2 located near the midpoint of Runway 10L-28R, and Taxiway A3 located 230 feet from the Runway 10L end.

Taxiways D and E are full-length taxiways parallel to Runway 18-36, with Taxiway D offset 315 feet east of the runway and Taxiway E offset 250 feet west of the runway. Taxiway D between Taxiway D2 and the Runway 36 end is closed to aircraft with wingspans of 48 feet or greater. Taxiways E1 and D1 are runway entrance taxiways connecting between the end of Runway 36 and Taxiways E and D, respectively. Taxiways E2 and D2 are exit taxiways located approximately 600 feet to the north of the Runway 36 threshold.

Taxiways C, F, and G connect north-south between Taxiways A and B and provide entry/exit and crossing points for both Runways 10R-28L and 10L-28R. Taxiway H is a runway entrance taxiway located at the 10R runway end connecting to Taxiway B.

Table 1-12: Taxiway System Summary

TAXIWAY	TAXIWAY TYPE	DESCRIPTION (BETWEEN)	WIDTH	ADG	TDG
A	Full Parallel	(TWY G – TWY A1)	40’	II	2
A1	Entrance	(TWY A - 10L-28R)	40’	II	2
A2	Exit	(TWY A - 10L-28R)	40’	II	2
A3	Exit	(TWY A - 10L-28R)	40’	II	2
B	Full Parallel	(TWY H - TWY C)	40’	II	2
B4	Crossover	(TWY B – T/L Spring)	40’	II	2
C	Exit	(TWY A - 10L-28R)	40’	II	2
	Exit	(10L-28R - 10R-28L)			
	Entrance	(TWY B - 10R-28L)			
D	Full Parallel	(TWY D1 - TWY A)	40’	II	2
D1	Entrance	(TWY D - 18-36)	40’	II	2
D2	Exit	(TWY D - 18-36)	28’	II	1
E	Full Parallel	(TWY E1 - TWY A)	40’	II	2
E1	Entrance	(TWY E - 18-36)	40’	II	2
E2	Exit	(TWY E - 18-36)	28’	II	1
F	Exit	(TWY A - 10L-28R)	40’	II	2
	Exit	(10L-28R - 10R-28L)			
	Exit	(TWY B - 10R-28L)			
G	Entrance	(TWY A - 10L-28R)	40’	II	2
	Exit	(10L-28R - 10R-28L)			
	Exit	(TWY B - 10R-28L)			
H	Entrance	(TWY B - 10R-28L)	40’	II	2

Source: HNTB Analysis

Table 1-13: Taxilane System Summary

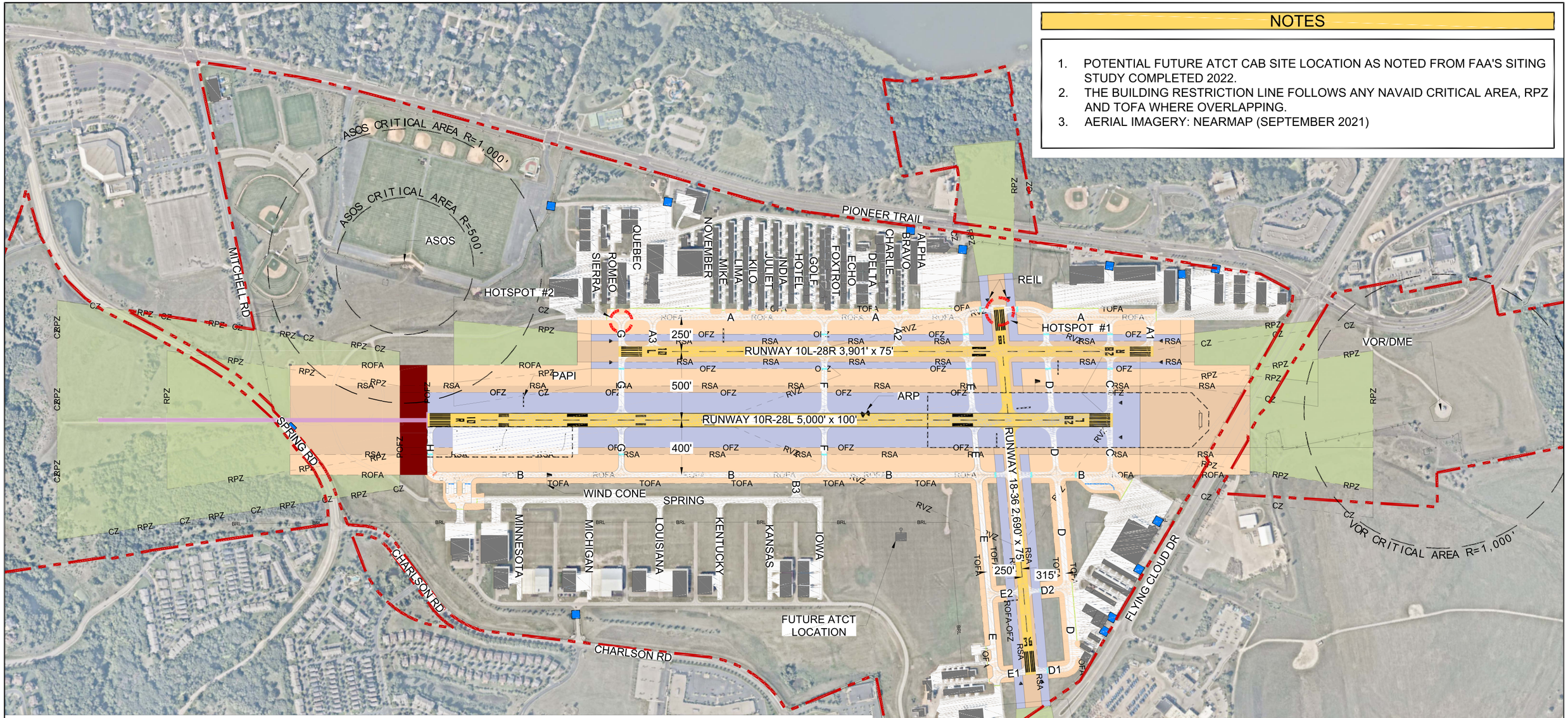
TAXILANE	WIDTH	ADG	TDG
ALPHA	22’	I	1*
BRAVO	20’	I*	1*
CHARLIE	20’	I*	1*
DELTA	20’	I*	1*
ECHO	20’	I*	1*
FOXTROT	20’	I*	1*
GOLF	20’	I*	1*
HOTEL	20’	I*	1*
INDIA	20’	I*	1*
JULIET	20’	I*	1*
KILO	20’	I*	1*
LIMA	20’	I*	1*
MIKE	20’	I*	1*
NOVEMBER	20’	I*	1*
PAPA	>35’	II	2
QUEBEC	>35’	II	2
ROMEO	25’	I	1
SIERRA	25’	I*	1
IOWA	32’	II	1
KANSAS	32’	II	1
KENTUCKY	32’	II	1
LOUISIANA	32’	III	1
MICHIGAN	32’	III	1
MINNESOTA	30’	III	1
SPRING	40’	III	2

*Does not meet minimum dimensional standards

Source: HNTB Analysis

NOTES

1. POTENTIAL FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA'S SITING STUDY COMPLETED 2022.
2. THE BUILDING RESTRICTION LINE FOLLOWS ANY NAVAID CRITICAL AREA, RPZ AND TOFA WHERE OVERLAPPING.
3. AERIAL IMAGERY: NEARMAP (SEPTEMBER 2021)



