

2008 ANNUAL REPORT TO THE LEGISLATURE



Metropolitan Airports Commission



PREPARED BY THE
METROPOLITAN AIRPORTS COMMISSION
AVIATION NOISE AND SATELLITE PROGRAMS OFFICE

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1. INTRODUCTION

The Metropolitan Airports Commission (MAC) was created in 1943 by the State of Minnesota Legislature to promote air transportation in the seven county metropolitan area. The MAC airport system is comprised of seven airports: Minneapolis-St. Paul International and the six reliever airports of Airlake, Anoka County-Blaine, Crystal, Flying Cloud, Lake Elmo and St. Paul Downtown. **Figure 1-1** shows each MAC airport location within the seven-county metropolitan area.

In 1989, the Minnesota Legislature adopted the Metropolitan Airport Planning Act. This legislation required the MAC and the Metropolitan Council (MC) to complete a comprehensive and coordinated program to plan for major airport development in the Twin Cities. The planning activities were designed to compare the option of future expansion of Minneapolis-St. Paul International Airport (MSP) with the option of building a new airport.

The analysis was completed in 1996, and the MAC and the MC formally submitted their recommendations to the Legislature on March 18, 1996. On April 2, 1996, legislation was passed by both the House and Senate, and subsequently signed by Governor Arne Carlson, stopping further study of a new airport and directing the MAC to implement the MSP 2010 Long Term Comprehensive Plan.

This legislation also requires the MAC to prepare an annual report to the legislature that describes recent airport activity, current and anticipated capacity and delay for the airfield and terminal, and technological developments that could improve airport efficiency. In 2006, the 1996 legislation was amended to require the MAC to include an update on the reliever airports in the annual report and submit the report to the legislature by March 30 each year.

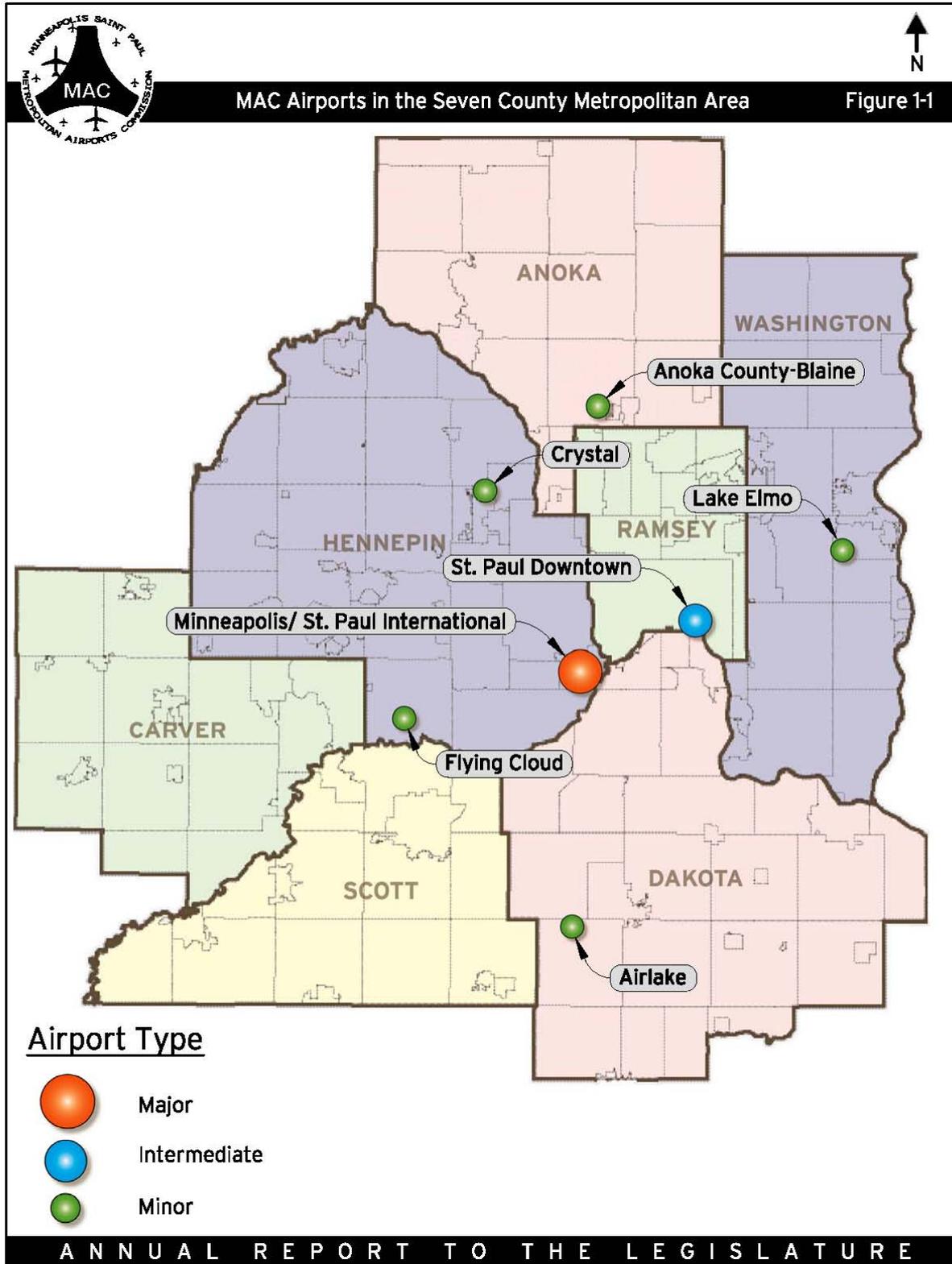
The 2008 Annual Report to the Legislature is divided into three main sections:

1. Introduction
2. Minneapolis-St. Paul International Airport
3. Reliever Airports

The main sections are further subdivided into sub-sections pertinent to the various facilities.



Figure 1-1: MAC Airports in the Seven County Metropolitan Area



2. MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT (MSP)

2.0 OVERVIEW

This portion of the report highlights the facilities and activities at Minneapolis-St. Paul International Airport (MSP), and includes the following topics:

- A description of MSP facilities
- A description of MSP activity and service trends
- A comparison of 1993 MAC forecasts with actual activity
- Current airfield capacity and average length of delay statistics
- Technological developments affecting aviation and their affect on airport operations and capacity

2.1 MSP AIRPORT FACILITIES

2.1.1 Airfield

Figure 2-1 shows the general airport layout for MSP. The airfield is approximately 3,060 acres, and consists of two parallel runways, one north-south runway and one crosswind runway. Runway 4-22 is 11,006 feet long (with environmental approvals for an extension to 12,000 feet); Runway 12R-30L is 10,000 feet long; Runway 12L-30R is 8,200 feet long; and Runway 17-35 is 8,000 feet long. **Table 2.1** summarizes the major airport components.

The parallel runways have deicing pads at each end sized to maintain runway departure rates during deicing conditions. Runway 17-35 has a 7-position deicing pad at the north end only because current operating restrictions normally preclude departures to the north over Minneapolis. All the deicing pads have adjacent facilities for recharging deicing trucks and for providing a rest area for the crews. A combined deicing operations and maintenance facility adjacent to the 12L deicing pad provides the capability to coordinate deicing operations on all pads.

Two cargo aprons (50 acres total) in the center of the airfield support a FedEx cargo sort facility and a UPS facility. A multi-tenant cargo facility and three airline maintenance hangars are sited on the western edge of the airfield. Northwest Airlines occupies two maintenance complexes and a cargo facility on the south side of the airport. Most of the Building B maintenance facility (adjacent to the Lindbergh Terminal inbound/outbound roadway) has been demolished. Site restoration will be completed in late 2009.

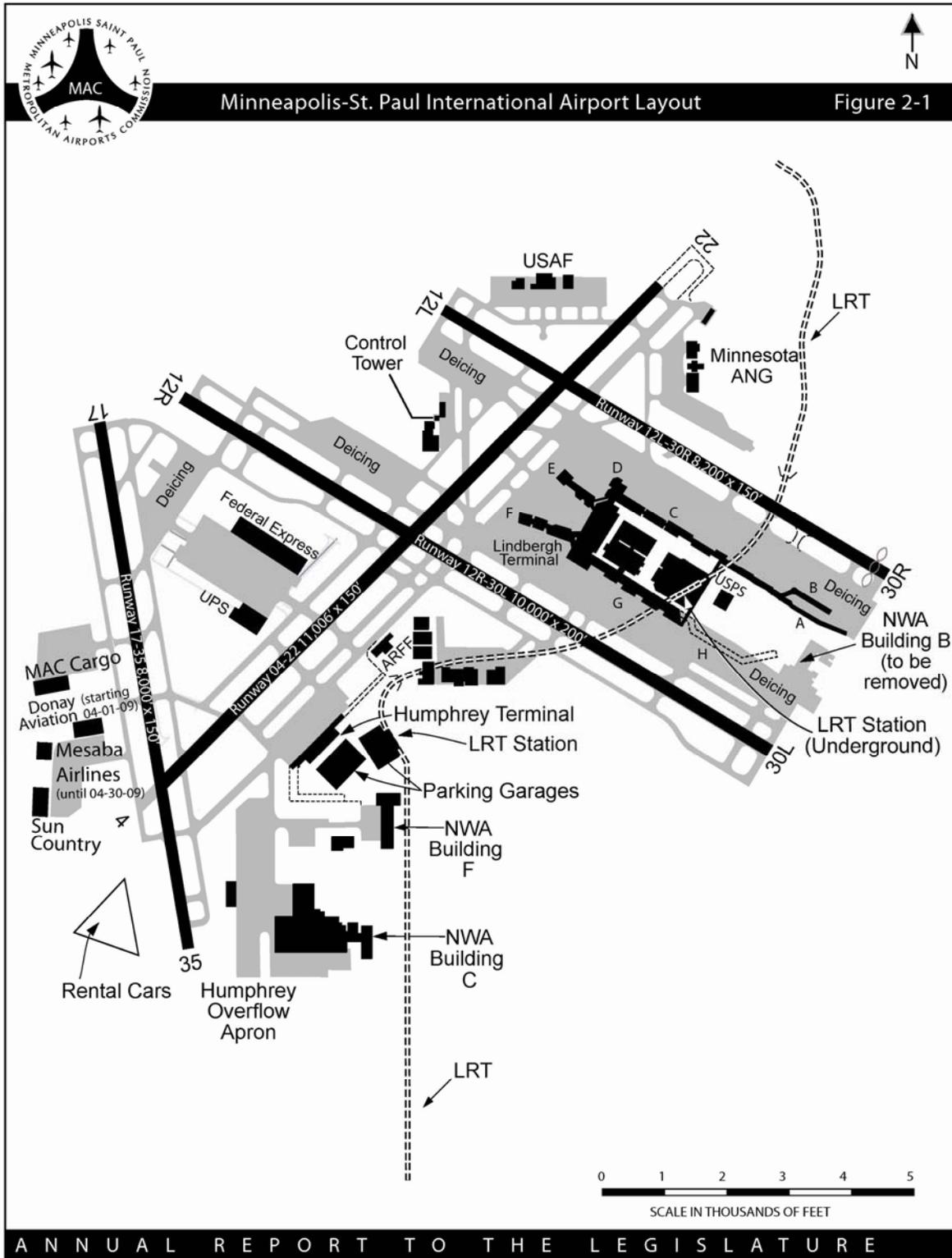
2.1.2 Lindbergh Terminal

The Lindbergh Terminal is located between the two parallel runways, east of Runway 4-22. **Figure 2-2** displays the terminal layout with single-loaded and double-loaded concourses, and 117 gate positions. The terminal has 10 gates that can support international arrivals into the International Arrival Facility. A concourse tram and moving



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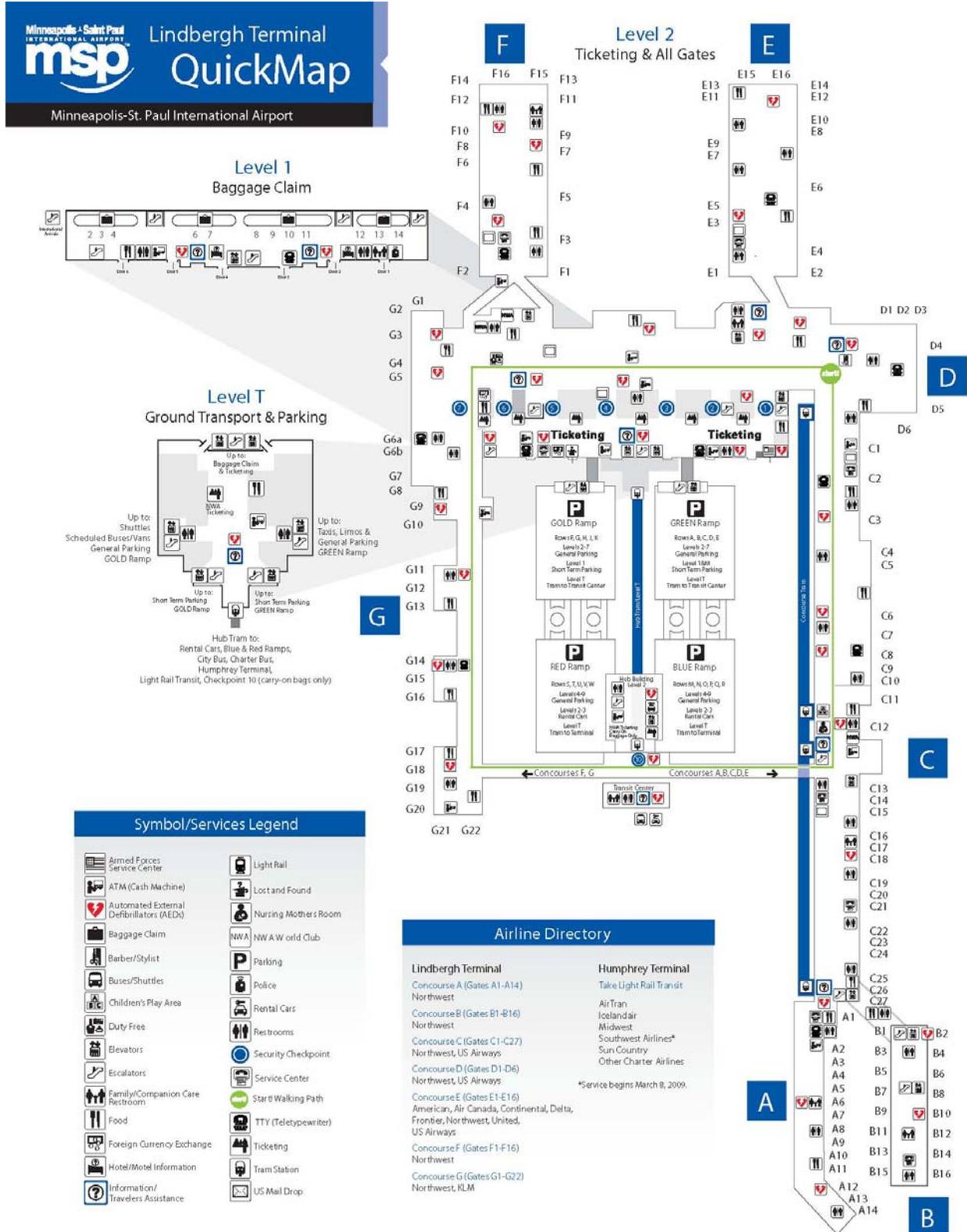
Figure 2-1: Minneapolis/St. Paul International Airport Layout





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Figure 2-2: Lindbergh Terminal



sidewalks assist passenger travel along Concourse C. Moving sidewalks also facilitate passenger movement on Concourses A, B and G, and through the connector between Concourses C and G. Four parking ramps provide short- and long-term parking for passengers and space for rental cars. A tram assists passenger movements from the terminal to the two most remote parking ramps.

2.1.3 Humphrey Terminal

The Humphrey Terminal, shown in **Figure 2-3**, provides 10 gates used by Sun Country, Midwest, Air Tran, Iceland Air, Southwest and several charter airlines. The terminal includes an International Arrival Facility and automobile parking spaces for 9,500 vehicles. The orange ramp was completed in February 2009, which added 4,575 parking spaces.