DRAWING LEGEND

RUNWAY PAVEMENT		35' BUILDING RESTRICTION LINE (BRL) [2]	BRL
EXISTING TAXIWAY / APRON PAVEMENT		RUNWAY HOLDING POSITION (PATTERN A)	
AIRPORT PROPERTY LINE		ILS HOLDING POSITION (PATTERN B)	
EXISTING BUILDING - ON AIRPORT		INTERMEDIATE HOLDING POSITION (PATTERN C)	
FUTURE ATCT CAB [1]		NON-MOVEMENT AREA BOUNDARY	
RUNWAY SAFETY AREA (RSA)	RSA	APPROACH LIGHTING SYSTEM (MALSR)	
RUNWAY OBSTACLE FREE ZONE (OFZ)	OFZ	NAVAID CRITICAL AREA	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	HOT SPOT [3]	
RUNWAY PROTECTION ZONE (RPZ)	RPZ	AIRSIDE GATE	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA		

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FIGURE 1-6 SEPTEMBER 2025

AIRFIELD CONFIGURATION

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1.3.3.6 Aircraft Holding Bays

The FCM airfield has two aircraft holding bays located near Runway 10R-28L that are used for aircraft bypass maneuverability. The existing aircraft holding bay on the Runway 10R end, known as the "B-Pad", is connected to the Taxiway B, Taxiway H, and Taxilane Spring intersection and is approximately 320 feet long and 140 feet deep. The aircraft holding bay has taxiway centerline markings encircling the pad and can accommodate two ADG II aircraft. MAC has plans to reconfigure this holding bay but the future holding bay would still accommodate two ADG II aircraft. The aircraft holding bay on the Runway 28L end is connected to the Taxiway B and Taxiway C intersection and is approximately 150 feet long and 45 feet wide. The aircraft holding bay can accommodate two ADG I aircraft.

1.3.4 Hot Spots

The FAA defines a hot spot as a location on an airport movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary. FCM has two existing hot spots. The hot spot locations are shown and described in **Table 1-14.**

Table 1-14: FAA Hot Spot Description

HOT SPOT	LOCATION	DESCRIPTION
HS 1	Taxiway A / Runway 18 intersection	Runway 18 approach area proximity to adjacent ramps along Taxiway A
HS 2	Taxiway A / G intersection	Short taxi distance from ramp to runway hold line

Source: FAA Airport/Facility Directory

1.3.5 Airfield Pavement Condition Summary

The runway, taxiway, and apron pavement at FCM is comprised of Asphalt-Concrete (AC) pavement. The FAA requires federally obligated airports to perform detailed inspections of their pavements at regular intervals as part of a formalized pavement management plan. The latest pavement inspection was completed in late 2020 by SEH. The pavement inspection rated the condition of all airport pavement utilizing the pavement condition index (PCI) method. PCI is a metric which defines pavement conditions using factors such as structural integrity, surface traction, capacity, and roughness. The PCI scale ranges from 0 to 100 with 0 representing pavement in a failed condition and 100 representing pavements in excellent condition. Values are assigned by a visual inspection of the pavements considering the type, severity, and quantity of pavement distress. **Figure 1.7** shows the results from the latest inspection conducted in December 2020.

The majority of pavement at FCM is in excellent condition, with a rating of 81-100. Runway 10R-28L is in good condition with a rating of 61-80. There are isolated sections of pavement outside of the movement area in fair condition with a rating of 41-60.

PIONEER TRAIL
SPRING RD
CHARLSON RD
CHARLSON RD
FUTURE ATCT LOCATION
FLYING CLOUD DR
RUNWAY 10L-28R 3,901' x 75'
RUNWAY 10R-28L 5,000' x 100'
RUNWAY 18-36 2,690' x 75'
QUEBEC
SIERRA
ROMEO
NOVEMBER
MIKE
LIMA
KILO
JULIET
INDIA
HOTEL
GOLF
FOXTROT
ECHO
DELTA
CHARLIE
BRAVO
ALPHA
SPRING
MINNESOTA
MICHIGAN
LOUISIANA
KENTUCKY
KANSAS
IOWA
A
A1
A2
A3
B
B1
B2
B3
C
D
D1
D2
E
E1
E2
F
G
H

DRAWING LEGEND

AIRPORT PROPERTY LINE	
BUILDING - ON AIRPORT	
PAVEMENT CONDITION INDEX: 1 - 20	
PAVEMENT CONDITION INDEX: 21 - 40	
PAVEMENT CONDITION INDEX: 41 - 60	
PAVEMENT CONDITION INDEX: 61 - 80	
PAVEMENT CONDITION INDEX: 81 - 100	
PAVEMENT CONDITION INDEX: UNKNOWN	

NOTES

SOURCE: PAVEMENT CONDITION SURVEY, DECEMBER 2020 (SEH)

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MAC METROPOLITAN AIRPORTS COMMISSION

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FIGURE 1-7 SEPTEMBER 2025

PAVEMENT CONDITION INDEX (PCI)

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1.3.6 Non-Aeronautical Traffic

FCM does not have fully separated non-aeronautical and aeronautical traffic and in some locations authorized vehicles are permitted to utilize taxiways and taxilanes to access facilities. The taxilanes between hangars in the northwest and southeast hangar complexes allow for both aircraft traffic and tenant vehicle access. Non-aeronautical traffic on the airfield is separated on two vehicle service roads (VSRs) that extend around the parallel runways. Two VSRs connect Taxiway A to Taxiway B, one is located west of Runways 10R/10L and the other east of Runways 28L/28R. See **Figure 1.10** for a depiction of the VSR locations.

1.3.7 Navigational Aids (NAVAIDS)

Navigational Aids (NAVAIDs) enhance the wayfinding ability and approach visibility of an airport.

1.3.7.1 Electronic NAVAIDS

Electronic NAVAIDs can be used for both precision and non-precision approach procedures. NAVAIDs, for use by a precision instrument approach procedure, typically include a glideslope antenna, localizer antenna, and select Global Positioning Systems (GPS). These NAVAID components, when combined, create a horizontally and vertically guided Instrument Landing System (ILS). Runway 10R is the only precision approach at the airport and has an ILS or LOC approach with as low as 200 and ½ mile visibility minimums.

Glideslope (GS) Antenna – The glideslope antenna is the part of an ILS system that provides vertical guidance to the landing aircraft. Runway 10R is equipped with an end-fire glideslope system, installed on the right side of the runway centerline. The glideslope antenna is owned and maintained by the FAA. End-fire glideslope systems have traditionally been used to address irregular terrain prior to the approach threshold of the runway.

Localizer (LOC) Antenna – The localizer antenna is the part of the ILS system that provides the lateral guidance, as it relates to runway centerline, information to the landing aircraft. The antenna is located on the opposite end of the runway from the arrival threshold. Runway 10R is equipped with a localizer array installed 650 feet from the Runway 28L end. The localizer array is owned and operated by the FAA and is an 8 pin, Mark 1 series, single frequency array.

Non-precision NAVAIDs include GPS, Airport Surveillance Radar 9 (ASR-9), Very High Frequency (VHF) Omni-Directional Range (VOR) with or without Distance Measuring Equipment (DME), and Tactical Air Navigation (TACAN). A summary of the electronic systems available for each runway end is provided in **Table 1-15**.

Very High Frequency Omni-Directional Range (VOR) Station / Distance Measuring Equipment (DME) – The VOR station located on the airport is called Flying Cloud VOR and is co-located with a DME antenna. The VOR provides information to help pilots navigate point-to-point within the National Airspace System (NAS). This is particularly useful for low altitude and high-altitude airway vectoring through the airspace surrounding the airport, as well as transition navigation into or out of the en-route airspace structure at FCM. In addition to providing en-route navigational assistance to aircraft, VORs also allow for non-precision approaches thereby enhancing the capability of the airport. The Airport has seven published non-precision instrument approaches to the airport [RNAV (GPS) and VOR], described further in **Section**

1.3.10.2. The Flying Cloud VOR is listed in Phase 2 of the FAA's decommissioning plan for VORs, with the exact timeline for decommissioning to be determined.

Table 1-15: Electronic NAVAIDs by Runway End

NAVAID	RUNWAY END					
	18	36	10L	28R	10R	28L
GPS		X	X	X	X	X
GS					X	
LOC					X	
VOR		X(1)			X	

(1) Runway 36 has a VOR/DME Approach

Source: HNTB Analysis

1.3.7.2 NAVAID Critical Areas

NAVAID critical areas delineate areas on the ground that must remain clear of aircraft, vehicle traffic, or permanent/temporary ground objects while the NAVAID in question is in use. NAVAID critical areas prevent any permanent or temporary objects from creating visual or signal interference with the NAVAID. **Figure 1.6** displays the size and location of NAVAIDs and their associated critical areas on the airfield, which are described below.

Glideslope (GS) Critical Areas – There is one end-fire glideslope antenna on the airfield, installed at the beginning of Runway 10R. The glideslope antenna requires ground protection of aircraft and objects to ensure adequate signal strength. The glideslope critical area encompasses the pavement the glideslope is installed on and extends to the runway threshold. The critical area includes a portion of Taxiway H so when the glideslope is in use, taxiing aircraft must hold short at the ILS hold bar marking at the intersection of Taxiway H and Taxiway B.

Localizer (LOC) Critical Areas – There is one localizer antenna on the airfield, installed prior to the Runway 28L threshold. The critical area extends 2,000 feet west along the Runway 10R-28L centerline with a width of 400 feet, equivalent to the runway Object Free Zone (OFZ).

Automated Surface Observing System (ASOS) Critical Areas – There is an ASOS located northwest of the FCM airfield, adjacent to the Flying Cloud Fields. This facility measures a variety of meteorological conditions that may affect aviation operations, such as wind speed and direction, cloud cover, visibility, precipitation type and intensity, pressure, and other select significant remarks. The ASOS has two defined circular critical areas to prevent nearby objects from disrupting the wind sensors, depicted on **Figure 1.6**. The first critical area is an outer circle with a 1000-foot radius from the ASOS, inside of which any structure or ground elevation should remain at least 10 feet below the ASOS wind sensor equipment. The second critical area, which is more restrictive, is an inner circle with a 500-foot radius from the ASOS, inside of which any structure or ground elevation should be at least 15 feet below the ASOS wind sensor equipment.

1.3.8 Airfield Lighting and Visual Aids to Navigation

Visual NAVAIDs provide enhancements to an airfield during nighttime and/or low visibility situations. These NAVAIDs can include pavement markings (with beads for reflectivity), airfield lighting fixtures (runway/taxiway lights), visual descent guidance systems, and enhancements to precision approach procedures such as approach lighting systems.

FCM has various lighting systems in place to maximize visibility of the airport and the approach end of runways during nighttime or periods of low visibility condition as well as to enhance ground movements and mitigate the potential for runway incursions. The intensity of the runway and taxiway lighting can be controlled by air traffic control personnel. When the Air Traffic Control Tower is closed, pilots can turn on and change the intensity of the lights for Runway 10R-28L and 18-36 by using the radio transmitter in the aircraft on the CTAF frequency, 119.15. Runway 10L-28R is closed when the ATCT is closed. The lighting systems and their locations are described below and in **Table 1-16**.

1.3.8.1 Runway Lighting

Runway Edge Lighting – Runway 10R-28L is equipped with High Intensity Runway Edge Lights (HIRLs). Runways 10L-28R and 18-36 are equipped with Medium Intensity Runway Edge Lights (MIRLs).

Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) – A MALSR is a 2,400-foot medium intensity approach light system (ALS) with light stations positioned every 200 feet. This system includes sequenced flashing runway alignment indicator lights (RAILs) and gives visual indicators during landing to transition from instrument flight to visual flight. A MALSR is approved for CAT-I precision approaches and enhances the pilot's ability to land during IMC. The MALSR system is installed on the Runway 10R approach end and crosses over Spring Road 1,050 feet west of the Runway 10R threshold.

Precision Approach Path Indicator (PAPI) is a lighting system that provides visual approach slope information. The system provides a combination of white and red-light projection patterns along the desired path to the touchdown point. Runways 10R-28L, 10L-28R and 18-36 are equipped with the 4-box PAPI system located left of the runway centerline, as is recommended by the FAA. All PAPIs maintain a 3.00-degree glide path angle except for the system on Runway 18 which maintains a 3.50-degree glide path angle, possibly due to the proximity of an off-airport tank obstruction.

Runway End Identifier Lights (REIL) consist of two synchronized flashing strobe lights (one on each side of the runway at the threshold) providing a visual reference point to assist pilots in identifying the runway end during approach. The intent of a REIL system is to aid the pilot in identifying the end of a runway without complex visual approach lighting. It is particularly helpful in identifying mis-aligned parallel runway thresholds for closely spaced parallel runways, which aids in reducing wrong surface landings. Depending on installation specification, this system can be omni-directional or unidirectional. All runway ends are equipped with a REIL system except for Runway 10R which has the MALSR installation.

Above-Ground Runway Guard Lights (RGL) consist of free-standing elevated guard lights (also commonly referred to as wig-wags) that are located on either side of the taxiway lateral to the hold bar. The yellow lights flash on and off to enhance the visibility of intersections and to draw a pilot's attention to the fact that they are approaching the entrance to a runway. While originally intended for use in low visibility conditions, their use throughout the day can enhance situational awareness and may mitigate the

potential for runway incursions. FCM has above-ground runway guard lights at each runway hold bar. There are currently no in-pavement runway guard lights at FCM.

Table 1-16: Existing Runway Lighting Summary

LIGHTING	RUNWAY END					
	18	36	10L	28R	10R	28L
MALSR					X	
HIRL					X	X
MIRL	X	X	X	X		
PAPI	X	X	X	X	X	X
REIL	X	X	X	X		X

Source: HNTB Analysis

1.3.8.2 Taxiway Lighting

Medium Intensity Taxiway Edge Lights (MITLs) are used to outline usable operational areas of taxiway pavement at airports and are blue in color. All taxiways in the movement area have MITLs. FCM also has lighted free-standing elevated directional guidance signs located along taxiways and runways and at intersections to assist pilots with wayfinding. The taxiways at FCM do not have in-pavement centerline lights.

1.3.9 Airfield Pavement Markings

Airfield pavement markings aid in a pilot's navigation of both runway and taxiway systems on the airfield. On the runway system, pavement markings vary based on the runway environment and the type of approaches for each runway end. Runway 10R has precision approach markings, Runways 28L, 10L, 28R, 18, and 36 have non-precision runway markings. Precision markings include runway edge lines and touchdown zone markings. All runways have centerline markings, designators, and threshold markings. Runways 10R-28L and 10L-28R also have aiming point markings.

Taxiway markings are designed to aid aircraft in taxiing to/from a runway or other airfield facilities. These markings are intended to provide a safe environment for aircraft maneuvering on the ground, provided aircraft adequately track the taxiway centerline. The standard taxiway markings at FCM are solid centerlines with no edge markings. FCM also has enhanced taxiway centerlines for up to 150 feet leading to a runway hold bar. These enhanced centerlines are the standard solid centerline with two dashed lines on either side and are intended to increase the pilot's visual recognition that they are approaching a runway environment.