Table 2.1

EXISTING AIRPORT FACILITIES

Airport Components	Quantity
RUNWAYS	
East/West Parallel (Runways 12L-30R and 12R-30L)	2
North/South (Runway 17-35)	1
Crosswind (Runway 4-22)	1
Total Runways	4
Other Runway Information:	
Longest Runway (Runway 4-22)	11,006 ft. ⁽¹⁾
TERMINAL BUILDING FACILITIES	
Lindbergh Terminal sq. ft.	2.8
Humphrey Terminal sq. ft.	.4
Total Terminal Square Footage (millions)	3.2
Lindbergh Terminal Gates	117
Humphrey Terminal Gates	10
Total Gates	127
Other Gate Information:	
Northwest/Delta Gates	104
Sun Country Gates	4-5
Regional Airline Positions (50 seats or less)	30
PARKING	
Lindbergh Terminal	13,299
Humphrey Terminal	9,500
Total Public Auto Parking Spaces	22,799

Note:

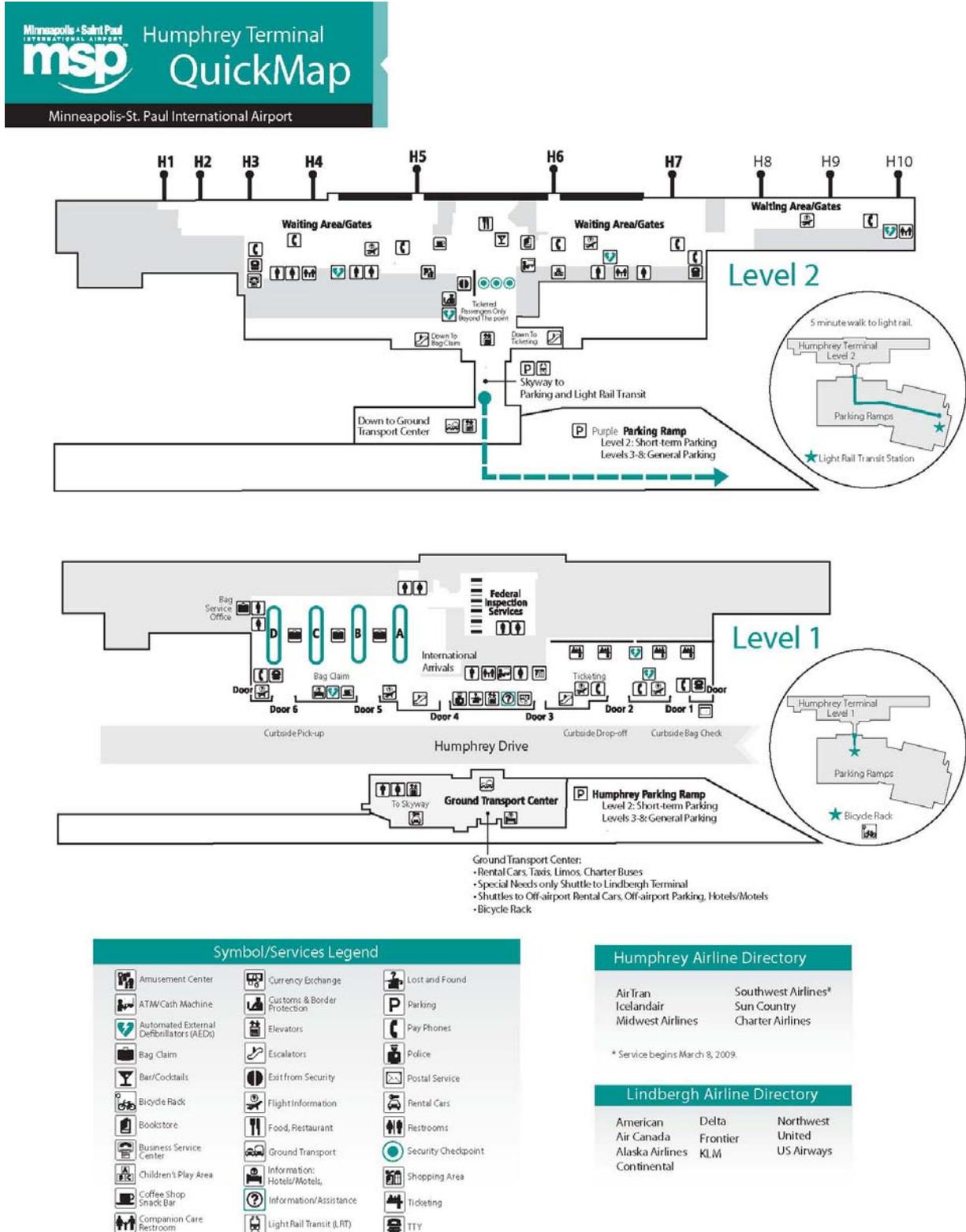
⁽¹⁾ Runway 4-22 is the longest runway and has environmental approval to be extended to 12,000 feet.

Source: Metropolitan Airports Commission Airport Development



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Figure 2-3: Humphrey Terminal



2.1.4 Light Rail and Bus Transit

The Metro Transit Hiawatha Line provides a light rail transit (LRT) commute option for MSP travelers and visitors between the Humphrey and Lindbergh terminals, downtown Minneapolis, and the Mall of America. The LRT stations at MSP are located directly east of the Humphrey Terminal, and below ground at the south end of the Lindbergh Terminal parking garage. Metro Transit estimates that more than 3,300 boardings occurred at the airport terminals on an average weekday in 2008. A bus station at ground level above the Lindbergh Terminal LRT station provides additional mass transit service and connectivity between the LRT and bus systems.

2.1.5 Aircraft Rescue and Fire Fighting

There are two Aircraft Rescue and Fire Fighting (ARFF) facilities that serve MSP. The main facility is located near the center of the airfield on the south side of the parallel runways. A satellite ARFF facility is located on the west side of the airfield, between the parallel runways.

2.1.6 MSP Long Term Comprehensive Plan Update

The MAC has initiated an update to the Minneapolis-St. Paul International Airport Long Term Comprehensive Plan. This plan will update previous plans that included a new west-side terminal option at the present airport site, as well as provide updated forecasts.

2.2 AIRPORT ACTIVITY AND SERVICE TRENDS

This section presents an overview of passenger and aircraft activity at MSP. As a result of the challenges facing the aviation industry in particular, and the overall economy in general, 2008 resulted in a 2.97 percent reduction in the total number of passengers utilizing MSP as compared to 2007. Total passengers for signatory airlines (i.e., AirTran, American, Delta, Northwest, Sun Country, United etc.) were 10.06% fewer than the total passengers carried by such airlines in 2007. The signatory airlines continued to shift operations to regional affiliate airlines typically operating aircraft of 76 seats or less (e.g., Mesaba, Pinnacle, Compass, Comair, Chautauqua, Express Jet, etc.) as evidenced by a 38.71 percent growth in passengers in the affiliate market. Overall, Airports Council International reported that the level of domestic passengers on all North American airlines dropped 4.2 percent for 2008 when compared to 2007.

Sun Country Airlines, despite intermittent troubled finances during the past decade and especially the last year, continues to grow its markets and expand its services as it restructures in Chapter 11 bankruptcy. As of December 2008, Sun Country served 13 year-round and 17 seasonal destinations, occupied four to five gates in the Humphrey Terminal, and was ranked one of the top ten airlines for customer satisfaction. Sun Country plans to initiate service to Branson, Missouri and Boston in May 2009.

Alaska Airlines commenced operations from the Lindbergh Terminal effective October 26, 2008 and currently provides twice-daily service to Seattle.

After nearly 20 years of recruitment by the MAC, Southwest Airlines began service at MSP on March 8, 2009. Southwest occupies one gate in the Humphrey Terminal and operates eight daily roundtrip flights to Chicago's Midway Airport.

2.2.1 Domestic Passenger Originations/Destinations

Figure 2-4 reviews historical passenger originations/destinations (O&D) at MSP. O&D passengers are those who begin or end their trip at the airport (vs. passengers who are connecting at the airport en route to another destination). O&D passenger demand is primarily driven by local socioeconomic factors.

Following is a summary of O&D activity at MSP. The MSP O&D data for 2008 are estimated based on passenger activity during the first two quarters of 2008.

- Between 1990 and 2008, O&D passengers at MSP rose from 9.5 million to 17.4 million, which is an increase of 83.2 percent. This represents an annual compounded growth rate of 3.2 percent.
- The number of O&D passengers in 2008 decreased by 3.1 percent when compared to 17.9 million¹ passengers that traveled through MSP in 2007.

2.2.2 Domestic Connections

There were fewer connecting passengers at MSP in 2008 when compared to 2007. In 2008, it is estimated that 7.7 million passengers connected through MSP, and there were an estimated 8 million connecting passengers in 2007. These data include both air carrier and regional carrier revenue passengers.

2.2.3 Annual Revenue Passengers

Total annual revenue passenger levels are shown in **Figure 2-5**, and include O&D and connecting passengers.

- In 2008 there were 32.9 million total annual revenue passengers at MSP. Between 1990 and 2008, total annual revenue passengers grew by more than 13.7 million passengers, which represents an annual compounded growth rate of 2.9 percent.
- The total annual revenue passenger level in 2008 dropped by 3.5 percent when compared to the level of 34.1 million in 2007.

2.2.4 Annual Aircraft Operations

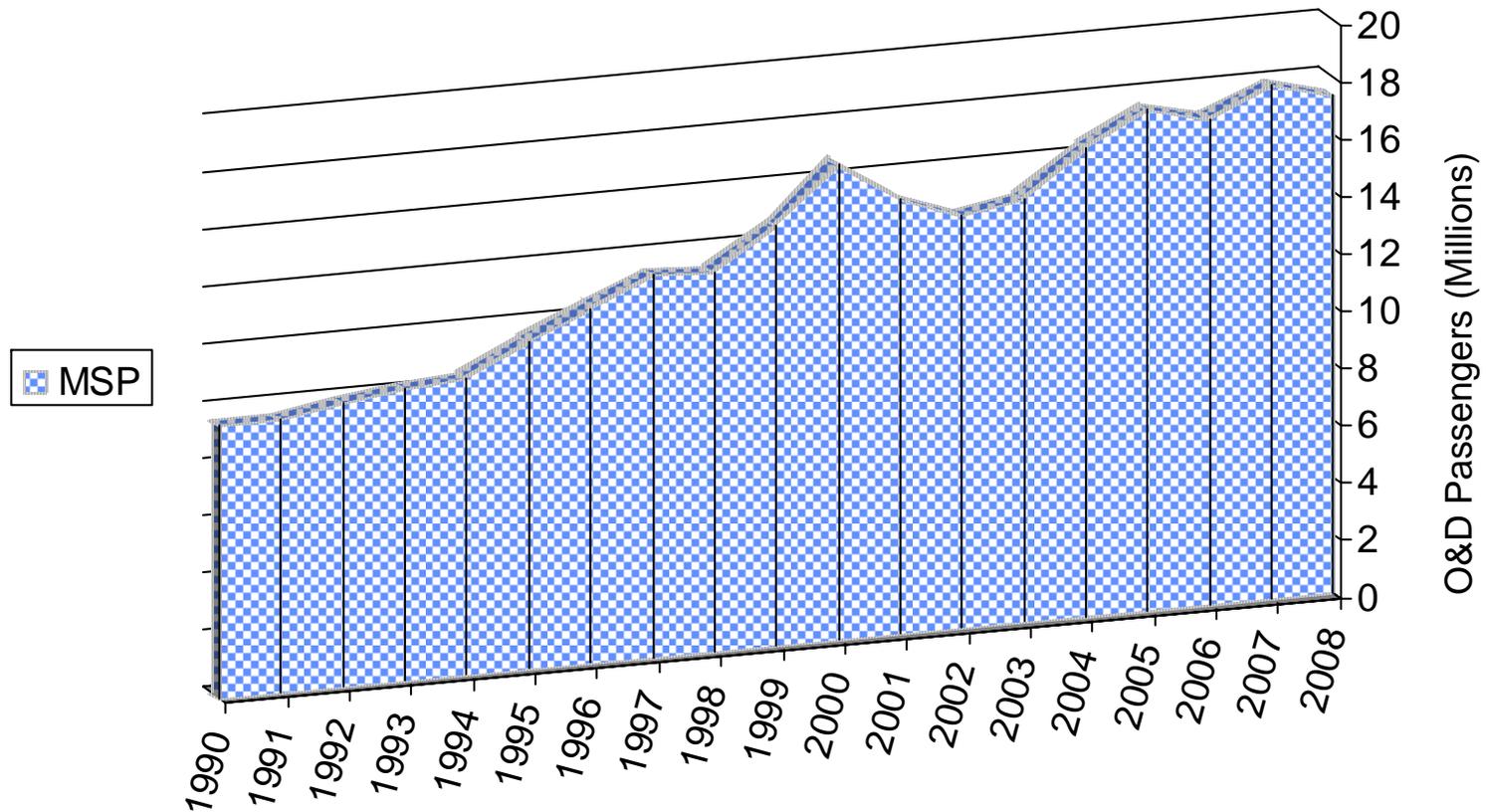
Annual aircraft operations are presented in **Figure 2-6**. Some of the key changes in the operational levels are highlighted below:

¹ This total is based upon actual data reported from U.S. DOT. The O&D estimation of 17.5 million passengers stated in the 2007 Annual Report to the Legislature was based upon three-quarters of data available at the time the report was prepared.



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Figure 2-4
Annual Domestic Passenger
Originations/Destinations* Totals
1990-2008

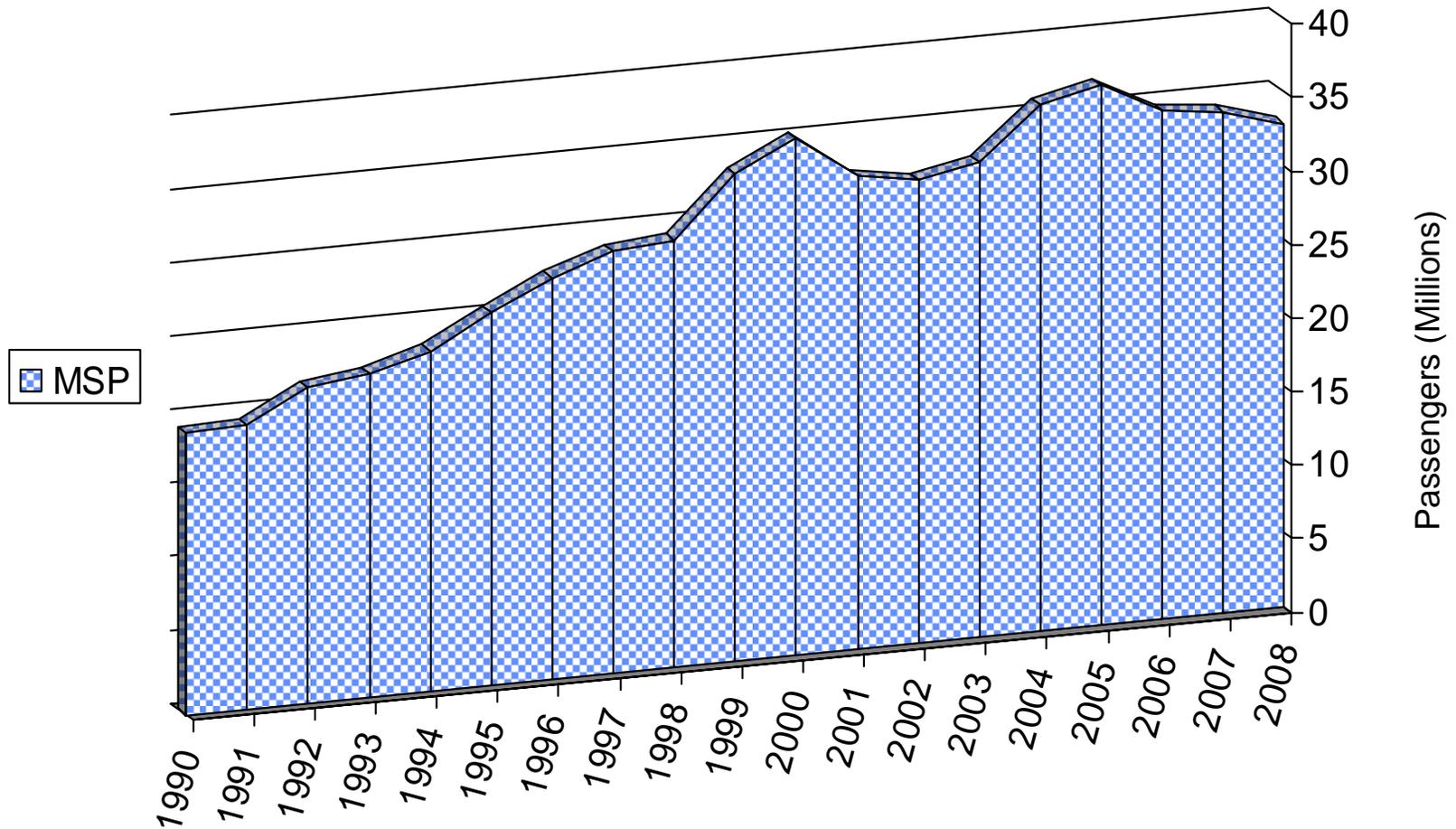


*2008 O&D passengers estimated from first two quarters of 2008.
Sources: U.S. DOT; HNTB analysis.



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Figure 2-5
Total Annual Revenue Passengers
1990-2008

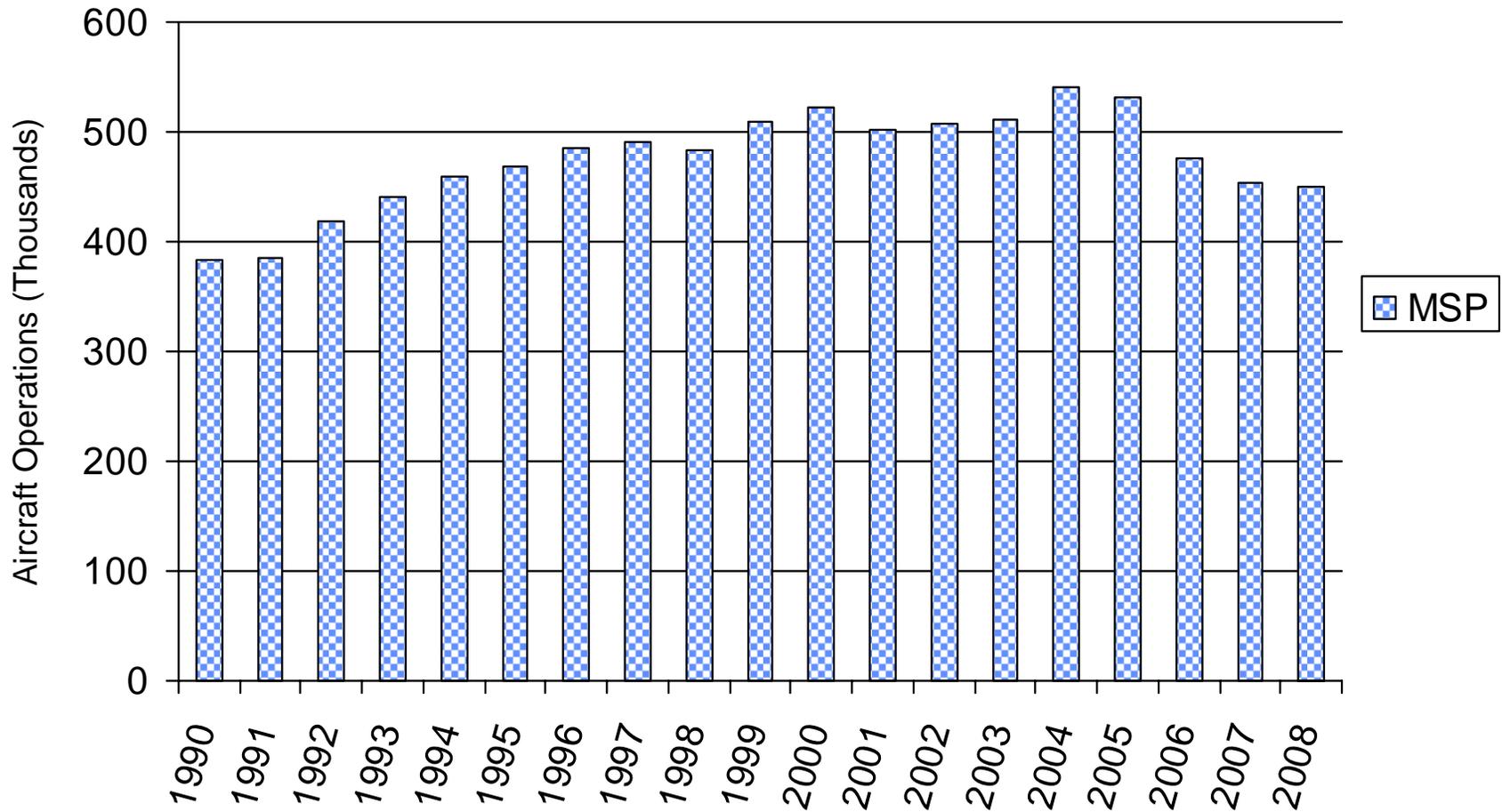


Sources: Metropolitan Airports Commission Airport Development.