Runway hold position markings identify the edge of a runway environment. Noted as two solid lines and two dashed lines, aircraft must hold prior to crossing this marking unless given clearance by air traffic control (ATC). These markings are adjacent to runway entrance signage. All runway entrances have surface painted signage identifying which runway the taxiway will lead into.

Non-movement area boundary markings delineate the movement area from the non-movement area. The movement area is controlled by ATC and includes runways and taxiways. The non-movement area is

not controlled by ATC and includes taxilanes and aprons. The non-movement area boundary is represented by a single dashed line and one solid line.

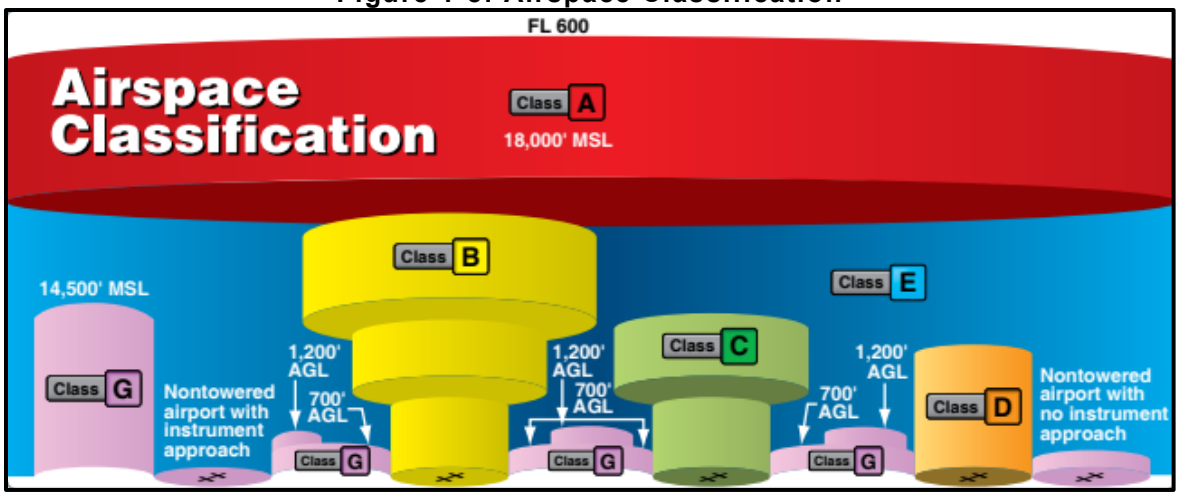
1.3.10 Airspace

The following sections describe the existing airspace conditions, which includes regional airspace, airport air traffic control tower, approach procedures and traffic patterns, and airport operations.

1.3.10.1 Regional Airspace

The FAA has jurisdiction of the airspace within the United States. The National Airspace System (NAS) is a complex system which provides for the safe and efficient flow of aircraft in and out of airports across the country. The airspace is divided into various Classes, A through G, which are defined as regulatory controlled airspace. The Classes vary depending on proximity to an airport and the size of the airport it surrounds. **Figure 1.8** graphically shows the various airspace types within the NAS and **Table 1-17** provides a brief description of each airspace class.

Figure 1-8: Airspace Classification



Source: Pilot's Handbook of Aeronautical Knowledge; FAA-H-8083-25B

Table 1-17: Airspace Classifications

CLASS	DESCRIPTION
A	Airspace from 18,000' MSL up to and including flight level FL600. Flight conducted under IFR.
B	Airspace from surface up to 10,000' MSL surrounding the nation's busiest airports. ATC clearance required for all aircraft to operate in this airspace.
C	Airspace from surface up to 4,000' above airport elevation MSL surrounding airports with an operational control tower, approach radar control service, and serving designated numbers of IFR operations and enplanements. Aircraft must establish two-way radio communication with air traffic control before entering airspace.
D	Airspace from surface up to 2,500' above airport elevation MSL surrounding airports with an operational control tower. Aircraft must establish two-way radio communication with air traffic control before entering airspace.
E	Controlled airspace not classified as either A, B, C, or D. Altitudes of the airspace vary by location, but it typically extends up to, but not including, 18,000' MSL.
G	Uncontrolled airspace that extends from the surface up to the base of the overlaying Class E airspace.

Source: Pilot's Handbook of Aeronautical Knowledge; FAA-H-8083-25B

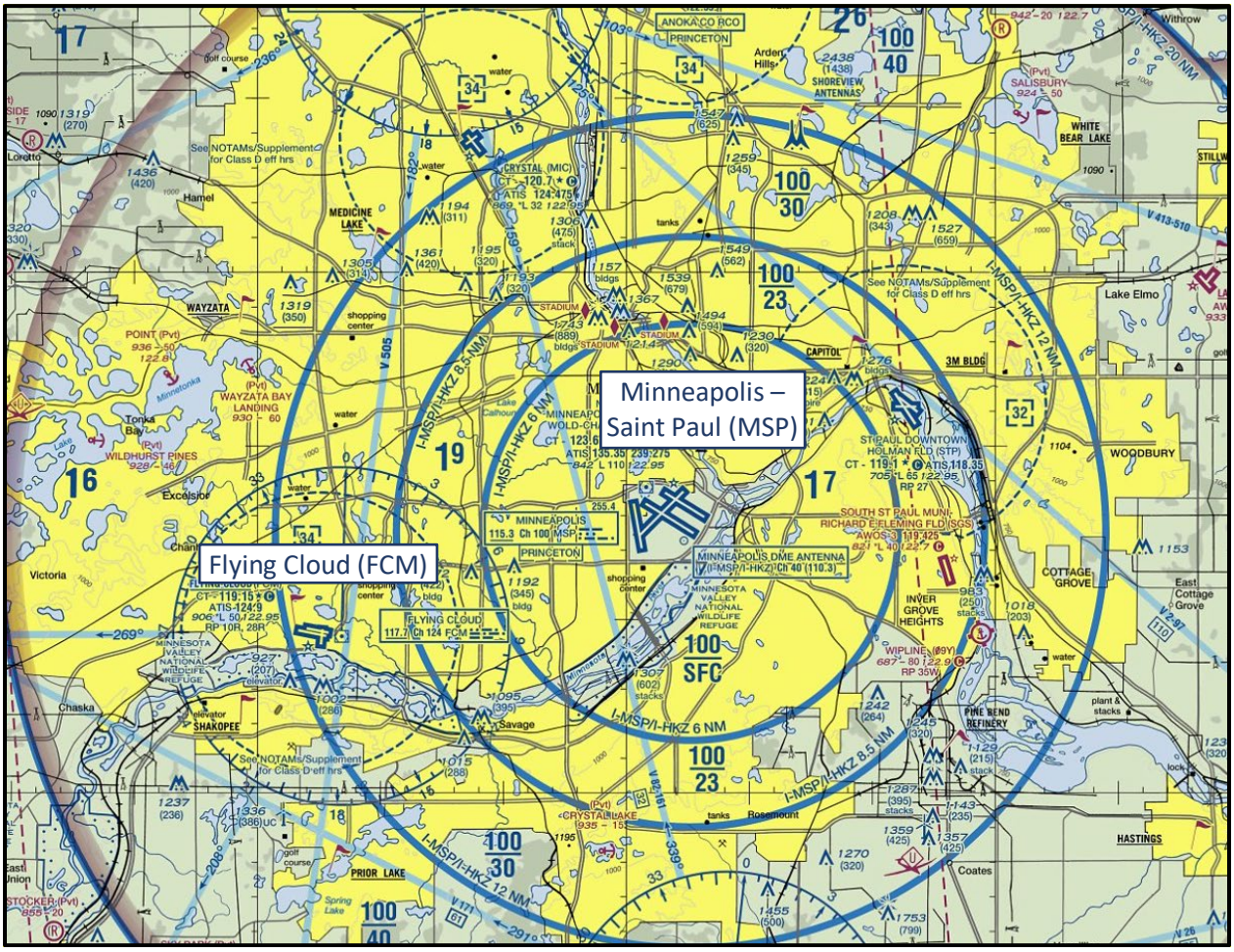
Figure 1.9 shows the regional area airspace, which includes Minneapolis – Saint Paul International airport as the region's primary airport. FCM is approximately 12 miles from MSP and its airspace overlaps with the outer rings of MSP's Class B airspace. The airspace surrounding FCM is classified as Class D airspace when the Air Traffic Control Tower (ATCT) is open (6:00 AM to 9:00 PM from November through March and 6:00 AM to 10:00 PM from April through October). Outside of these hours the airspace surrounding FCM is classified as Class E. The Class D airspace extends from the ground surface of the airport to 3,400 feet above sea level or to the bottom of the Class B airspace, whichever is lower, and extends to a radius of 5 miles from the geographical center of the airport. When the Class D airspace is active, pilots are required to contact the air traffic control tower prior to entering the movement area on the ground or entering the airspace while in the air.

Class E airspace is a general category of controlled airspace that is intended to provide air traffic service and separation for Instrument Flight Rules (IFR) aircraft from other aircraft. IFR means that the pilot is certified to fly under Instrument Meteorological Conditions (IMC) (less than three miles visibility and/or 1,000-foot ceilings). Pilots rated only for Visual Flight Rules (VFR) can operate in Class E airspace only when visibility is three statute miles and above and cloud heights are 1,000 feet above ground level (AGL) and higher. Class E airspace typically extends to 18,000 feet mean sea level (MSL) and generally fills in the gaps between other classes of airspace in the United States. At FCM, Class E airspace applies to FCM airspace when ATCT is closed.

The Airport also lies under Minneapolis/ Saint Paul International Airport's (MSP) Class B Airspace which consists of controlled airspace extending upward from different floor elevations to a ceiling height of 10,000 feet MSL. FCM lies under the area where the floor elevation is 3,000 feet MSL.

FCM has its own ATCT that provides air traffic control services. When the ATCT is closed, the Minneapolis Terminal Radar Approach Control (TRACON) located at Minneapolis-Saint Paul International Airport provides air traffic control services. The Flight Service Station (FSS) at Princeton, Minnesota also assists the Minneapolis TRACON when the FCM ATCT is closed. When the ATCT is closed, aircraft operating at the Airport are advised to broadcast their intentions and monitor Common Traffic Advisory Frequency (CTAF) frequency. Pilots making instrument approaches or departures must remain in contact with the ATCT or Minneapolis TRACON.

Figure 1-9: Regional Airspace



Source: FAA Twin Cities Visual Flight Rules (VFR) Sectional, March 2022

1.3.10.2 Instrument Approach Procedures

Federal Aviation Regulations (FAR) Part 91 outlines two different types of flight rules. Visual Flight Rules (VFR) apply in generally good weather conditions based on visibility. Instrument Flight Rules (IFR) apply when visibility levels fall to less than three statute miles and/or cloud levels go below 1,000 feet.
The local traffic pattern altitude is 1,906 feet MSL (1,000 feet above the airport elevation).

Aircraft with IFR instrumentation can utilize established approach procedures at FCM. IFR flight rules require specific departure and arrival instructions, flight routing, altitude assignment, and communication

procedures. These procedures allow a pilot to operate in controlled airspace and in poor weather at appropriately equipped airport facilities such as FCM. There is one precision instrument approach procedure and seven non-precision instrument approach procedures established for FCM, with the approach minimums listed in **Table 1-18**.

Table 1-18: Approach Procedures

RUNWAY END	APPROACH PROCEDURE	VISIBILITY MINIMUM
10R	ILS	200 and ½ mile
10L	LPV	300 and 1 mile
28L	LPV	300 and 1 mile
28R	LPV	300 and 1 mile
36	LP	400 and 1 mile
18[1]	VIS	534 and 1 mile
10R	LOC or COPTER ILS	200 and ¼ mile

(1) Circling available from other runways

Source: FAA Approach Plates published October 7, 2021

1.3.10.3 Imaginary Surfaces and Obstructions

Regulations for the protection of airspace around a public-use civilian or military airport are specified in 14 CFR Part 77 *Safe, Efficient Use, and Preservation of the Navigable Airspace*. These surfaces are used by the FAA to identify obstructions to airspace around an airport facility. The surfaces are comprised of primary, approach, transitional, horizontal, and conical three-dimensional imaginary surfaces. Their exact configuration varies based upon the category and type of approach to the runway, visibility, and runway classification (utility or non-utility). A utility runway is defined as a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less. Obstructions are defined as objects that penetrate these surfaces and may necessitate mitigative measures such as removal, relocation, or marking and lighting. **Table 1-19** provides dimensional information for selected 14 CFR Part 77 surfaces.

Table 1-19: 14 CFR Part 77 Surface Dimensions

PART 77 SURFACE	RWY 10R	RWY 28L	RWY 10L	RWY 28R	RWY 18	RWY 36
Part 77 Category	Other-Than-Utility		Other-Than-Utility		Utility	
Approach Surface						
Inner Width (ft.)	1,000	1,000	500	500	500	500
Outer Width (ft.)	16,000	3,500	2,000	2,000	1,250	2,000
Length (ft.)	50,000	10,000	5,000	5,000	5,000	5,000
Slope	50:1/40:1[1]	34:1	20:1	20:1	20:1	20:1
Primary Surface						
Width (ft.)	1,000		500		500	
Length Beyond End of Runway (ft.)	200		200		200	

(1) The precision instrument approach surface begins with a 50:1 slope for horizontal distance of 10,000 feet before transitioning to a 40:1 slope for an additional 40,000 feet.

Source: 14 CFR Part 77

The State of Minnesota Department of Transportation (Mn/DOT) has established regulations that control the type of development allowed off runway ends to prevent incompatible development. The Flying Cloud Joint Airport Zoning Board (JAZB) followed these guidelines to approve a zoning ordinance in April 2019 to protect areas around FCM.

1.4 General Aviation

General aviation (GA) is the term used to describe any civilian aviation operations, typically excluding airline and charter services, or the military. There are many activities that can be done at GA facilities including pilot training, business aviation, agriculture, emergency rescue, recreational, and a variety of other purposes. General Aviation (GA) airports often contain various aeronautical businesses to support pilots and aviation at the airport. These businesses at FCM are broken up into two categories: full-service Fixed Base Operators (FBOs) and single-service commercial operators. **Table 1-20** and **Table 1-21** provides an inventory of the FBOs and single-service commercial operators which are shown graphically in **Figure 1.10**. For this inventory, the Airport is broken up into four quadrants (Northwest, Northeast, Southwest, Southeast) divided by the crossing runways.

1.4.1 Fixed Base Operators

FCM is currently home to five full-service FBO facilities, spread evenly across the airport. **Table 1-20** summarizes their locations on the airfield and the services they provide to their clients, including an estimate of the number of indoor hangar storage and outdoor apron parking areas for aircraft. On most occasions aircraft are housed indoors to avoid damage from weather and minimize the need to deice aircraft in winter months. The FBOs also provide landside vehicle parking, and some have terminal facilities for their clients.