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Figure 2-6
Annual Aircraft Operations
1990-2008



Sources: Metropolitan Airports Commission, and FAA OPSNET.

- In 1990, MSP had 382,960 annual operations according to FAA Tower counts. Total annual operations at MSP generally increased through 2000, then declined after the events of September 11, 2001. During 2001, there were 501,252 total operations at MSP, which amounted to a 4 percent decline from the previous year.
- Annual MSP operations peaked at 540,727 in 2004, but have since declined each year due to the effect of higher fuel prices and the overall economy; both of which have forced many airlines to cut flights and reduce fleets.
- At MSP during 2008, the total number of arrivals and departures dropped slightly from 2007 levels. In 2008 there were 449,972 operations, which is .8 percent lower than the 2007 level of 453,566.

2.2.5 Nonstop Markets

Figure 2-7 shows the number of nonstop domestic and international (including Canada) markets served from MSP in 2004 through 2008. The domestic markets include those receiving an annual average of at least five weekly nonstop flights. The international markets include those receiving an annual average of at least one weekly nonstop flight. Some of these markets are served only seasonally.

MSP offered 144 nonstop markets in 2008, which is unchanged from the number of markets offered in 2007. There were 123 domestic and 21 international markets (nine of these international markets were to Canada).

Figure 2-8 displays how the nonstop markets from MSP are served. The categories are listed as air carrier service (jet aircraft), regional carrier service (regional jet, turboprop aircraft, and a combination of both), and a combination of air carrier and regional carrier service. For the purposes of this report, a “regional jet aircraft” is defined as a jet aircraft with 85 or fewer seats (e.g., Canadair Regional Jet and Embraer Regional Jet).

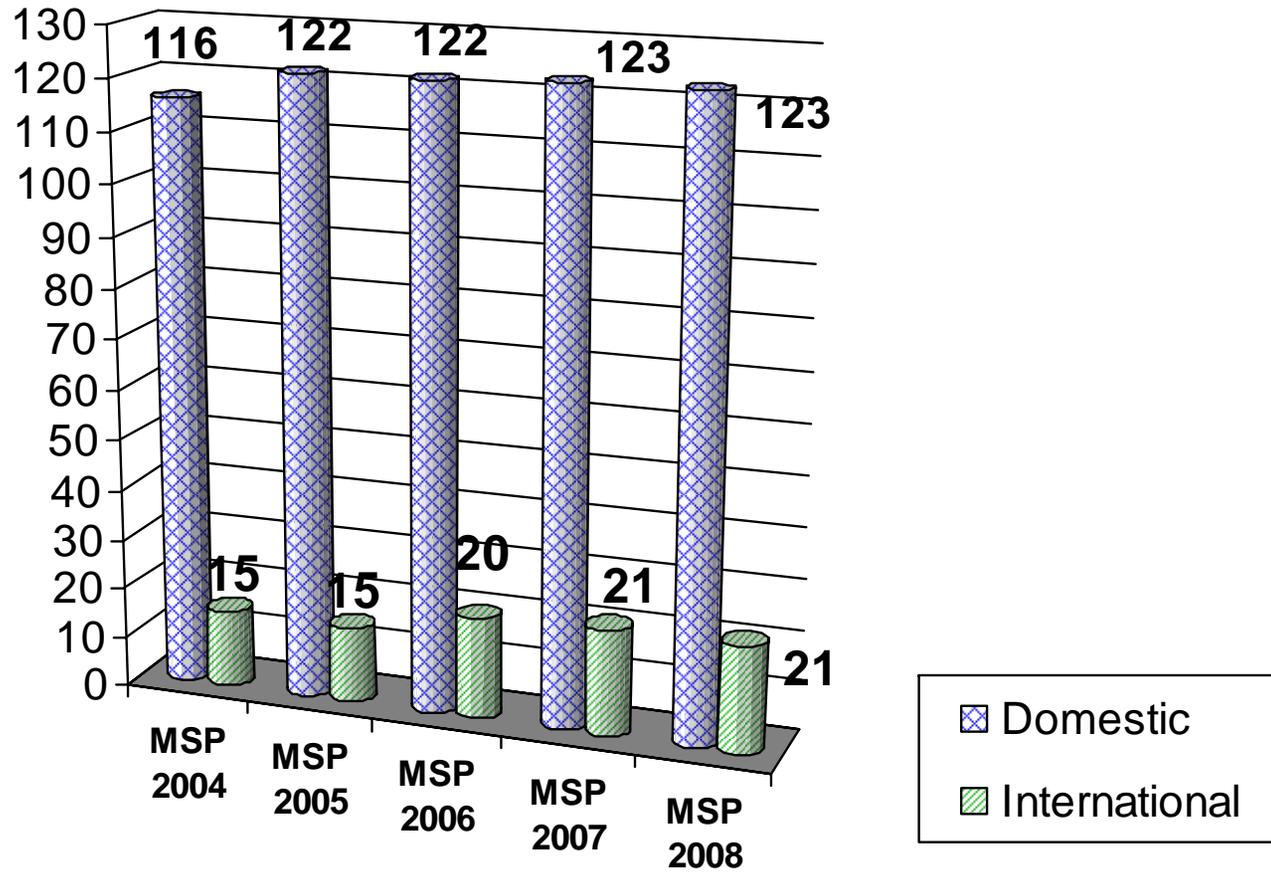
Of the MSP nonstop markets served in 2008, approximately 32.2 percent are served exclusively by air carrier jets. Regional carrier service accounts for 31.6 percent of MSP markets, with 17.8 percent being served by regional jets, 7.5 percent being served by turboprop aircraft, and 6.3 percent being served by a combination of regional jets and turboprops. The remaining 36.2 percent of MSP nonstop markets are served by a combination of air carrier and regional carrier service aircraft.

Table 2.2 and **Figure 2-9** compare MSP to other major metropolitan areas in terms of the number of nonstop markets served by each airport per population of the Metropolitan Statistical Area. As shown, on a per capita basis, only one metropolitan area in the nation of similar size, has more cities served by nonstop flights than MSP.



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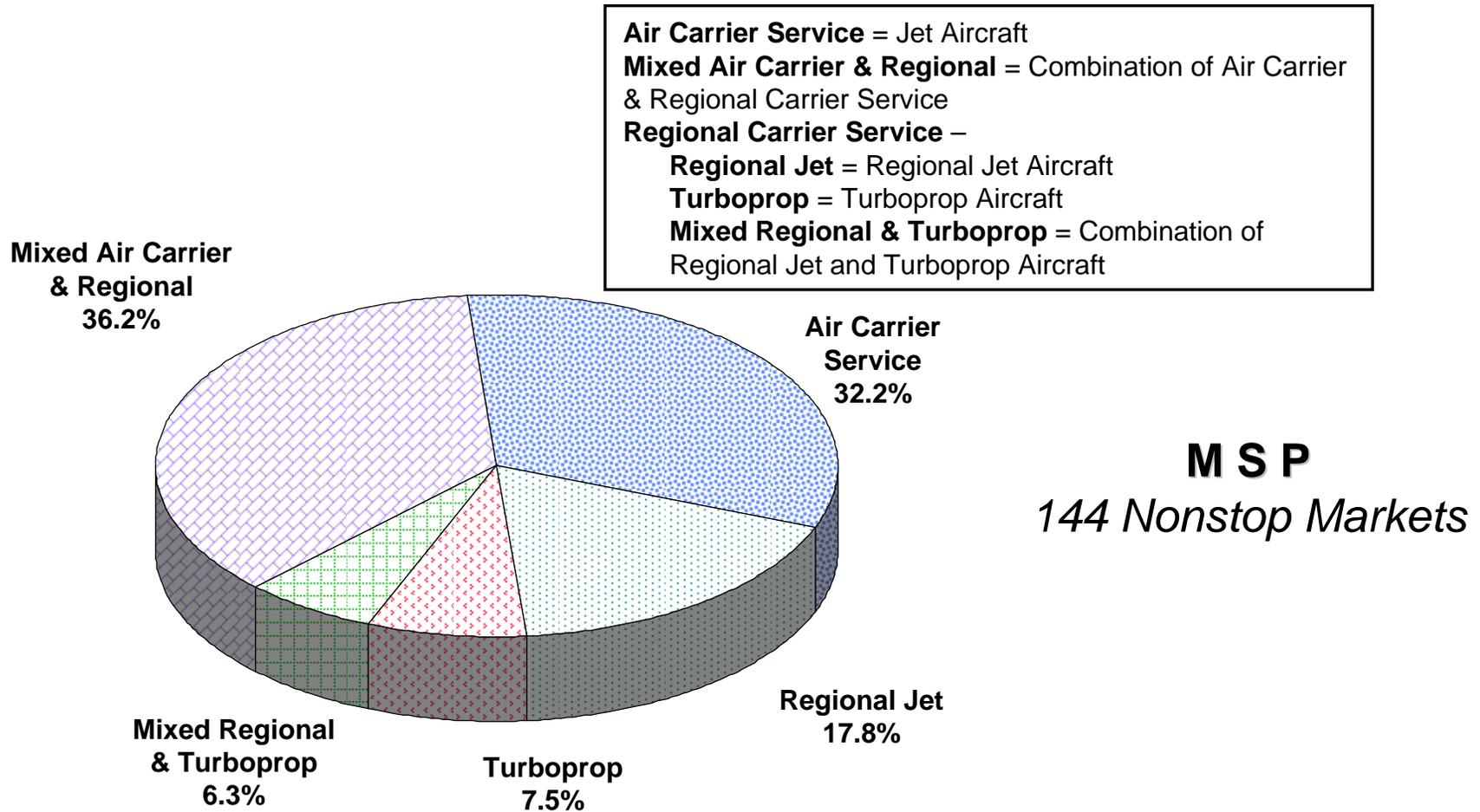
Figure 2-7
Number of Nonstop Markets
2004, 2005, 2006, 2007, 2008



Sources: Official Airline Guide via BACK Aviation Solutions, 2008; and HNTB analysis.



Figure 2-8 2008 Nonstop Markets by Type of Service



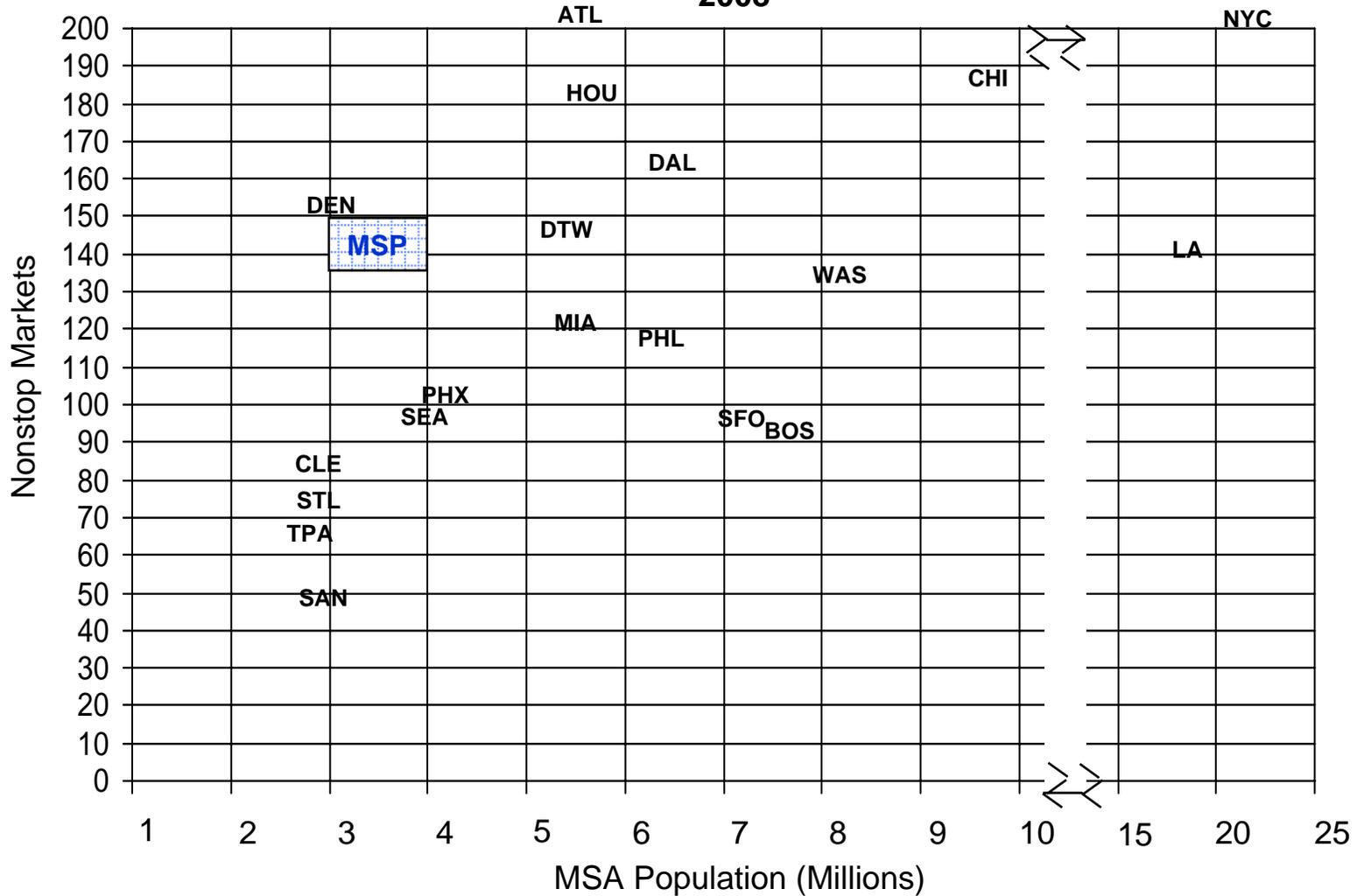
Sources: Official Airline Guide via BACK Aviation Solutions, 2008; and HNTB analysis.

Note: Regional jets are defined as a jet aircraft having 85 or fewer seats.



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**Figure 2-9
Population vs. Nonstop Service
2008**



Sources: Metropolitan Airports Commission and HNTB analysis.

Table 2.2

NONSTOP MARKETS BY METROPOLITAN AREA

Metropolitan Area	Population ⁽¹⁾ (Millions)	Nonstop Markets ^{(2) (3)}	Markets/Pop. (Million) Ratio
New York	22.0	226	10.3
Los Angeles	17.8	140	7.9
Chicago	9.7	188	19.3
Washington-Baltimore	8.2	135	16.4
Boston	7.5	95	12.7
San Francisco-Oakland	7.3	96	13.2
Dallas-Fort Worth	6.5	164	25.2
Philadelphia	6.4	119	18.6
Houston	5.7	182	31.8
Atlanta	5.6	229	40.7
Miami-Fort Lauderdale	5.4	120	22.2
Detroit	5.4	147	27.2
Phoenix	4.2	102	24.4
Seattle-Tacoma	4.0	96	23.8
Minneapolis-St. Paul	3.5	144	40.7
Denver	3.0	151	50.4
San Diego	3.0	49	16.5
Cleveland	2.9	83	28.7
St. Louis	2.9	73	25.5
Tampa-St. Petersburg	2.7	65	23.9

Notes:

⁽¹⁾ U.S. Census Bureau; Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2007 (CBSA-EST2007-01); Annual Estimates of the Population of Combined Statistical Areas: April 1, 2000 to July 1, 2007 (CBSA-EST2007-02).

⁽²⁾ Metropolitan areas served by more than one airport are counted once.

⁽³⁾ Markets include those receiving an average of at least five weekly nonstop domestic flights or one weekly nonstop international flight during the period from January through December 2008.

Source: U.S. Census Bureau, 2008 Official Airline Guide via Back Aviation Solutions

2.3 COMPARISON OF 1993 MAC FORECAST WITH ACTUAL ACTIVITY

As required by the Metropolitan Planning Act of 1989, the Dual Track forecasts were revised in 1993, using 1992 as a base year. To ensure that the revised forecasts were optimal from both predictive and planning standpoints, forecast workshops were convened in 1992 and 1993 by the MAC and the MC. The Expert Panel Session on Forecast Methodologies, held on October 29, 1992, focused on the most appropriate forecasting techniques given recent aviation trends and the character of aviation demand at MSP. The Expert Panel Session on Aviation Assumptions, held on

November 18, 1992, addressed ongoing trends in the aviation industry with regard to fares, aircraft equipment, and airline service practices. The Socioeconomics Expert Panel Session was convened on November 19, 1992, to assess the most likely trends in area population, employment, and income that ultimately drive demand for aviation services. The final Expert Panel Session was held on May 27, 1993, to review the work accomplished to date and to develop a consensus on the final assumptions, methodologies, and scenarios to be used in the updated forecasts.