Table 1-20: Fixed Based Operator Inventory

FBO	SERVICES	FUEL TYPE	AREA (SF)	AIRCRAFT PARKING POSITIONS (COVERED)	AIRCRAFT PARKING POSITIONS (UNCOVERED)
Elliott Aviation	Fueling, maintenance, aircraft storage and line service, aircraft management, charter and sales, aviation parts, avionics, pilot accessory sales, Deicing Type 1	100LL Jet A	139,000 (pavement) 46,000 (grass)	37	27
AV8 Flight School	Pilot training, flight School, ramp tie down, maintenance service for airplanes, helicopters, and LSA, aircraft rental, fueling	100LL	11,000	14	16
Modern Avionics	Fueling, avionics maintenance, aircraft storage, pilot-static system check, panel upgrade services, ADS-B	100LL	15,000	3	6
Premier Jet Center	Fueling, maintenance, de-icing (Type 1 & 4), aviation parts, car rental, aircraft charter and management	100LL Jet A	42,000	30	13
Thunderbird Aviation	Fueling, maintenance, aircraft storage and line service, flight training, aircraft charter and sales, air tours, pilot accessory sales	100LL Jet A	14,000	20	20

Source: Tenant websites, HNTB Estimates and Analysis

1.4.2 Single-Service Commercial Operators

FCM currently hosts six single-service commercial operators with specialized leases. Single-service commercial operators offer specific services, such as flight training, repairs, or sales but are not full-service FBOs. **Table 1-21** provides an inventory of the six existing single-service operators currently leasing at the Airport.

Table 1-21: Single-Service Commercial Operator Inventory

OPERATOR	SERVICES
ATP Flight School	Pilot training, flight school
Aviation Charter/ Executive Aviation	Private Charter, corporate, personal, cargo, air ambulance
Cirrus Aircraft Design	Maintenance, repairs, parts distribution
Citadel Aircraft Maintenance	Aircraft maintenance, repairs, inspections, oil changes, prop balancing
Exclusive Aircraft Sales	Fueling, maintenance, aircraft storage and line service, flight training, aircraft charter and sales, air tours, pilot accessory sales
Inflight Pilot Services	Pilot training, flight instruction

Source: Tenant websites and HTNB analysis

1.4.3 Hangar Storage Areas

FCM has additional hangar storage areas that are not part of existing FBO facilities. **Table 1-22** provides an inventory of existing hangar storage at each of the airside facility quadrants.

Table 1-22: Hangar Storage Area Inventory

AREA OF AIRPORT	NUMBER OF HANGARS	ESTIMATED TOTAL AREA (SF)
Northwest	92	432,000
Northeast	7	45,400
Southwest	13	187,200
Southeast	9	57,000

Source: HNTB Analysis

1.5 Support Facilities

Support facilities include airport administration, maintenance, and fueling. These facilities support the operations of the airport and tenants. The following sections describe the various support facilities located at the Airport which are depicted on **Figure 1.10** as appropriate.

1.5.1 Airport Traffic Control Tower

The Airport Traffic Control Tower (ATCT) at FCM is a Level 6 tower, located in the southeast region of the airfield. The tower is open from 6:00 AM to 9:00 PM in the winter months (November through March) and from 6:00 AM to 10:00 PM in the summer (April through October). In March of 2022, the FAA completed a siting study for a potential new ATCT location at FCM. The study was completed to identify a preferred location for the ATCT with the goal of improving airfield safety by reducing parallax and increasing visibility of the airport's movement areas.

1.5.2 Administration

MAC administration staff use a shared office space on the second floor of the Executive Aviation offices. Previously MAC staff utilized a small office within the maintenance and storage building, however, the FAA has repurposed this space for their own use.

1.5.3 Emergency Services

The City of Eden Prairie provides emergency services for the Airport, including police, fire, and rescue. This is achieved through an agreement between MAC and the city. The nearest fire station, Fire Station #2, located at 12100 Sunnybrook Rd in Eden Prairie, approximately a five-minute drive away.

1.5.4 Airport Maintenance

MAC owns two maintenance and equipment storage buildings at FCM. One building is connected to the Airport Traffic Control Tower (ATCT) building. The second is located south of the ATCT and contains a restroom and a shower facility for maintenance staff. These buildings hold equipment, parts, and snow management materials. There is a diesel tank in the vicinity of the maintenance building for MAC use only. There is also a contained recycling area for airport tenants to dispose of used aircraft oil. MAC snow removal equipment facilities as well as maintenance space are collocated with Executive Aviation facilities.

1.5.5 Fuel Services

Airport fueling operations are handled by the FBOs with two below ground tanks located in the northeast hangar area between two Elliott Aviation hangars, with tanker truck access via Pioneer Trail. Fuel is transported across the airport via fuel trucks that are owned and operated by the FBOs. The FBOs provide both Jet A and 100LL aircraft fuel types. The airport also provides self-service fuel for purchase from pumps in the southeast apron area adjacent to the Modern Avionics facilities.

1.5.6 Aircraft Deicing

One aircraft deicing truck operates at FCM and is owned by Premier Jet Center. The truck provides shared services to the other FBOs at FCM as needed.

1.6 Landside Access and Vehicle Parking

1.6.1 Gate Access

There are 14 airside gates that provide access to the airfield: three in the southwest region, four in the southeast region, four in the northwest region, and three in the northeast region. The airside gates are depicted on **Figure 1.10.**

1.6.2 Vehicle Parking

Each FBO has adjacent parking for their customers. A parking area is located at the base of the ATCT for FAA and MAC staff use. All privately owned hangars are accessed via alleyways/aircraft taxilanes, with tenants parking inside or adjacent to their individual hangars. The quantity of available parking varies for each facility and is summarized in **Table 1-23** and visualized in **Figure 1.10.**

Table 1-23: Vehicle Parking Areas

FACILITY	LOCATION ON AIRPORT	ESTIMATED NUMBER OF VEHICLE SPACES
ATCT and Maintenance	Southeast	17
Aviation Charter/ Executive Aviation	Southeast	11 airside 48 landside
Thunderbird Aviation	Northwest	42
Elliott Aviation	Northeast	5 airside 120 landside
Modern Avionics	Southeast	7
Premier Jet Center	Northwest	73

Source: Google Earth, HNTB analysis

TENANT INVENTORY

ELLIOTT AVIATION	
AV8 FLIGHT SCHOOL	
MODERN AVIONICS	
PREMIER JET CENTER	
THUNDERBIRD AVIATION	
ATP FLIGHT SCHOOL	
AVIATION CHARTER / EXECUTIVE AVIATION	
CLUB JET	
PRIVATE HANGARS	

NOTES

1. POTENTIAL FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA'S SITING STUDY COMPLETED 2022.

PIONEER TRAIL
FUEL STORAGE
QUEBEC
ROMEO
SIERRA
NOVEMBER
MIKE
LIMA
KILO
JULIET
INDIA
HOTEL
GOLF
FOXTROT
ECHO
DELTA
CHARLIE
BRAVO
ALPHA
REIL
NORTHWEST
NORTHEAST
RUNWAY 10L-28R
PAPI
WEST VSR
ARP
RUNWAY 10R-28L
EAST VSR
SPRING RD
WIND CONE
SOUTHWEST
MINNESOTA
MICHIGAN
LOUISIANA
KENTUCKY
KANSAS
IOWA
CHARLSON RD
RUNWAY 18-36
FUTURE ATCT LOCATION
SOUTHEAST
EXISTING ATCT
FLYING CLOUD DR
FUEL PUMPS
AIRPORT MAINTENANCE

DRAWING LEGEND

TENANT VEHICLE PARKING	
RUNWAY PAVEMENT	
TAXIWAY WITH LABEL / APRON PAVEMENT	x
AIRPORT PROPERTY LINE	
BUILDING - ON AIRPORT	
AIRSIDE GATE	
AOA FENCE	x x
VEHICLE SERVICE ROAD	

FCM

MAC MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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0 500' 1,000'

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FINAL DOCUMENT

FIGURE 1-10 SEPTEMBER 2025

TENANT AND SUPPORT FACILITIES INVENTORY

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1.7 Utilities and Drainage

1.7.1 Utilities

Most tenants at the Airport have either electric or natural gas service, or both, as well as telephone service. The electrical lines are above ground in some locations at the airport, and below ground in others. The tenants are billed directly by the utility companies. Qwest provides telephone service, and Minnegasco provides natural gas. Xcel provides electric service to the airport, and Comcast serves tenants with cable.

1.7.2 Drainage and Water Quality

FCM is located on former farmland. According to Hennepin County soil surveys, soils on site are considered mainly Eden Prairie sandy loam categorized as Hydrologic Soil Group A. These soils have high infiltration rates even when thoroughly wetted, and consist chiefly of deep, well to excessively drained sands and/or gravel. These soils have a high rate of water transmission and result in low runoff potential.

The airport site drains primarily to the south, but a small portion drains to the north. Most of the airfield drainage infiltrates into the ground or is routed into ditches. These ditches outlet into infiltration basins. Approximately 96% of the airfield drainage is routed to infiltration basins. Only a small portion is routed to the north into the drainage conveyance for Pioneer Trail.

The airport property and land acquired for the runway extensions and new south hangar area were field reviewed in their entirety as part of the 2008 Federal/State Environmental Impact Statement (EIS) and found to encompass no jurisdictional wetland that would be regulated under state or federal law, no non-jurisdictional wetland or water of the United States or any other wetland. Storm water ponding facilities on the airport were reviewed and found to lie in areas that lacked hydric soils under natural conditions. The National Wetland Inventory (NWI) shows a paulustrine emergent/seasonally flooded (PEMC) wetland off the west end of Runway 10R-28L; however, no wetland was found in this location when field reviewed. Accordingly, the Lower Minnesota River Watershed District (LMRWD) issued a Wetland Conservation Act (WCA) certificate exemption for impacts to storm water ponds to be affected by the airport project. Similarly, the U.S. Army Corps of Engineers provided written concurrence that the airport property encompasses no waters of the United States that would be regulated under the Clean Water Act.

MAC maintains a Storm Water Spill Pollution Prevention Plan (SWPP) and a Spill Prevention Control and Countermeasure Plan (SPCC) for MAC-owned facilities at the Airport. The MAC has a general storm water discharge permit from the Minnesota Pollution Control Agency (MPCA). In addition, MAC maintains a Water Management Plan for the Airport. It includes best management practices for protecting the storm water conveyances, wetlands, and groundwater. Due to activities performed by the Fixed Base Operators (FBOs), they are required to maintain their own general storm water discharge permit from the MPCA, along with their own SWPP and SPCC plans.

Chemicals used in deicing activities at airports is of concern because of the potential effects on receiving water bodies. Airport tenants and/or FBOs conduct very little to no aircraft deicing at FCM. Most aircraft can be stored inside or in heated hangars prior to takeoff or cannot fly when icing conditions exist, which eliminates the need for glycol use. MAC may use some amount of urea on the runways during icing conditions. The amount used varies annually. Salt is not used due to its corrosive nature. Sand is used on

a limited basis, depending on weather conditions. Given these minor uses, and as supported in the EIS document referenced above, the potential impact on water quality from the airport is minimal.

1.7.3 Sanitary Sewer and Water

Most of the Airport is now served with sanitary sewer and water. Two major projects completed in 2002 and in 2008 completed the service to and around the airport. There are a few localized areas within the airport where only cold storage hangars exist that do not have the ability to connect at the present time. The new south hangar area will be served with sanitary sewer and water in its entirety as the area develops with hangar construction. The water service to the hangars also includes numerous hydrants for fire protection. The City of Eden Prairie maintains the system, and tenants are responsible for connecting, repairing their own connections and for payment to the City. MAC owned maintenance facilities and the FAA air traffic control tower are all connected to the services, and payments are made by each respective agency.

Existing tenants that have legal wells and septic holding tanks have been allowed to keep them in past years. Tenants with illegal sandpoint wells or drain fields were required to remove or abandon them after MAC adopted its Sanitary Sewer and Water Policy in 1998, and subsequent revision in October 2000. Consistent with that policy, no new wells or holding tanks have been allowed at the airport. Now that services are available, MAC policy allows tenants 24 months to abandon compliant private systems and connect to the new sanitary sewer and water system. MAC is working with tenants and commercial operators to get their connections completed.

1.8 Environmental

1.8.1 Air Quality

Responsibility for protecting and improving the nation's air quality rests with the U.S. Environmental Protection Agency (USEPA). Section 109 of the Clean Air Act (CAA) establishes National Ambient Air Quality Standards (NAAQS) to protect public health and environmental welfare. The USEPA identifies the following seven criteria pollutants for which NAAQS apply: ozone (O_3), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter ($PM_{2.5}$ and PM_{10}), and sulfur dioxide (SO_2). The USEPA considers geographic areas that are in violation of one or more NAAQS nonattainment areas. Section 110 of the Clean Air Act requires states with nonattainment areas to develop a state implementation plan (SIP) that demonstrates how the area will reach attainment of the NAAQS within a specific timeframe.

FCM is located in Hennepin County. Based on the USEPA Greenbook, Hennepin County is designated a maintenance area for CO (1971 standard) and SO_2 (1971 standard). The designation signifies those violations of the NAAQS for CO and SO_2 have occurred in the past but that the area is currently in attainment. Maintenance Plans have been developed as part of the SIP for the Minneapolis-Saint Paul area. Maintenance Plans established area-wide emission budgets, control strategies and timeframes for maintaining the attainment status, and are periodically updated.

1.8.2 Biological Resources

Biological resources include terrestrial and aquatic plant and animal species; game and non-game species; special status species; and environmentally sensitive or critical habitats. Provisions have been set forth in NEPA for the protection of biological resources. Although the Endangered Species Act (ESA) does not

protect state-protected species or habitats, NEPA documentation ensures that environmental analysis prepared for airport actions addresses the potential effects to state-protected resources.

According to the USFWS Information, Planning, and Conservation (IPaC) tool, federally listed species include the threatened Northern Long-eared Bat (*Myotis septentrionalis*) and the endangered Rusty Patched Bumble Bee (*Bombus affinis*). Additionally, the Monarch Butterfly is listed as a candidate species in the area. There is no critical habitat at or in the direct vicinity of FCM.

Airport property is primarily cleared or developed areas (e.g., terminal, hangars, runways, taxiways, roads, parking, etc.). The undeveloped area is primarily cleared of dense vegetation and maintained as grass. Conservation areas and the Minnesota Valley National Wildlife Refuge are located nearby the Airport, as shown on **Figure 1.11**. The Minnesota Valley National Wildlife Refuge consists of 14,000 acres along 70 miles of the Minnesota River. The refuge, with its wetlands and floodplain forests, provides protected habitat to numerous species, including but not limited to migrating waterfowl, threatened and endangered species, and the bald eagle.[2]

1.8.3 Department of Transportation Act, Section 4(f)

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the Department of Transportation Act of 1966, states that the "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use."

A project that would use Section 4(f) parks or recreation areas must also comply with Section 6(f) of the Land and Water Conservation Fund, 16 U.S.C. § 4601-8(f) if the property was acquired or developed with financial assistance under the Land and Water Conservation Fund State Assistance Program. Section 6(f), administered by the NPS, requires that areas funded through the program remain for public outdoor recreation use or be replaced by lands of equal value, location, and recreation usefulness.