The forecasts were developed with the understanding that the assumptions were likely to vary over the forecast period, and that the variation could be material. The likely range of possibilities resulting from these variations was tested by constructing alternative scenarios in conjunction with the expert panels. These scenarios were developed separately and in combination. In this manner, a range of possible variations from the base case forecasts was developed.

The scenarios took into account factors affecting economic growth, including fuel prices, low-cost carriers, airfares, airline hubbing ratio, regional carrier penetration into air carrier markets, and changes in the structure of air travel demand. The highest scenario was defined by the following assumptions:

- Higher than projected economic growth
- A continuation of the high level of connecting activity at MSP by Northwest Airlines
- High international travel demand resulting from an increasingly globalized economy

The most conservative scenario was defined by the following assumptions:

- Lower than projected economic growth
- A reduction in connecting activity by Northwest Airlines to the minimum level allowed by the hub covenant contained in the Northwest loan agreement
- A greater transfer of routes from air carriers to regional carriers

A comparison of the enplanement, passenger origination, and aircraft operations forecasts with actual 1993-2008 activity follows. It should be noted that activity levels fluctuate from year to year around a long-term average. It is important to distinguish between these short-term fluctuations and long-term trends when evaluating a forecast.

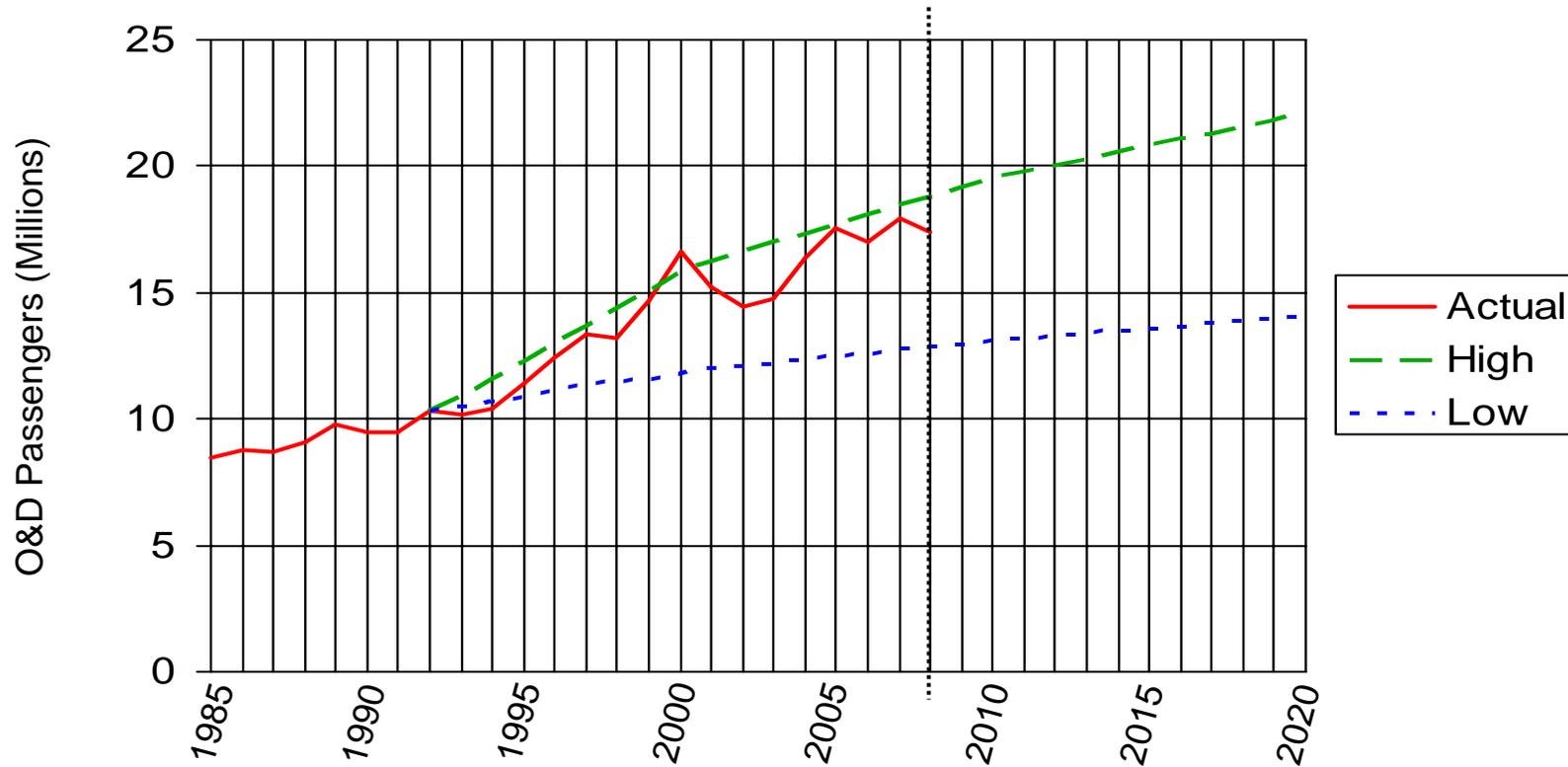
Figures 2-10–2-12 show O&D, total passengers, and annual aircraft operations, respectively.

- Actual passenger originations were slightly below the high forecast level in 1993 through 1999, but increased to a level above the high forecast during 2000 (**Figure 2-10**). Passenger originations and destinations in 1998 were reduced because of the loss of service resulting from the Northwest Airlines strike in August and September. O&D totals were also down in 1999 due to the strike, but rebounded midway through the year to pre-strike levels. At the end of 2001, O&D numbers decreased 8.4 percent from a high of 16.6 million



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Figure 2-10
Minneapolis-St. Paul International Airport
Forecast vs. Actual 2008 Passenger Originations/Destinations



Sources: Metropolitan Airports Commission and HNTB analysis.

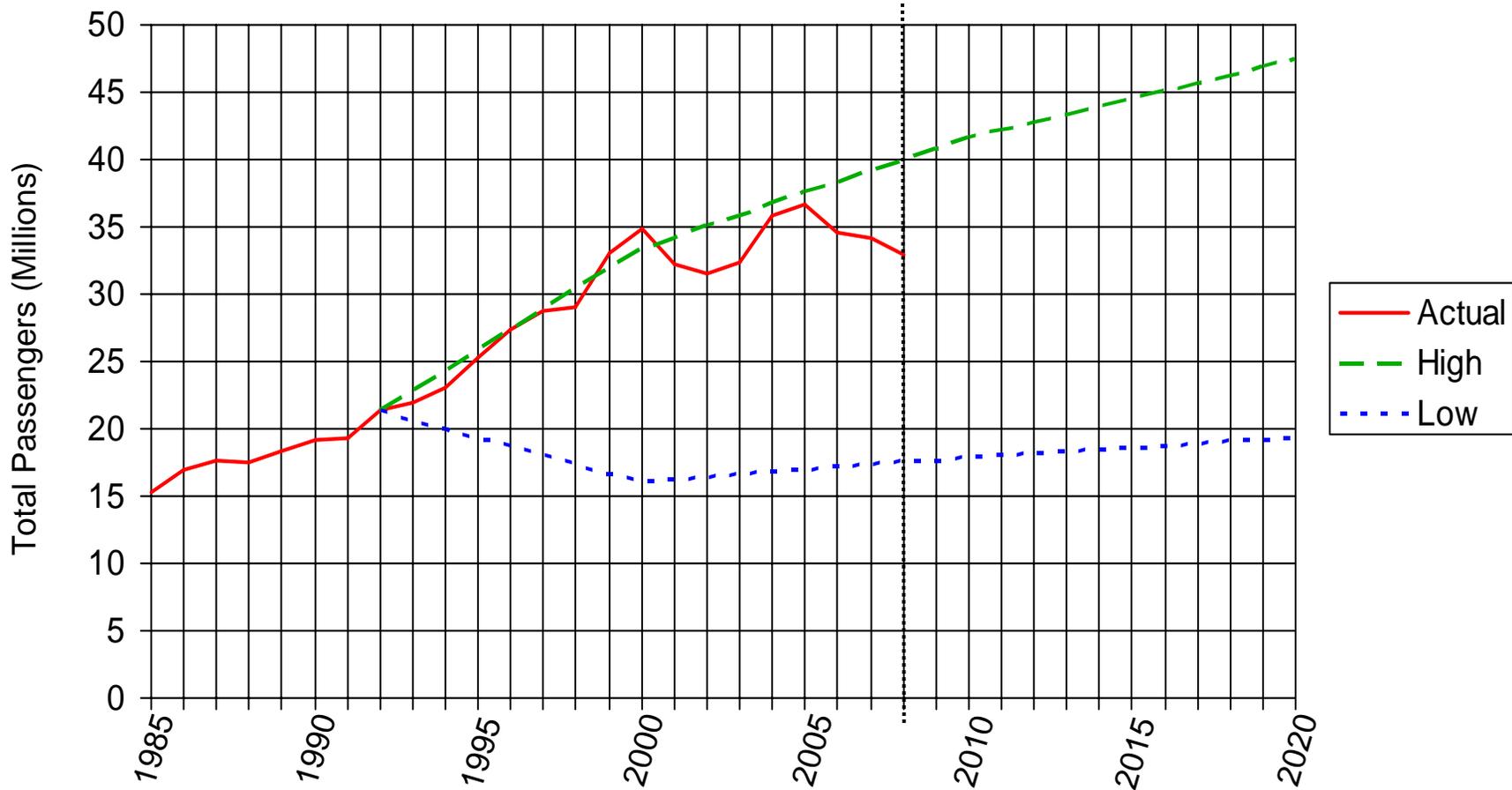
Note: O&D Passenger estimates are based on the first two quarters of 2008.

after passengers reduced air travel in response to the events of September 11. In 2002, due to the lingering effects of September 11, and the economic downturn, O&D passenger numbers continued their decline. By the end of the year, they were down 5.3 percent from 2001, to 14.4 million. In 2005, O&D passengers rebounded to pre-September 11, 2001 levels. O&D passenger levels decreased a little in 2006 to 17.0 million, but then grew to 17.9 million in 2007. In 2008, the O&D passenger level was 17.4 million which is 7.4 percent below the high forecast of 18.8 million O&D passengers.

- As shown in **Figure 2-11**, MSP total passenger activity grew at close to historical rates in 1993, but growth accelerated between 1994 and 1995 and approached the high forecast in 1996. In 1999 and 2000, total passengers exceeded the high forecast. Much of the passenger growth at MSP between 1994 and 2000 was the result of one-time factors. These include Northwest Airlines' hub consolidation at MSP and Detroit in 1992 and 1993; the liberalization of Canadian markets, which opened up MSP as a hub for cross-border traffic beginning in 1995; and the lapse of the passenger ticket tax during most of 1996. Also, airlines have developed much more sophisticated reservation systems that allow them to generate more revenue by filling otherwise empty seats with passengers flying on discount fares. The passenger growth rate in 1998 decreased from that of previous years because of the loss of service resulting from the Northwest strike; however, discount fares helped Northwest Airlines regain lost passenger volumes in 1999. A decline in the number of total revenue passengers occurred after September 11, 2001 that resulted in MSP experiencing an 8.3 percent decrease from 2000 levels. In 2002, MSP experienced another decline in total revenue passengers due to the after-effects of September 11 coupled with the sluggish economy. Passenger levels rose in 2003 and 2004, and reached 36.7 million in 2005, but then dropped in 2006 to 34.6 million. Passenger levels continued to decrease in 2007 to 34.1 million, and then again in 2008 to 32.9 million. The 2008 levels are 17.8 percent below the high forecast level of 40 million.
- **Figure 2-12** compares total aircraft operations (as counted by the FAA Air Traffic Control Tower at MSP) with the high and low forecasts. There was an initial burst of aircraft operations in 1993 and 1994 as a result of significant build-up of regional carrier flights by Northwest Airlinck. Since that time, factors that stimulated passenger traffic, such as the strong economy, Northwest Airlines' hub consolidation, the liberalization of Canadian markets, and the lapse of the passenger ticket tax, have served to maintain a high number of aircraft operations. Numbers of total aircraft operations decreased in 1998 due to the Northwest strike in August and September. As stated previously, the Northwest schedule rebounded to pre-strike levels in October 1998. Immediately after September 11, 2001, air carriers reduced aircraft operations at MSP by nearly 20 percent in response to low passenger demand. As a result, MSP aircraft operations in 2001 decreased by 4 percent from 2000 levels. The economic downturn and lingering effects of September 11 also affected the growth rate of total aircraft operations at MSP in 2002. Operations in 2002 actually increased by 1.2 percent over the total number of



Figure 2-11
Minneapolis-St. Paul International Airport
Forecast vs. Actual 2008 Total Revenue Passengers

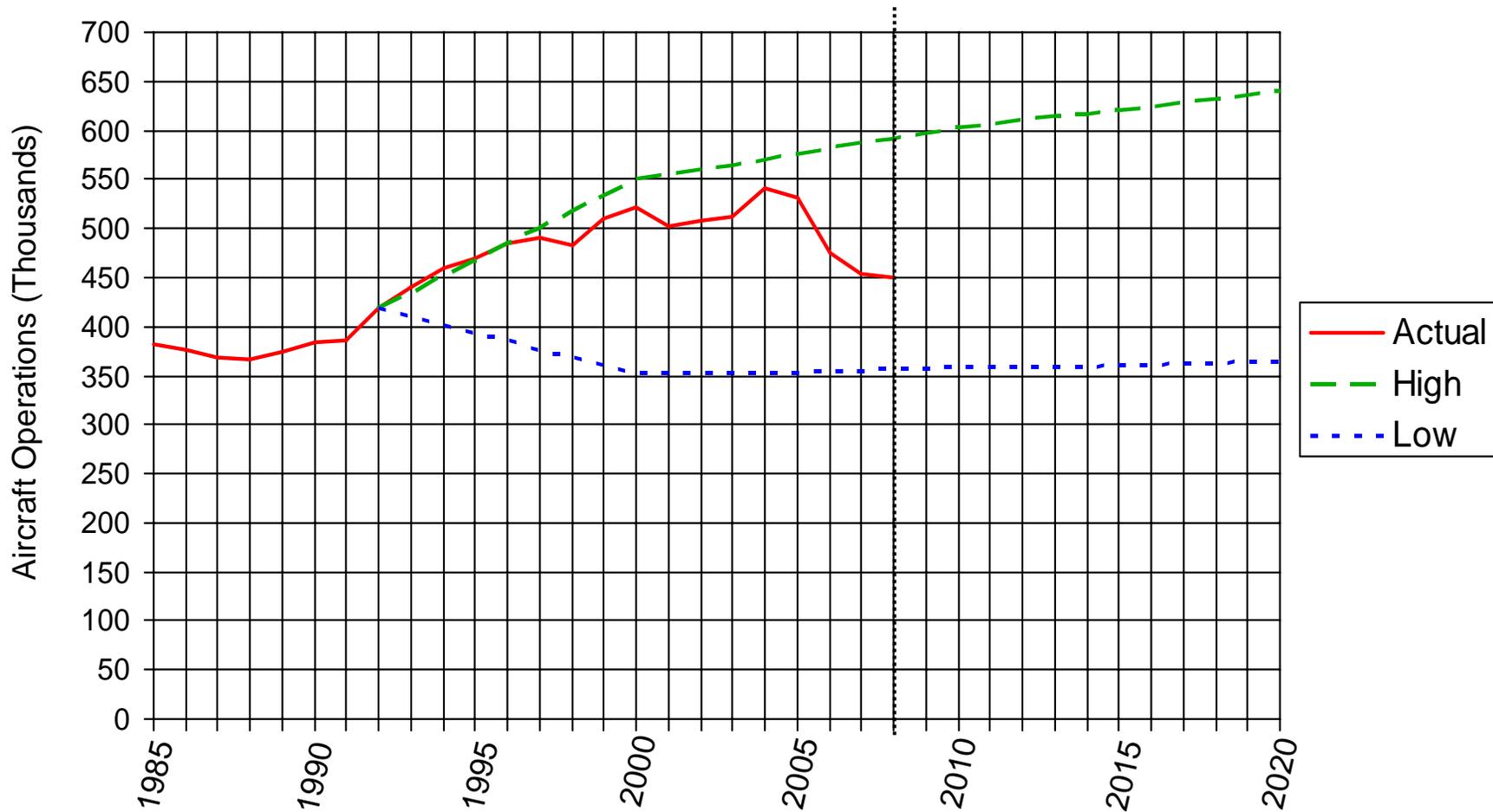


Sources: MSP Base and Combination 2 Forecasts; and Metropolitan Airports Commission.



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Figure 2-12
Minneapolis-St. Paul International Airport
Forecast vs. Actual 2008 Total Aircraft Operations



Sources: MSP Base and Combination 2 Forecasts; Metropolitan Airports Commission and FAA OPSNET.

aircraft operations in 2001. In 2004, operations increased by 6.4 percent over 2003. However, annual aircraft operations declined in 2005, 2006, 2007, and 2008. In 2008, there were 449,972 aircraft operations, which marks a .8 percent drop from the level in 2007 of 453,566, and 24 percent below the high forecast of 592,000.

2.4 AIRPORT CAPACITY AND DELAY

This section describes the airfield capacity at MSP. An aircraft delay analysis is also provided.

2.4.1 Airfield Capacity

Airfield capacity is typically described in terms of hourly capacity and annual capacity under good weather and poor weather conditions. **Table 2.3** shows existing and future hourly capacity for MSP.

Table 2.3

EXISTING AND FUTURE HOURLY AIRFIELD CAPACITY

Hourly Airfield Capacity	Existing	2010
Optimum Rate ⁽¹⁾	160	167
Marginal Rate ⁽²⁾	155	167
IFR Rate ⁽³⁾	125	137

Notes: ⁽¹⁾ Ceiling and visibility above minima for visual approaches.

⁽²⁾ Below visual approach minima but better than instrument conditions.

⁽³⁾ Instrument conditions (ceiling < 1000 feet or visibility < 3 miles).

Source: FAA Benchmark Report, 2004.

- As shown in **Table 2.3**, existing hourly capacity at MSP is about 160 operations in good weather and 125 operations in poor weather. Specific conditions that define poor weather include the airport's most commonly used instrument configuration, where operations are conducted below visual approach minima (e.g., instrument approaches).
- According to the FAA 2004 Benchmark study, it is possible that improvements in technology could occur within the next 10 years that will support higher capacity levels. These improvements include advanced Traffic Management Advisor (TMA) to allow controllers to sequence aircraft more efficiently, and Cockpit Display of Traffic Information (CDTI)-Enhanced Flight Rules which will enable specially-equipped aircraft to maintain visual approaches even in marginal weather conditions. MSP's hourly capacity could increase by a total

of 4.4 percent to 167 operations in good weather and by a total of 9.6 percent to 137 operations in adverse weather with utilization of these technologies.

- According to the FAA's 1993 Capacity Enhancement Plan for MSP, with the north-south runway in place, annual capacity would be 580,000 operations, assuming a 4-minute average delay level. Based on analysis reported in the 2015 Terminal Expansion Project Draft Environmental Assessment, the airfield could accommodate up to 723,000 annual operations with an average delay of 12.7 minutes per operation. (It should be noted that this level of delay is considered to be the maximum tolerable based on a review of the nation's most congested airports.)
- The MAC STAR Program will focus on development of RNAV departure procedures during 2009, which will help increase airspace efficiency and reduce airport delay, fuel burn, emissions and noise impacts. The testing of these procedures will be conducted in phases with voluntary cooperation by three participant airlines that have aircraft equipped with the necessary technology. The MAC will work closely with FAA air traffic control on refinement of these procedures and then provide an update in the 2009 Annual Report.

2.4.2 Airfield Delay

Delay can be measured in several ways. This section reviews various delay measures as they are reported by the FAA and apply to MSP.

Number of Delayed Flights as Reported by FAA

The FAA Air Traffic Operations Network (OPSNET) database counts flights that were reported to be delayed by Air Traffic Control (ATC) for more than 15 minutes. Delays of less than 15 minutes are not counted, nor are delays not initiated by ATC. In addition, since delays are reported by facility, a flight that was delayed by 13 minutes by one facility and 12 minutes by another facility (for a total delay of 25 minutes) was not included in the OPSNET database prior to October 1, 2008. These data limitations should be kept in mind when reviewing OPSNET delay data.

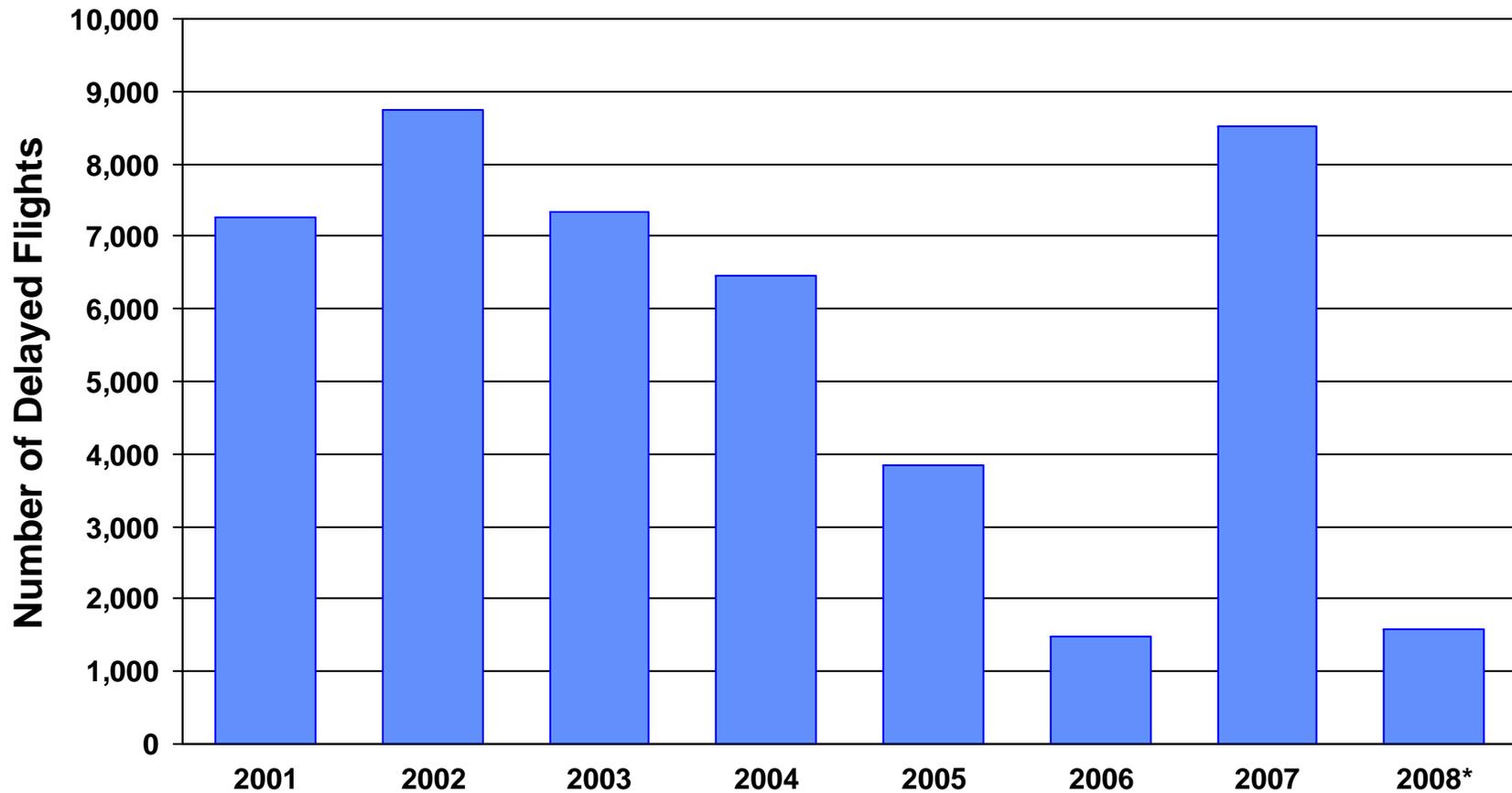
In 2008, the FAA made significant modifications to its reporting rules that will affect historical data comparisons. The FAA now combines arrival and enroute delays into one category, and now reports delays for aircraft which accumulate 15 minutes or more holding delay at each facility throughout the entire route of flight.

Figure 2-13 graphically depicts the number of flights delayed by ATC. Delays peaked in 2002 when a total of 8,733 flights were reported delayed. Over the next five years, the number of delayed flights steadily decreased, reaching a low of 1,474 in 2006 (which is the first full year of operation with the new runway). In 2007, the number of reported delays jumped to 8,510. It is likely that the two-month closure of Runway 12R/30L for reconstruction and high instances of bad weather conditions during that year caused a good portion of this increase. Delays dropped significantly in 2008 to 1,579.



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Figure 2-13
MSP Flights Delayed by ATC*
2001-2008



*This total is reported differently in 2008 due to FAA adjusting the way air traffic control calculates delays for arriving and departing flights.

Sources: FAA OPSNET, and Metropolitan Airports Commission analysis.

Percentage of Flights Arriving On Time

The data series used to calculate on-time performance for arrivals is the FAA's Aviation System Performance Metrics (ASPM) database. Within this data set, aircraft must be airborne in order for them to be considered "delayed"; therefore, cancelled and/or diverted flights are not considered "late" in this system. Scheduled times typically include some "cushion" for delay, especially for arrivals operating during peak periods. A delayed flight can be attributed to mechanical problems, lack of crew or poor weather, and is not limited to capacity constraints.

Figure 2-14 shows average on-time gate arrival performance for domestic air carrier flights at MSP based on the delay data extracted from the FAA ASPM database. The top graph compares MSP's 12-month average on-time performance with the national average. Between 2001 and 2008, the highest on-time performance for MSP occurred in 2002 and 2003 when overall annual on-time performance averaged about 84 percent. In 2004 and 2005, on-time performance slowly declined to about 80 percent, and remained at roughly 80 percent through 2006. In general, MSP's on-time performance has tracked fairly close to the national average, although MSP saw its on-time performance decline more steeply than was experienced at the national level in 2007 to a low of 73 percent. It is possible that some of the decline in 2007 is attributable to major runway reconstruction from August 13, 2007 to October 18, 2007 and poor weather at MSP in December 2007. In 2008 MSP's on-time percentages remained steady at about 74 percent for the first six months then rose to 79.6 percent by year end.

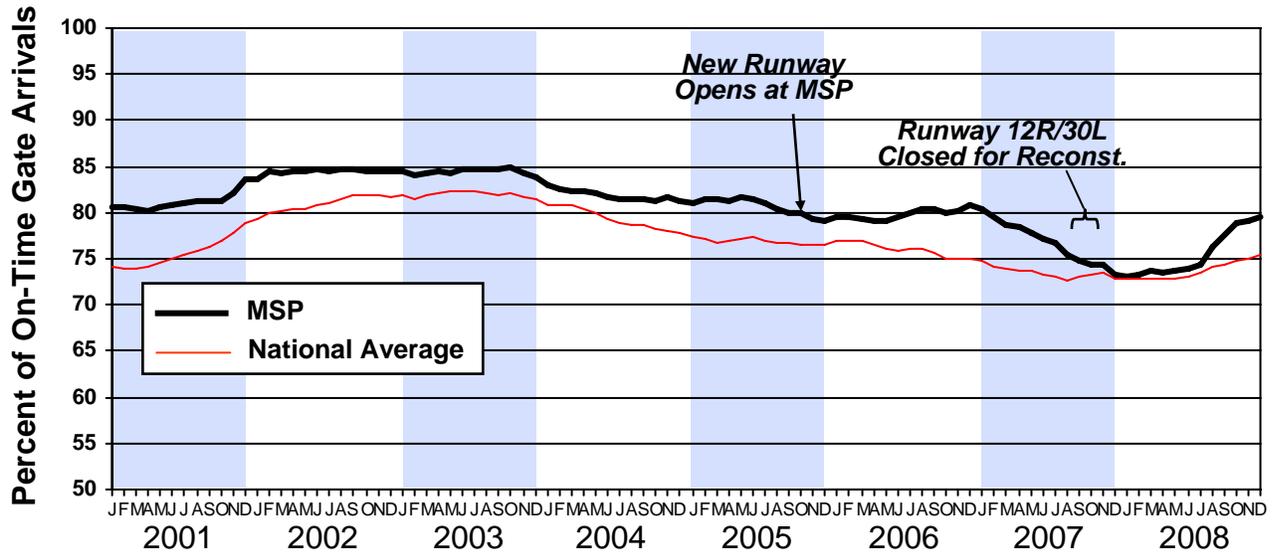
Average Delay Per Aircraft Operation

Finally, average delay per operation attributable to the Airport is examined. Airport-attributable delay can be estimated by comparing a flight's actual air and taxi times with estimated unconstrained times. The total cumulative amount of delay experienced by all scheduled flights in the database is then divided by the total number of flights in the database for the same time period. The output is usually expressed in minutes of delay per operation.

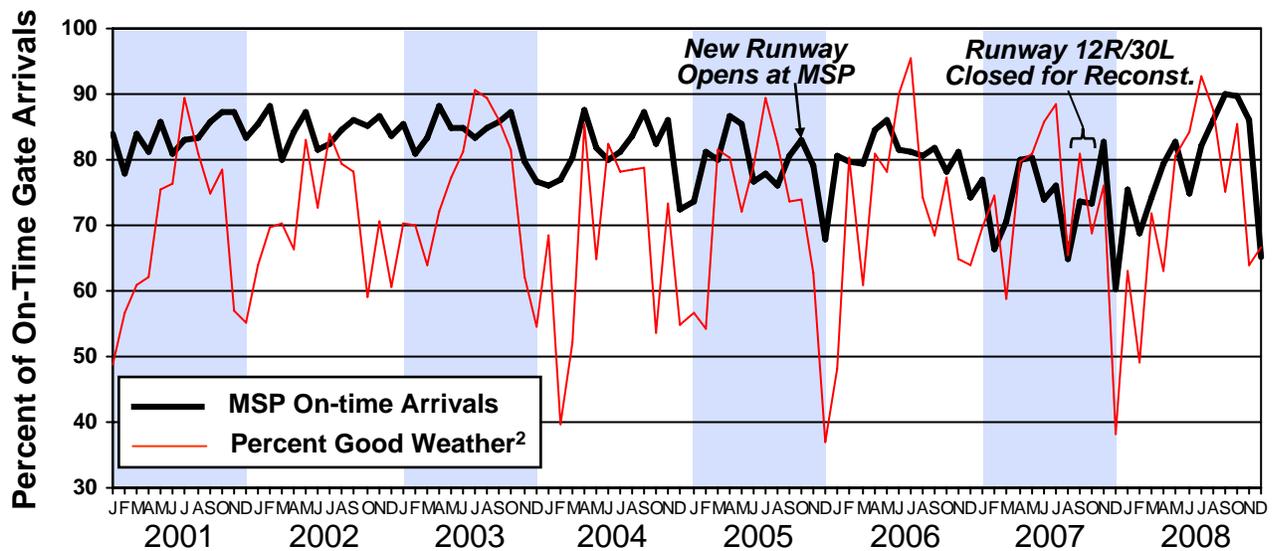
In editions of this report prior to 2005, delay was estimated by using the FAA's Consolidated Operations and Delay Analysis System (CODAS) and the DOT Airline Service Quality Performance (ASQP) database to compare optimal vs. actual taxi and flight times for MSP. Subsequent to 2005, the FAA's Aviation System Performance Metrics (ASPM) database was used. The FAA replaced CODAS with this new program, providing delay information to industry professionals and government agencies. ASPM data come from ARINC's Out-Of-On-In (OOOI), Enhanced Traffic Management System (ETMS), ASQP, weather data, airport arrival and departure rates (15-minute interval), airport runway configurations and cancellations. Creation of the ASPM database provides a more comprehensive analysis of airport delay and capacity. The FAA also uses the results to create performance benchmarks for airports based on facility enhancements that occur each year. The FAA's main objective was to develop a clear and well-supported methodology to calculate aircraft delays that will be accepted by



Figure 2-14
On-Time Gate Arrivals, MSP vs. National Average¹
(12-Month Moving Average)



Comparison of MSP Monthly
On-Time Gate Arrivals¹ and
Percent of Good Weather



1. Percentage of flights arriving within 15 minutes of scheduled arrival time. National average consists of the top 55 airports in ASPM database through Oct. 2004 and top 75 airports for rest of period.
2. Defined as when conditions may allow visual approaches; actual separation standards used at time of observation are not available in ASPM database.

Sources: FAA-APO Aviation System Performance Metrics (ASPM) database, HNTB analysis.

both government and industry as valid, accurate and reliable. Currently, there is general industry acceptance of the ASPM metric.

The ASPM information presented in **Figure 2-15** shows average delay per operation. The top graph compares the Airport's 12-month moving average with the average for 75 high-delay airports tracked by the FAA. Between 2001 and 2005, MSP's average delay per operation ranged between 6.5 minutes and 7.1 minutes, while the average delay for the 75 airports tracked by the FAA ranged from about 4.8 minutes to 5.6 minutes. After MSP's new runway opened in late October 2005, average delay per aircraft began to decrease dramatically, reaching a low of about 5.5 minutes toward the end of 2006. Since that time, however, the 12-month moving average delay per operation began to increase steadily, reaching about 7.5 minutes by the end of 2007, while average delay for the 75 airports tracked by the FAA remained fairly constant at about 6.0 minutes.

The bottom graph compares MSP's month-by-month average delay per operation with the percentage of time the Airport operated in poor weather conditions (which typically increases delays). As shown, the highest delays were experienced when Runway 12R-30L was closed for reconstruction and again in December 2007 when the Airport was operating in poor weather conditions more than 60 percent of the time.

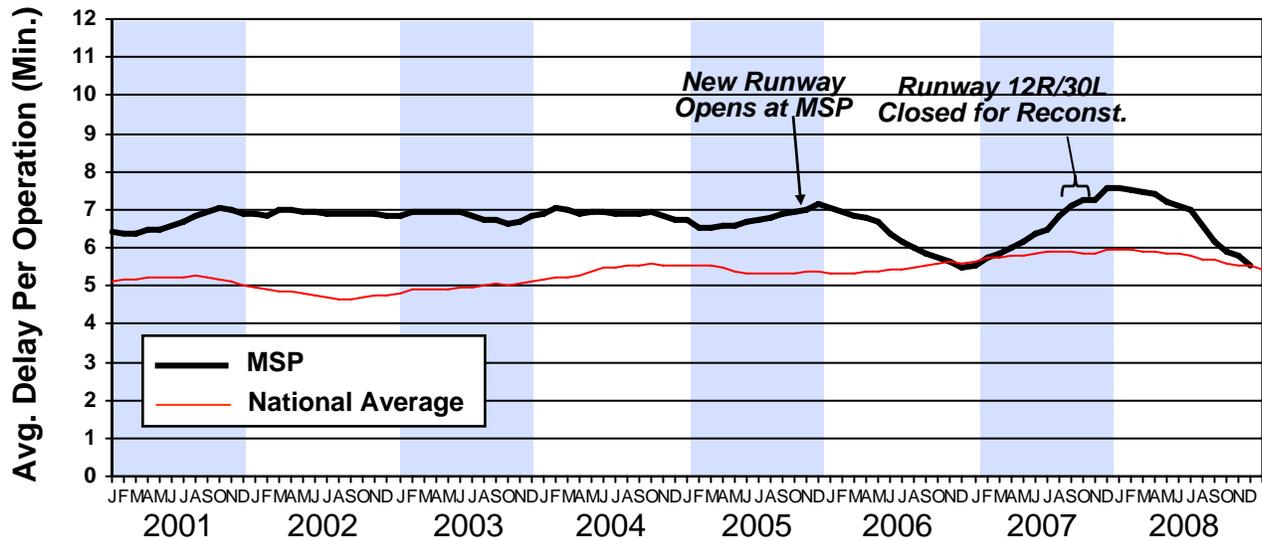
In 2008, poor weather conditions in February, April and December contributed significantly to the level of delay. As shown in **Table 2.4**, MSP ranked 12th in the nation in 2008 in terms of highest average delay with 5.6 average minutes of delay per operation. This is an improvement from 2007 when MSP averaged 7.6 minutes of delay per operation.