FCM is surrounded by multiple parks, conservation areas and wildlife refuges, as indicated on **Figure 1.11**. The closest 4(f) property is Flying Cloud Fields located on Airport property immediately west of the North Building Area. Other 4(f) properties near the Airport are Staring Lake Park (north of the Airport), Cedar Hills Park (west of the Airport), Prairie Bluff Conservation Area (south of the Airport), Riley Creek Conservation Area (southwest of the Airport), and the Minnesota Valley National Wildlife Refuge (located south of the Airport).[3] Staring Lake Park and the Minnesota Valley National Wildlife Refuge are also considered 6(f) properties.[4]

See the Historical, Architectural, Archaeological, and Cultural Resources section for a description of historic resources at and around the Airport.

[2] USFWS, Minnesota Valley National Wildlife Refuge, https://www.fws.gov/refuge/minnesota-valley/species
[3] Hennepin County GIS, Parks Finder, https://gis.hennepin.us/parks/, accessed 4/4/2022
[4] The Land and Water Conservation Fund, Past Projects, https://lwcf.tplgis.org/mappast/, accessed 4/4/2022

SECTION 4(f) RESOURCE INVENTORY

1. Minnesota Valley National Wildlife Refuge
2. Riley Creek Conservation Area
3. Prairie Bluff Conservation Area
4. Flying Cloud Fields
5. Staring Lake Park
6. Cedar Hills Park
7. Goodrich-Ramus Barn
8. John R. Cummins Homestead
8. Lookout Park Wayside
10. Fredrick-Miller Spring

STARING LAKE

PIONEER TRAIL

SPRING ROAD

CHARLSON ROAD

FLYING CLOUD DRIVE

GRASS LAKE

MINNESOTA RIVER

DRAWING LEGEND

AIRPORT PROPERTY BOUNDARY	
NATURAL RESOURCE CORRIDORS AND CONSERVATION AREAS	1
PARKS AND OPEN SPACE	
HISTORIC ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES	

FCM

MAC MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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FIGURE 1-11 SEPTEMBER 2025

SECTION 4(f) RESOURCES

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1.8.4 Hazardous Materials, Solid Waste, and Pollution Prevention

Aircraft fuel constitutes the largest quantity of hazardous substances stored and consumed at the Airport. The USEPA does not identify any hazardous waste sites under Resource Conservation and Recovery Act (RCRA) at or around the Airport, nor are there any National Priorities List sites.[5]

1.8.5 Historical, Architectural, Archeological, and Cultural Resources

The National Historic Preservation Act (NHPA) (54 U.S.C. §§300101 et seq.) establishes the Advisory Council on Historic Preservation (ACHP). The ACHP oversees federal agency compliance with the NHPA. The NHPA also established the National Register of Historic Places (NRHP), which the National Park Service (NPS) oversees.

The closest NRHP-listed resource is the John R. Cummins Homestead, located immediately north of FCM within Staring Lake Park. The original structure was concreted in the 1879 and is "significant as an example of a "second generation" farmhouse in southern Hennepin County and for its associated with John Cummins, Eden Prairie pioneer and noted local horticulturist." [6]

The City of Eden Prairie's Heritage Preservation Program includes more than 200 dedicated heritage sites, including a few located nearby FCM. Heritage sites near the Airport include the Cummins-Phipps-Grill House (John R. Cummins Homestead), the Goodrich-Ramus Barn (north of the Airport along Pioneer Trail), Lookout Park Wayside (south of Airport along Flying Cloud Drive), Frederick-Miller Spring (west of the Airport along Spring Road).[7]

1.8.6 Noise and Noise-Compatible Land Use

A Noise Abatement Plan for FCM was last revised in January 2017. The Plan includes recommended Noise Abatement Procedures (NAP) aimed at keeping more operations over less populated areas, promoting FCM quiet hours from 10 pm to 7 am, and keeping aircraft at or over 1,000 feet as much as possible.[8]

1.8.7 Water Resources (includes wetlands, surface waters, groundwater, floodplains, stormwater)

Water resources are considered wetlands, floodplains, surface waters (including wild and scenic rivers), and groundwater. These resources typically function as a single, integrated natural system that are important in providing drinking water and in supporting recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems. There are no designated wild and scenic rivers near the Airport.

1.8.7.1 Wetlands

Figure 1.12 shows the locations of wetlands as indicated on the Hennepin County GIS maps. The mapping includes wetlands indicated on the Hennepin County's Wetland Inventory (HCWI), as well as the National Wetland Inventory (NWI). As shown, there are wetlands associated with the major surface waters nearby the Airport, including the Minnesota River and Grass Lake (south of the Airport), Staring Lake and Purgatory

[5] USEPA, Cleanups in the Community Map, https://www.epa.gov/cleanups/cleanups-my-community
[6] NPS NRHP, John R. Cummins Homestead, https://catalog.archives.gov/id/93201852
[7] Eden Prairie Heritage Sites, https://gis.edenprairie.org/historicsites/index.html
[8] MAC, Noise Abatement Plan Flying Cloud Airport (FCM), https://metroairports.org/sites/default/files/2021-09/fcm_na-plan-2017.pdf

Creek (north of the Airport), and Riley Creek (west of the Airport). Additionally, there are a few small wetland areas depicted on Airport property within the airfield. As detailed in **Section 1.7.2** *Drainage and Water Quality*, the airport property was reviewed as part of a 2008 EIS and was found to include no jurisdictional wetlands, waters of the United States, or any other wetland.

1.8.7.2 Floodplains and Floodways

According to current FEMA Flood Insurance Rate Map 27053CO430F (effective 11/4/2016), there are 100-year floodplains and floodways located around the Airport, associated with nearby waterways.[42] However, all Airport facilities are located outside of the 100-year floodplain, due to higher elevation. A very small portion of 100-year floodplain associated with Staring Lake is on Airport property within the Runway 18-36 RPZ north of Pioneer Trail.

The Minnesota River is located about 1 mile south of the Airport. Much of the area south of Flying Cloud Drive, including the areas surrounding Grass Lake and the Minnesota River is considered a regulatory floodway. Additionally, there is 100-year floodplain associated with Staring Lake located about ¼ mile north of the Airport.

1.8.7.3 Surface Waters

Major surface waters around the Airport include the Minnesota River and numerous lakes. **Section 1.7.2** *Drainage and Water Quality* provides additional information related to the Airport drainage system, SWPPP, SPCC and stormwater discharge permits.

1.8.7.4 Groundwater

As detailed in *Section 1.7.2 Drainage and Water Quality*, FCM is located on former farmland, consisting of soils with a high rate of transmission. As a result of the high infiltration rates, there are lower rates of stormwater runoff at FCM and a high rate of groundwater recharge. The Airport is in the City of Eden Prairie which relies on groundwater for municipal water. The City operates fifteen wells that draw from the Prairie du Chien-Jordan aquifer and is managed through the City's Wellhead Protection Plan (WHPP).[9] **Section 1.7.3** *Sanitary Sewer and Water* provides additional details around water supply at the Airport.

[9] City of Eden Prairie, Local Water Management Plan Update, December 2020, https://www.edenprairie.org/home/showpublisheddocument/5310/637496762763630000

STARING LAKE

PIONEER TRAIL

PURGATORY CREEK

SPRING ROAD

RILEY CREEK

CHARLSON ROAD

FLYING CLOUD DRIVE

GRASS LAKE

MINNESOTA RIVER

DRAWING LEGEND

AIRPORT PROPERTY BOUNDARY	
100-YEAR FLOODPLAIN	
WATER BODIES	
WETLANDS	

FCM

MAC — MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

N

NOT TO SCALE

HNTB

FINAL DOCUMENT

FIGURE 1-12 SEPTEMBER 2025

WATER RESOURCES

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