There are many factors that contribute to airfield delay, including poor weather conditions, runway closures (typically due to construction), changes in airline schedules, changes in ATC procedures, airline fleet mix changes, airline practices, and other factors. In addition, how delays are defined or reported can change over time. For these reasons, it is often difficult to determine and report the precise causes for delays or to be definitive about delay trends. However, it is important to note that planned reconstruction on Runway 12L-30R will likely increase delay averages for 2009.

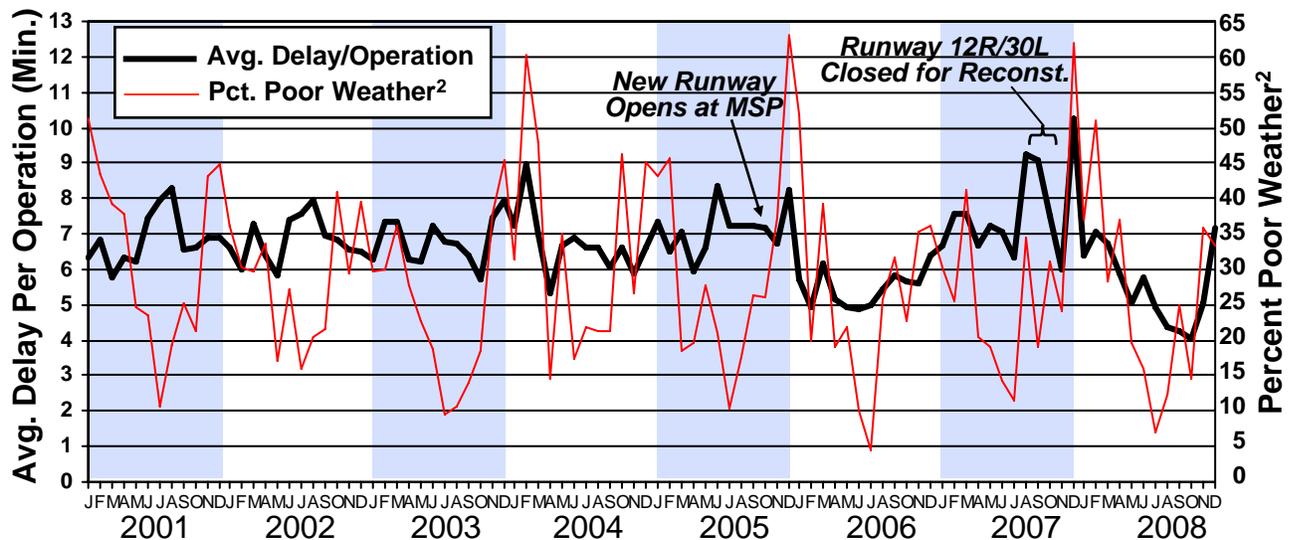


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Figure 2-15
MSP Average Delay Per Aircraft Operation
Compared to National Average¹
(12-Month Moving Average)



Comparison of MSP Average
Delay Per Aircraft Operation
and Percent Poor Weather²



- 1) An operation is either a landing or a takeoff. National average consists of top 55 airports in ASPM database through Oct. 2004 and top 75 airports for rest of period.
- 2) Poor weather is defined as when aircraft must make instrument approaches; actual separation standards used at time of observation are not available in ASPM database.

Sources: FAA-APO Aviation System Performance Metrics (ASPM) database, HNTB analysis.

Table 2.4

**TOP 15 LARGE HUB AIRPORTS WITH
HIGHEST AVERAGE TOTAL DELAY PER OPERATION**

Airport Ranking	2008 Total Airport Operations	2008 Avg. Minutes of Delay per Operation	2007 Avg. Minutes of Delay per Operation	2007 Airport Ranking	Change from 2007 to 2008
1. JFK	446,968	12.3	14.8	1	-2.5
2. LGA	384,080	12.2	12.3	2	-0.1
3. EWR	442,098	11.8	11.8	3	0.0
4. PHL	492,038	9.1	10.6	4	-1.5
5. ATL	978,084	8.6	8.2	5	0.4
6. ORD	881,566	7.1	7.3	8	-0.2
7. CLT	537,598	6.8	7.0	9	-0.2
8. DTW	462,529	6.4	7.8	6	-1.4
9. BOS	374,535	6.2	6.8	10	-0.6
10. DEN	625,844	5.8	6.2	12	-0.4
11. DFW	655,306	5.6	6.1	13	-0.5
12. MSP	449,972	5.6	7.6	7	-2.0
13. SLC	389,915	5.6	6.5	11	-0.9
14. IAH	578,288	5.5	6.1	14	-0.6
15. IAD	391,626	5.3	6.0	15	-0.7

Source: FAA OPSNET for airport operations data, FAA ATADS for average minutes per operation (taxi-in, taxi-out, and airborne delay).

2.5 TECHNOLOGICAL / CAPACITY ENHANCEMENTS

The FAA continuously investigates potential capacity-enhancing development/technology in an effort to increase airport efficiency and reduce delay. When advancement is identified, efforts are made to implement the technology at the busiest airports. This section describes these efforts as they apply to MSP.

- In 1993, the FAA published the *Minneapolis-Saint Paul International Airport Capacity Enhancement Plan*. The purpose of the plan was to identify potential cost-effective projects which would appreciably increase airport capacity. The plan was followed by the 1996 *Airport Capacity Enhancement Terminal Airspace Study*, which identified potential methods of improving airspace capacity.
- Airport Surface Detection Equipment (ASDE-3) was installed at MSP in 1996 to allow air traffic controllers to “see” aircraft maneuvering on the ground

during poor visibility conditions. Installation of an upgraded system called ASDE-X is currently in process. This new system includes some components of the current ASDE-3, and it will add remote units around MSP's airfield to provide for more precise aircraft positioning. ASDE-X will provide seamless coverage for complete aircraft identification information, and it will allow for the Next Generation (NexGen) of navigation technology (Automatic Dependence Surveillance - Broadcast "ADS-B") to broadcast critical information using the Global Navigation Satellite System. Installation and commissioning of ASDE-X is anticipated by the end of 2009.

- Capacity improvements at MSP will be aided by the use of Flight Management System/Area Navigation Routes (FMS/RNAV). The equipment will provide a more consistent flow of aircraft to the arrival and departure runways. In February 2009 testing will begin on RNAV procedures developed by the FAA in coordination with the MAC and Pinnacle Airlines.
- The MAC has had ongoing involvement with the development and deployment of differential Global Positioning System technology at MSP. Over eight years ago a Special CAT I Local Area Augmentation System (LAAS) was installed at MSP and in 2009 the system will be upgraded to an FAA-certified CAT I installation. This system will allow operators to utilize on-aircraft technologies that could provide for flight management approaches that reduce fuel consumption and controller workload. Ultimately, curved approaches and precision missed approaches may be provided to reduce noise impacts and to lower landing minimums. This will result in a small increase in airport capacity.
- In an effort to increase the operational efficiency and capacity of MSP during inclement weather, the MAC has implemented additional CAT II and CAT III capabilities at the airport. Cat II approaches (currently on Runway 30L) allow approaches down to 1200 feet visibility and 100 foot cloud ceiling. CAT III(B) approaches (currently on Runways 12L and 35) allow approaches down to 600 feet visibility, and no ceiling.
- Future increases in MSP capacity levels will depend on the introduction of new aircraft avionics. An enhanced tool called Automatic Dependent Surveillance-Broadcast/Cockpit Display of Traffic Information (ADS-B/CDTI) identifies the location of other aircraft and displays their position in the cockpit. This technology allows pilots to maintain the desired separation more precisely; however, it requires aircraft to be properly equipped to use this device. The FAA has awarded a contract to start the installation of the ground equipment necessary to install this system at MSP. Minneapolis is in Segment 1, which is expected to have the ground equipment certified by September of 2010. The FAA has issued a notice of proposed rule making (NPRM) which calls for all aircraft which will operate in a terminal area, such as MSP, to have on board aircraft equipment by 2020.
- Alternative airspace improvements were studied in the *Airport Capacity Enhancement Terminal Airspace Study*. The report found that the existing

airspace around MSP can be reconfigured to accommodate the proposed north-south runway. In addition, airspace efficiency can be improved either by adding a new jet arrival fix or a new parallel jet arrival stream. These improvements have now been implemented with the opening of Runway 17-35 in October 2005.

- Within the next decade, air traffic controllers will begin using the Passive Final Approach Spacing Tool (pFAST), which assists controllers with sequencing aircraft and creates a better flow of traffic into the terminal area.

2.5.1 Precision Instrument Approaches

In addition to how an airport's runways are separated and configured, airfield capacity can be greatly affected by how the runways are equipped for inclement weather. The number and type of precision instrument approaches at MSP is summarized in **Table 2.5**.

Table 2.5

PRECISION INSTRUMENT APPROACHES

MSP	CAT I	CAT II	CAT III
Runways:	30R	30L	12L (CAT IIIB) 12R (CAT IIIA) 35 (CAT IIIB)

Notes: The term decision height is defined as the height at which a decision must be made during a precision approach to either continue the landing maneuver or execute a missed approach.

Precision approaches are categorized based on decision height and the horizontal visibility that a pilot has along the runway. Visibility values are expressed in statute miles, or in terms of runway visual range (RVR), if RVR measuring equipment is installed at an airport.

The different classes of precision instrument approaches are:

- Category I (CAT I) – provides approaches to a decision height down to 200 feet and a basic visibility of $\frac{3}{4}$ statute miles or as low as 1,800 feet RVR.
- Category II (CAT II) – provides approaches to a decision height down to 100 feet and an RVR down to 1,200 feet.
- Category IIIA (CAT IIIA) – provides approaches without a decision height (down to the ground) and an RVR down to 700 feet.
- Category IIIB (CAT IIIB) – provides approaches without a decision height and an RVR down to 150 feet.
- Category IIIC (CAT IIIC) – provides approaches without a decision height and RVR. This will permit landings in "0/0 conditions," that is, weather conditions with no ceiling and visibility as during periods of heavy fog.

Source: December 2006 U.S. Terminal Procedures, NOAA.

2.6 STEWARDS OF TOMORROW'S AIRPORT RESOURCES (STAR) PROGRAM

Working to minimize environmental impacts from airport operations is an ongoing focus for the MAC. MSP is a large and complex operation with many stakeholders. The MAC has maintained its focus on optimizing and improving all MAC-controlled operation and development actions at MSP in an effort to reduce negative impacts to the environment. Additionally, the MAC continues to conduct outreach and advocacy to influence, to the degree possible, non-MAC-controlled activities at MSP to further aid in the reduction of environmental impacts.

At the March 17, 2008 MAC Commission meeting, the Stewards of Tomorrow's Airport Resources (STAR) Program was introduced. The intent of the STAR Program is to maintain a focus on the MAC's commitment to the environment and the community through the development of initiatives that are environmentally sound and contribute to the financial viability and operational efficiency at MSP and the reliever airports. The sustainable practices to date focus on the following areas:

- Energy Conservation/Renewable Energy
- Green Buildings, Facilities and Infrastructure
- Water Quality and Conservation
- Air Quality
- Waste Management and Recycling
- Noise Abatement
- Natural Resources Management
- Financial Stability

This program provides a solid foundation and model for future STAR Program initiatives, and it will promote minimizing environmental impacts from airport operations for the MAC in 2009 and into the future. Moving forward, STAR efforts will establish sustainability goals, discover new opportunities to become more efficient, and document new activities and/or projects that quantify the benefits of the respective initiatives.

3. RELIEVER AIRPORTS

3.0 OVERVIEW

The Metropolitan Airports Commission (MAC) owns and operates six reliever airports throughout the metropolitan area that surrounds Minneapolis-St. Paul International Airport (MSP). Reliever Airports are defined by the FAA as airports designated to relieve congestion at Commercial Service Airports and to provide improved general aviation access to the overall community. This system of airports generates an estimated \$1.4 billion dollars annually for the Twin Cities economy while reducing general aviation operations at MSP. The reliever airports are Airlake, Anoka County-Blaine, Crystal, Flying Cloud, Lake Elmo and St. Paul Downtown.

This portion of the report highlights the facilities and activities at each of the reliever airports, and organizes the information into the following three sections:

- Description of Reliever Airport Facilities
- Historic and Existing Activity Levels
- Development Programs

3.1. DESCRIPTION OF RELIVER AIRPORT FACILITIES

According to the Metropolitan Council Aviation Policy Plan, December 1996, all but one of the MAC reliever airports are classified as minor airports. This means that primary runway lengths are between 2,500 and 5,000 feet. St. Paul Downtown is classified as an intermediate airport, which means its primary runway is between 5,000 feet and 8,000 feet long.

Airport users at the MAC reliever airports include air taxi, business, general aviation, flight training, recreational, and military. Each of the reliever airports is open for public-use 24-hours per day. The following sections outline the existing airport facilities at each location.

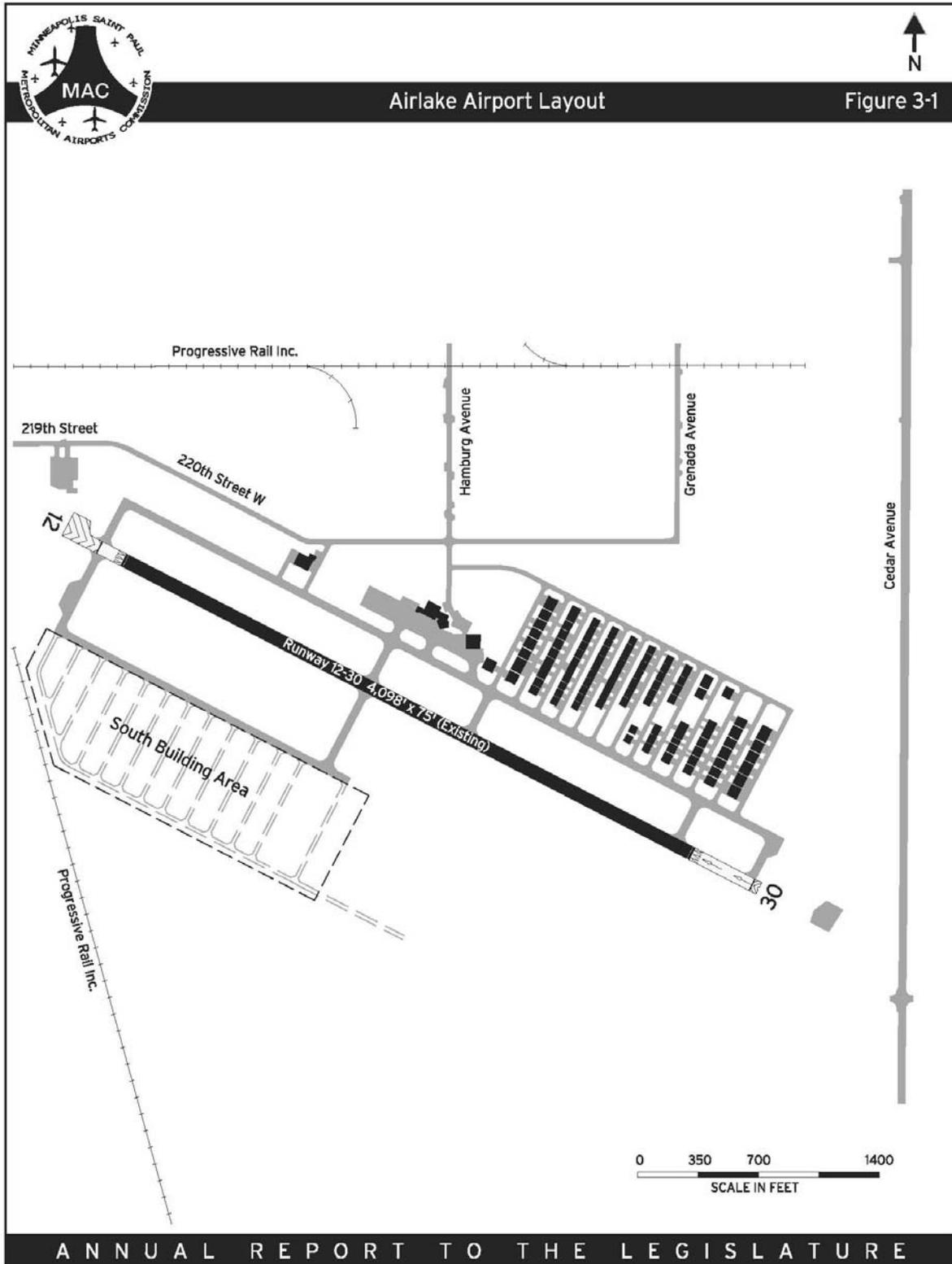
3.1.1 Airlake Airport (LVN)

Airlake Airport (LVN) consists of approximately 595 acres, and the airfield includes one northwest-southeast runway and full-length parallel taxiway. Runway 12-30 is 4,098 feet long by 75 feet wide. The airport has a precision instrument approach to Runway 30 and a non-precision approach to Runway 12. **Figure 3-1** shows the general airport layout and facilities. A Fixed Base Operator (FBO) at the airport provides fueling and other aircraft maintenance services. The airport had 158 based aircraft and an estimated 39,021 aircraft operations in 2008. There is no air traffic control tower located at the airport. Aircraft operators utilize common traffic advisory procedures while flying to and from the airport.



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Figure 3-1: Airlake Airport (LVN) Layout



3.1.2 Anoka County-Blaine Airport (ANE)

Anoka County-Blaine Airport (ANE) consists of approximately 1,862 acres, and the airfield includes one east-west runway and one north-south runway. Both runways have full-length parallel taxiways. Runway 9-27 is 5,000 feet long by 100 feet wide and Runway 18-36 is 4,855 feet long by 100 feet wide. The airport has a precision instrument approach to Runway 27 and non-precision instrument approaches to Runways 9, 18 and 27. **Figure 3-2** shows the general airport layout and facilities. Three FBOs at the airport provide fueling, flight training, and other maintenance services for aircraft and helicopters. The airport had 439 based aircraft and 69,403 aircraft operations in 2008. A non-federal Air Traffic Control Tower is located at the airport, and operates each day in the winter from 7 a.m. to 9 p.m., and 7 a.m. to 10 p.m. in the summer. The change in operating hours coincides with daylight savings time.

3.1.3 Crystal Airport (MIC)

Crystal Airport (MIC) consists of approximately 436 acres, and includes two northwest-southeast runways and two southwest-northeast runways. Runway 14R-32L has a full-length parallel taxiway. Runway 14L-32R is 3,263 feet long by 75 feet wide, Runway 14R-32L is 3,266 feet long by 75 feet wide and Runway 6L-24R is 2,499 feet long by 75 feet wide. The turf runway (6R-24L) is 2,122 feet long by 150 feet wide, and is closed during the winter months. The airport has two non-precision instrument approaches. **Figure 3-3** shows the general airport layout and facilities. Three FBOs at the airport provide fueling, flight training, and other aircraft maintenance services. The airport had 238 based aircraft and 49,244 annual aircraft operations in 2008. An FAA-operated air traffic control tower is located at the airport, and operates each day in the winter from 7 a.m. to 9 p.m., and 7 a.m. to 10 p.m. in the summer. The change in operating hours coincides with daylight savings time.

3.1.4 Flying Cloud Airport (FCM)

Flying Cloud Airport (FCM) consists of approximately 854 acres, and includes two east-west runways and one north-south runway. All runways have full-length parallel taxiways. Runway 10R-28L is 3,909 feet long by 75 feet wide; Runway 10L-28R was extended to 3,900 feet in 2008 and is 75 feet wide; and Runway 18-36 is 2,691 feet long by 75 feet wide. The airport has a precision instrument approach to Runway 10R and non-precision instrument approaches to Runways 10R, 28L, 28R, and 36. It also has a published precision instrument approach procedure for helicopters. **Figure 3-4** shows the general airport layout and facilities. Six FBOs at the airport provide fueling, flight training, and other maintenance services for aircraft and helicopters. The airport had 413 based aircraft and 119,139 aircraft operations in 2008. An FAA-operated air traffic control tower is located at the airport, and operates each day in the winter from 7 a.m. to 9 p.m., and 7 a.m. to 10 p.m. in the summer. The change in operating hours coincides with daylight savings time.

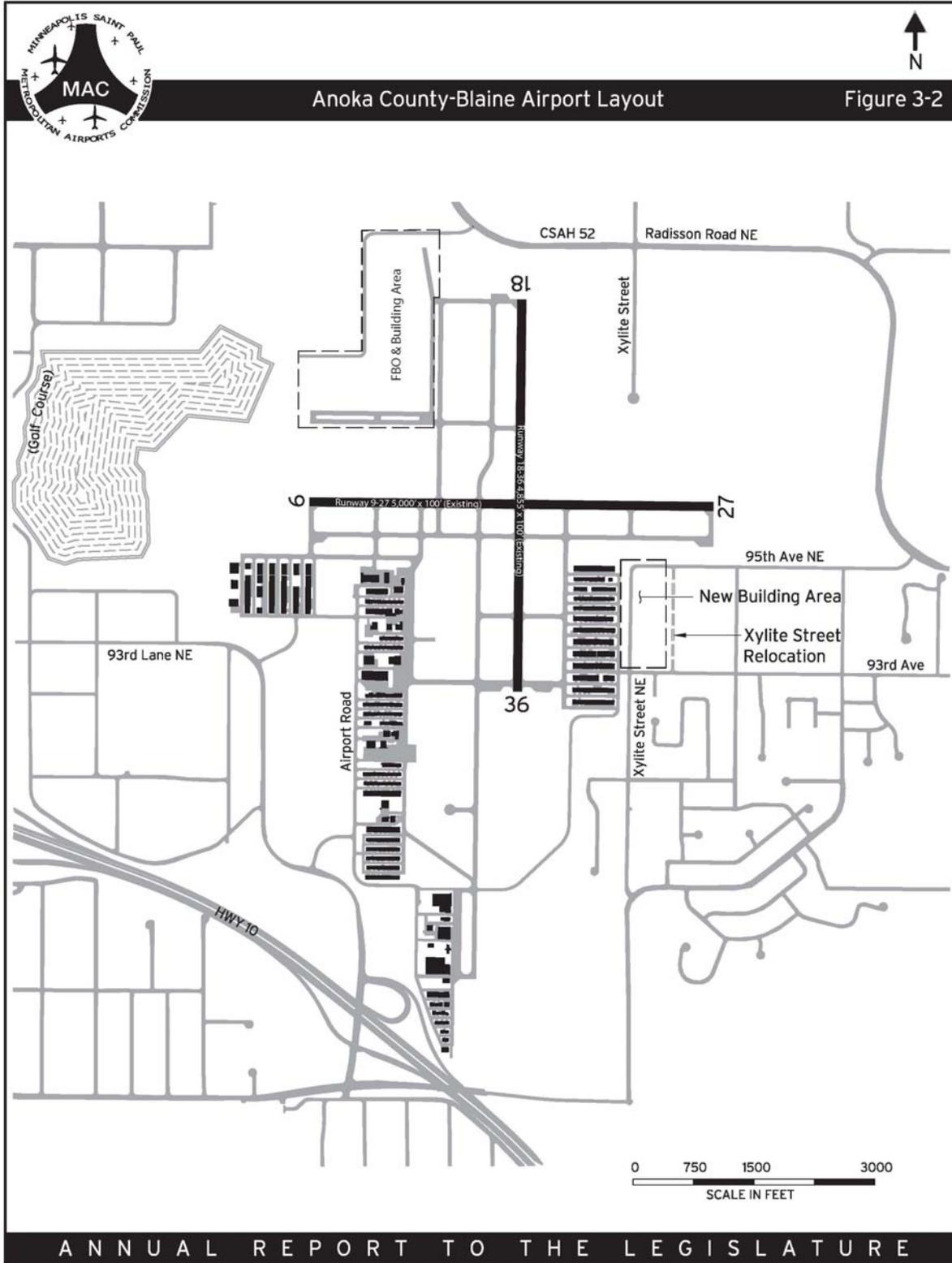
3.1.5 Lake Elmo Airport (21D)

Lake Elmo Airport (21D) consists of approximately 640 acres, and includes one northwest-southeast runway and one southwest-northeast runway. Both runways have



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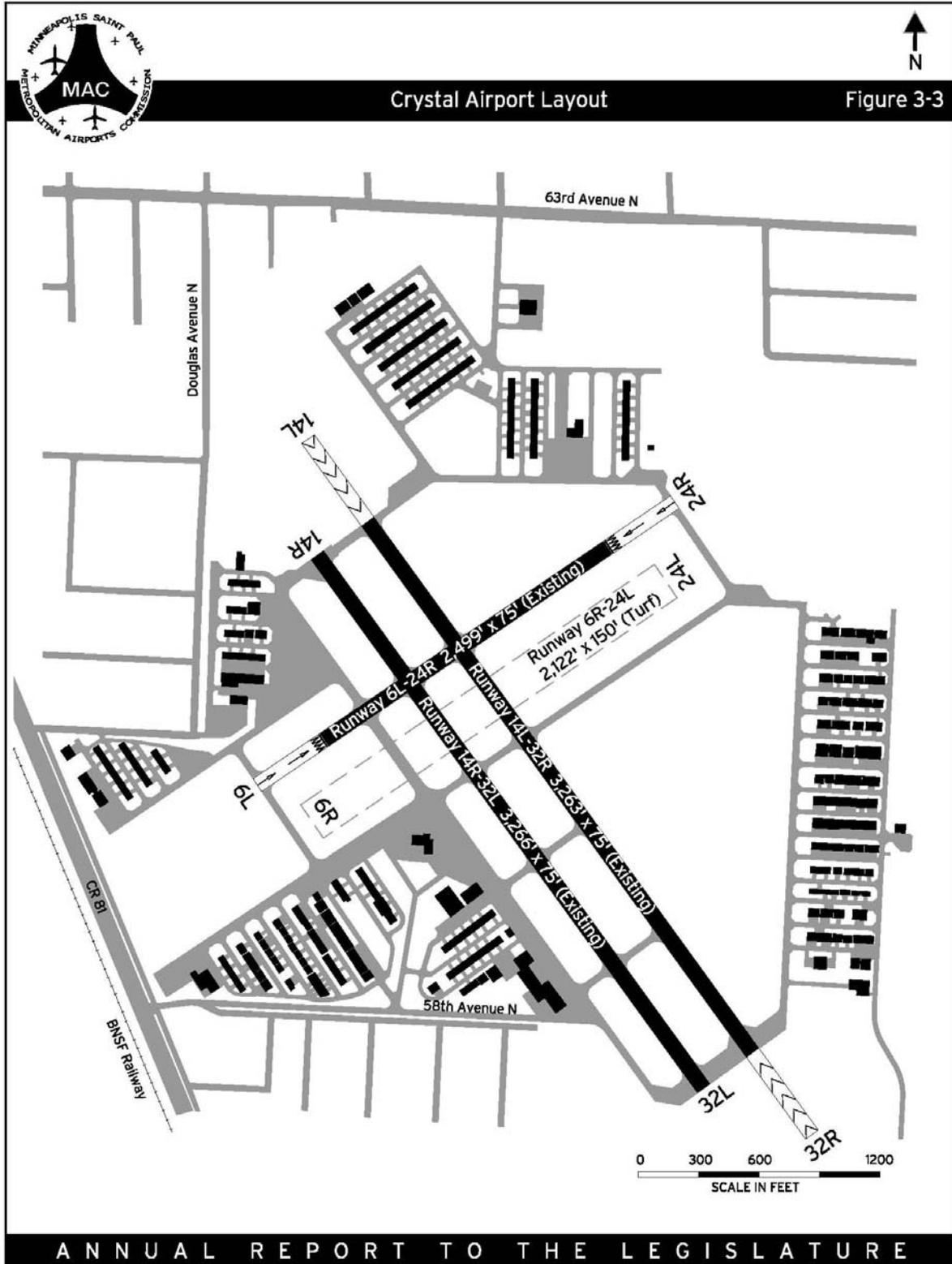
Figure 3-2: Anoka County-Blaine Airport (ANE) Layout





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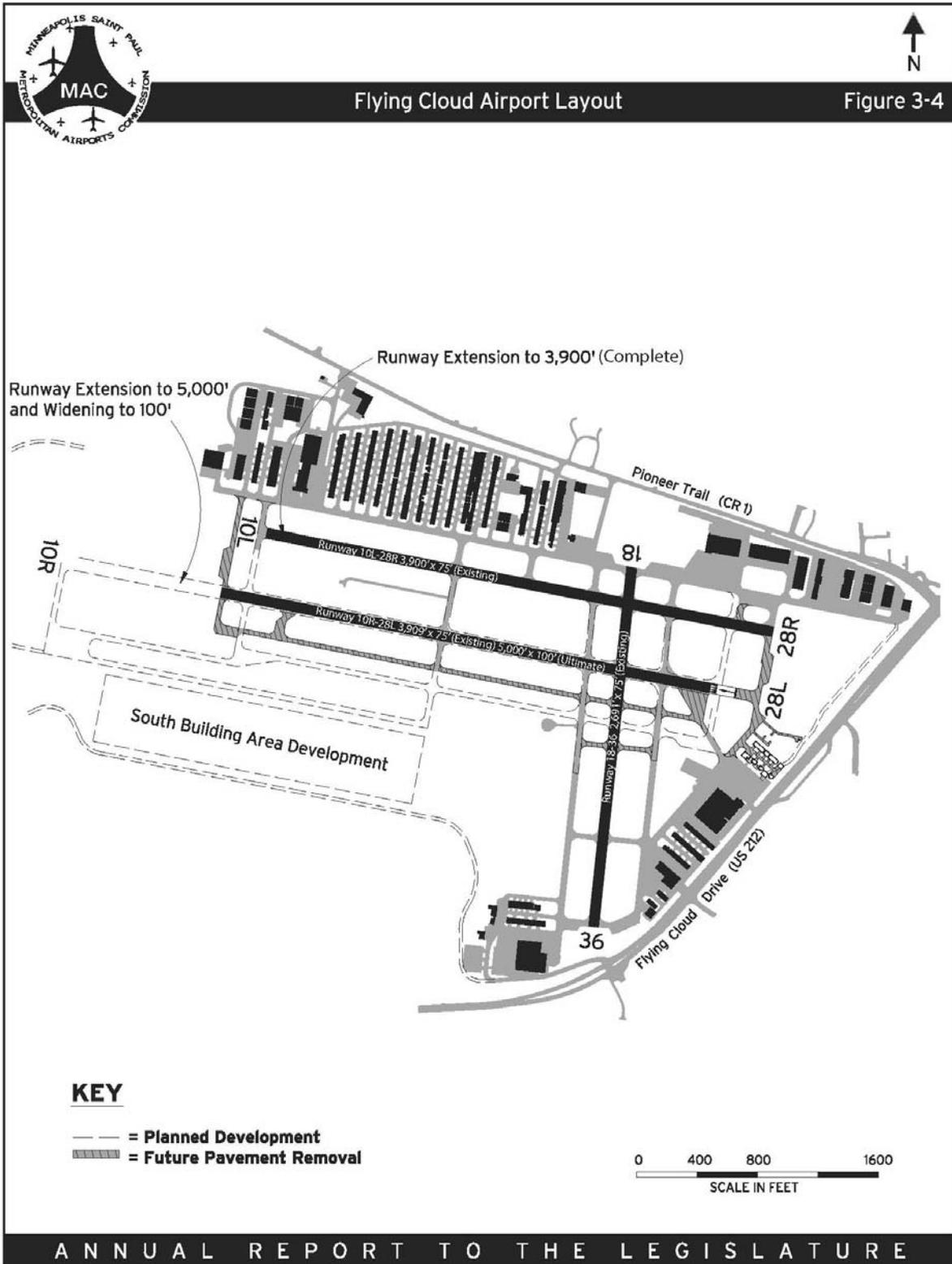
Figure 3-3: Crystal Airport (MIC) Layout





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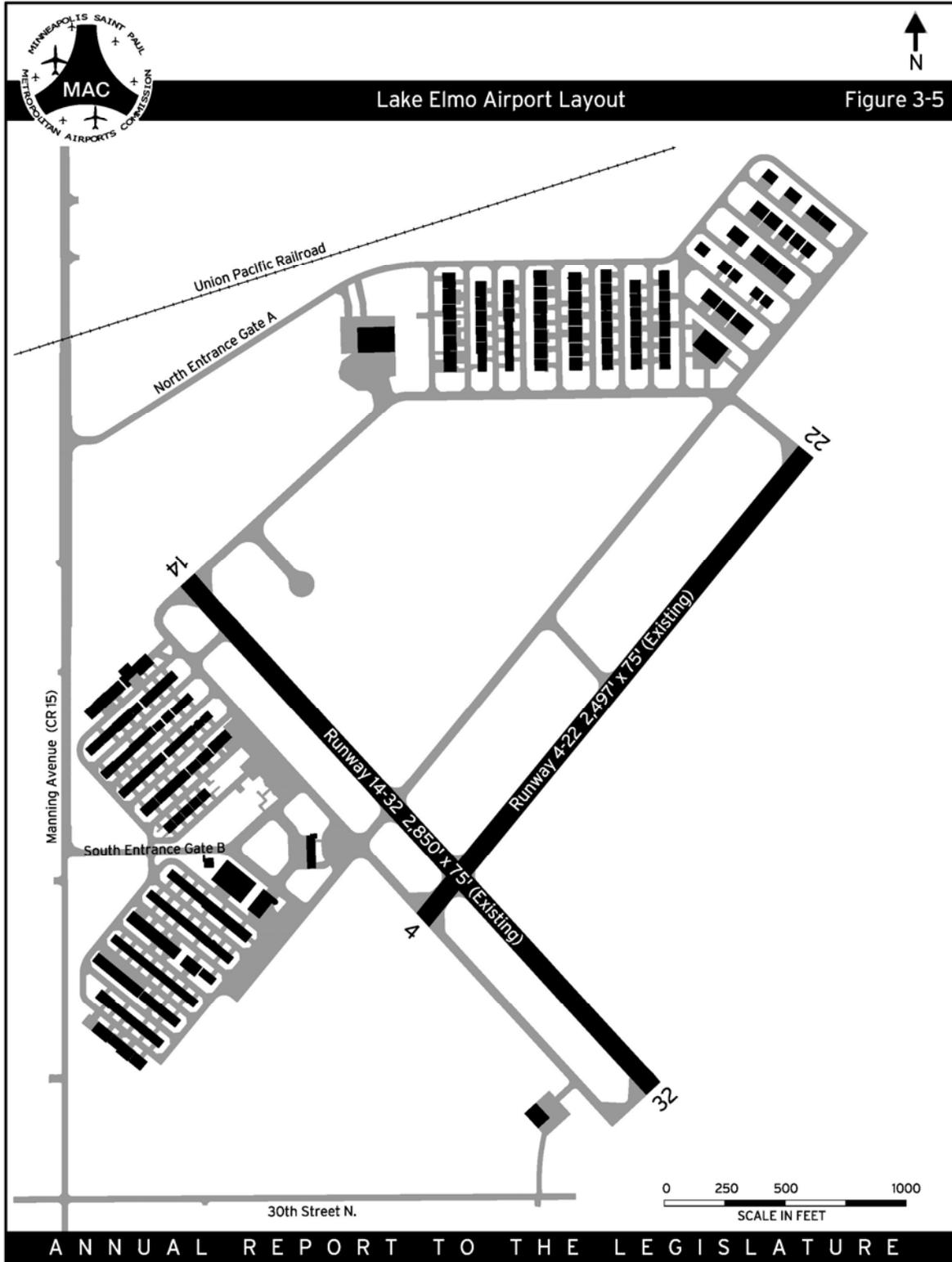
Figure 3-4: Flying Cloud Airport (FCM) Layout





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Figure 3-5: Lake Elmo Airport (21D) Layout



full-length parallel taxiways. Runway 14-32 is 2,850 feet long by 75 feet wide and Runway 4-22 is 2,497 feet long by 75 feet wide. The airport has two non-precision instrument approaches to the airport. **Figure 3-5** shows the general airport layout and facilities. One FBO at the airport provides fueling, flight training, and other aircraft maintenance services. The airport had 230 based aircraft and an estimated 37,612 aircraft operations in 2008. There is no air traffic control tower located at the airport. Aircraft operators utilize common traffic advisory procedures while flying to and from the airport.

3.1.6 St. Paul Downtown Airport (STP)

St. Paul Downtown Airport (STP) is also commonly referred to as Holman Field. The land area measures approximately 572 acres, and the airfield consists of two northwest-southeast runways and one east-west runway. Runway 14-32 has a full-length parallel taxiway. Both of the other runways have partial parallel taxiways. Runway 14-32 is 6,491 feet long by 150 feet wide; Runway 13-31 is 4,004 feet long by 150 feet wide; and Runway 9-27 is 3,642 feet long by 100 feet wide. The airport has precision instrument approaches to Runways 14 and 32, and non-precision instrument approaches to Runways 14, 31, and 32. It also has a published precision instrument approach procedure for helicopters. **Figure 3-6** shows the general airport layout and facilities. Two FBOs at the airport provide fueling, flight training, and other maintenance services for aircraft. The airport had 124 based aircraft and 109,512 aircraft operations in 2008. An FAA-operated air traffic control tower is located at the airport, and operates from 7 a.m. to 10 p.m. on weekends and 6 a.m. -10 p.m. on weekdays.

3.2 HISTORIC AND FORECAST ACTIVITY LEVELS

This section presents an overview of aircraft activity at the reliever airports.

Aircraft operators must choose an airport to base their aircraft. Airports in Minnesota are required to submit a report to the State that identifies the aircraft based at their facilities for 180 days or more. **Table 3.1** shows historical based aircraft counts for each of the reliever airports from 1980 through 2008. Total based aircraft grew slowly between 1984 and 1999, and peaked at 1,864 aircraft in 1999. Since that time, total based aircraft have declined to 1,602 in 2008. This is a 14 percent decrease when compared to 1999 totals. While the number of based aircraft has decreased at each of the six airports during the past nine years, the largest reductions occurred at FCM and MIC. The data in **Table 3.1** are the best available but should be viewed purely as estimates. Numbers that remained unchanged over periods of several years suggests that there were data limitations and that updated information was not available.

Historically, the total number of aircraft based at MAC reliever airports has accounted for less than 1 percent of U.S. active fleet. Since 1999, the share has been gradually declining. Total based aircraft at all six reliever airports combined is currently estimated at 0.7 percent of all registered aircraft.



Figure 3-6: St. Paul Downtown Airport (STP) Layout

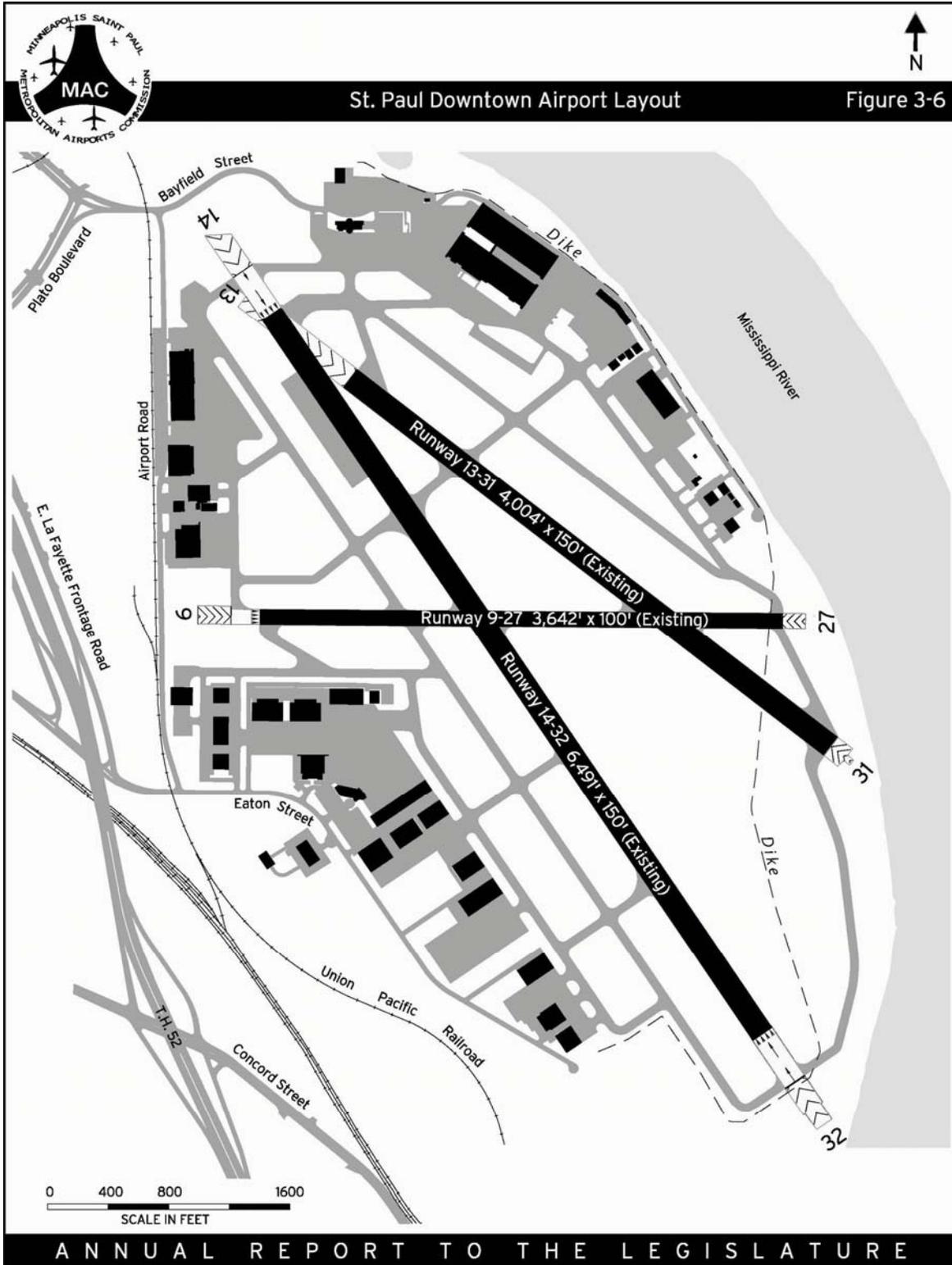


Table 3.1

HISTORICAL BASED AIRCRAFT AT MAC RELIEVER AIRPORTS

Year	Airlake (LVN)	Anoka County (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul (STP)	Total
1980	N/A	353	315	582	170	190	1,610
1981	N/A	360	297	580	220	205	1,662
1982	N/A	384	337	608	238	181	1,748
1983	N/A	362	327	615	236	164	1,704
1984	61	361	352	568	244	165	1,751
1985	63	390	338	568	145	147	1,651
1986	93	412	333	560	145	160	1,703
1987	153	408	345	565	150	168	1,789
1988	153	384	325	492	149	181	1,684
1989	140	405	320	485	171	188	1,709
1990	140	411	324	485	177	191	1,728
1991	140	414	327	487	179	193	1,740
1992	165	408	327	482	189	198	1,769
1993	179	408	327	482	189	198	1,783
1994	179	415	327	482	198	198	1,799
1995	179	415	327	482	198	198	1,799
1996	179	431	327	482	205	198	1,822
1997	179	441	327	482	210	203	1,842
1998	179	451	327	482	210	180	1,829
1999	178	472	309	509	250	146	1,864
2000	175	454	296	485	245	137	1,792
2001	170	447	280	461	235	131	1,724
2002	170	464	278	473	237	130	1,752
2003	190	490	288	463	237	124	1,792
2004	177	488	263	456	236	124	1,744
2005	163	482	265	451	239	124	1,724
2006	159	475	261	447	233	124	1,699
2007	175	459	251	450	227	124	1,686
2008	158	439	238	413	230	124	1,602

Source: Metropolitan Airports Commission Records.

Historical operations recorded at the reliever airports are presented in **Table 3.2**. An operation is either an arrival or a departure. Therefore, one arrival and one departure together equal two operations. Aircraft operations totals reported for each airport are generally obtained from the air traffic control towers located at each airport. Of the six reliever airports, ANE, FCM, MIC, and STP have control towers. However, aircraft operations are only counted while the towers at those airports are operational. It should be noted that these respective airports are open 24-hours per day while the control towers are closed during late night and early morning hours. The aircraft operations totals in **Table 3.2** do not include operations that occurred while the towers were closed.

At airports where there is no air traffic control tower, such as LVN and 21D, the operations totals are estimated through various methods and available data. The operations totals presented for LVN and 21D are estimations by airport staff that were calculated from airport inspection data and comparative analyses with airports that have similar conditions.

The total aircraft operations at the reliever airports for 2008 numbered 423,931, which represents a decrease of approximately 5.5 percent from the previous year. Individually, each of the reliever airports showed a decrease in operations with one exception. Aircraft operations at FCM rose from 117,492 in 2007 to 119,139 according to FAA data.

Table 3.3 and **Table 3.4** show forecasts for based aircraft and operations at the six MAC reliever airports through 2025. More detailed analyses of forecasted based aircraft and forecasted operations were done as part of the Long-Term Comprehensive Plan (LTCP) efforts for LVN, MIC, and 21D in 2008. LTCPs are being conducted in 2009 for STP, ANE and FCM; therefore, forecast information was carried over for those airports from the FAA's Terminal Area Forecast (TAF) 2007.

Table 3.2

HISTORICAL OPERATIONS AT MAC RELIEVER AIRPORTS

Year	Airlake (LVN)	Anoka County (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul (STP)	Total
1980	N/A	190,000	183,840	218,975	100,000	134,286	827,101
1981	N/A	150,000	154,436	194,229	90,000	107,305	695,970
1982	N/A	150,000	123,577	145,718	90,000	77,509	586,804
1983	20,000	140,000	136,314	166,266	90,000	97,118	649,698
1984	23,000	145,000	140,704	165,542	92,000	103,118	669,364
1985	35,000	160,000	143,665	176,246	82,000	112,019	708,930
1986	40,000	165,000	152,773	191,350	70,000	124,786	743,909
1987	52,000	180,000	165,367	209,423	63,000	135,397	805,187
1988	64,000	200,000	172,074	186,699	65,000	151,869	839,642
1989	66,000	212,000	177,679	207,661	65,000	166,436	894,776
1990	67,980	215,000	189,910	227,408	66,950	190,333	957,581
1991	74,745	195,650	173,150	186,496	69,650	168,450	868,141
1992	81,087	195,650	179,546	198,306	69,650	152,378	876,617
1993	81,087	195,650	183,554	218,745	69,950	132,531	881,517
1994	82,500	199,000	185,991	238,838	71,000	145,834	923,163
1995	75,397	181,866	171,478	216,313	64,887	133,686	843,627
1996	75,397	192,600	187,957	217,703	68,400	139,055	881,112
1997	72,382	143,083	175,728	198,199	65,664	136,968	792,024
1998	76,725	143,950	179,186	210,907	69,604	158,785	839,157
1999	76,725	150,014	178,342	192,737	70,996	158,835	827,649
2000	76,418	156,546	176,554	186,078	70,687	157,788	824,071
2001	70,229	136,892	156,801	185,593	64,962	142,794	757,271
2002	69,176	138,935	127,095	176,408	64,529	171,628	747,771
2003	58,108	132,144	98,612	155,837	54,205	131,794	630,700
2004	53,309	109,853	75,023	163,196	49,855	127,478	578,714
2005	51,678	101,267	72,205	157,710	48,329	129,814	561,003
2006	48,014	92,947	65,528	144,178	44,903	125,669	521,239
2007	41,292	80,508	53,038	117,492	38,617	117,535	448,482
2008	39,021	69,403	49,244	119,139	37,612	109,512	423,931

Source: Metropolitan Airports Commission Records.

Table 3.3

SUMMARY OF BASED AIRCRAFT FORECAST AT MAC RELIEVER AIRPORTS 2005-2025

Year	Airlake (LVN)	Anoka County (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul (STP)	Total
2005	158	466	260	453	236	95	1,668
2010	225	482	293	482	291	95	1,868
2015	234	495	323	501	300	95	1,948
2020	237	500	327	520	308	95	1,987
2025	239	505	330	539	312	95	2,020

Source: Metropolitan Airports Commission Long-Term Comprehensive Plan, Crystal Airport (MIC), June 2008

Table 3.4

SUMMARY OF FORECAST OPERATIONS AT MAC RELIVER AIRPORTS 2005-2025

Year	Airlake (LVN)	Anoka County (ANE)*	Crystal (MIC)	Flying Cloud (FCM)*	Lake Elmo (21D)	St. Paul (STP)*	Total
2010	58,590	92,438	74,719	129,158	60,197	133,308	548,410
2015	60,546	102,375	74,686	139,042	61,321	147,534	585,504
2020	61,519	109,841	76,850	145,793	61,764	158,420	614,187
2025	61,325	117,916	77,266	153,114	63,700	170,244	643,565

Source: Metropolitan Airports Commission Long-Term Comprehensive Plan, Crystal Airport (MIC), June 2008 (Low Forecast), and *FAA TAF, December 2007

3.3 DEVELOPMENT PROGRAMS

This section outlines the status of major development programs at each of the reliever airports. It is important to note that the MAC is investigating opportunities for non-aeronautical development at the reliever airports as a way to enhance revenue and help make the reliever airport system as financially self-sustaining as possible.

3.3.1 Airlake Airport (LVN)

The MAC completed the LTCP update for LVN in 2008. The plan recommends that the south hangar area be completed so hangar construction can begin. There continues to be a waiting list for new hangar space at the airport. The MAC is reviewing alternatives for getting proposals from developers to complete the site preparation and construct new hangars.

The LTCP also recommends that the airfield's only runway (Runway 12-30) be extended to 5,000 feet at some point in the future to coincide with industrial/commercial development in Lakeville and potentially in the Eureka Township. The runway extension shown in the plan requires relocation of a portion of Cedar Avenue. MAC staff is working with Dakota County on the proposed realignment of this road. An Environmental Impact Statement (EIS) is required before the project can be completed.

In addition to the LTCP recommendations, the MAC will continue its ongoing pavement maintenance and rehabilitation program for LVN.

3.3.2 Anoka County – Blaine Airport (ANE)

A major airport expansion program for ANE commenced in 2005 that included an extension to Runway 9-27 and the installation of an Instrument Landing System (ILS). The runway was extended from 4,000 feet to 5,000 feet, and widened from 75 feet to 100 feet. As a result, the entire runway pavement was reconstructed. The parallel taxiway was also extended and fully reconstructed. An approach lighting system (MALSR) was also added for Runway 27.

A new hangar area was also included in the development. The project involved the construction of taxiways and connectors, a new FBO apron, site preparation for a new building area, security fencing, basins for storm water, and a water main loop from the new building area to the Air Traffic Control Tower. An access road was constructed from Radisson Road to the new building area. This area now houses a new FBO and aircraft storage hangar. The expansion program was funded through a public-private agreement between the MAC, Anoka County and a developer contracted by the County. The FBO will build new hangars for aircraft maintenance, storage, and lease.

All of the expansion projects have impacted wetland areas on the airport. A substantial wetland mitigation project has been completed on MAC-owned property in the City of

Ham Lake, which included the creation and restoration of 120 acres of varying wetland types.

Recent construction projects include the ongoing pavement rehabilitation projects for the taxiways and the installation of sanitary sewer and water facilities in 1999 and 2000. In addition, approximately 370 acres of land was leased to the Minnesota Amateur Sports Commission for the construction and operation of an 18-hole youth golf course.

Preparation of the LTCP is beginning for ANE and should be completed by the end of 2009. This plan will analyze existing facilities, forecast future activity, and outline development needed to meet the projected demand.

The MAC will begin working with local communities to enact airport safety zoning once the LTCP process is complete. This process is expected to take approximately eight months to complete.

In addition to the LTCP recommendations, the MAC will continue its ongoing pavement maintenance and rehabilitation program for ANE.

3.3.3 Crystal Airport (MIC)

The MAC completed the LTCP update for MIC in 2008. The plan studied many alternatives for the airport, and included an analysis of impacts if MIC was closed. The LTCP recommends the airfield remain open, but recognizes the airfield capacity could be reduced by closing two runways without impacting the capacity of the reliever airport system. The LTCP for MIC suggests keeping the original paved runway and one paved crosswind runway intact. The MAC is evaluating the process for moving forward with plan recommendations.

In addition to preparing the LTCP, the MAC will continue its ongoing pavement maintenance and rehabilitation program for MIC.

3.3.4 Flying Cloud Airport (FCM)

Pavement rehabilitation projects have been ongoing at FCM over the past few years. Runway 10R-28L was reconstructed in 2005. Security gate improvements were completed in 2004. A sanitary sewer and water installation project was undertaken in 2002 to serve the east and south hangar areas. An extension to the sanitary sewer and water system in the north hangar area was completed in 2008.

In 2006, an EIS was completed for two runway extensions and a new building area development. The first phase of construction, which included the extension of Runway 10L-28R to 3,900 feet, was completed in 2008. Phase 2, in which Runway 10R-28L will be extended to 5,000 feet, will start in 2009. The expansion program also includes new hangar area development on the south side of the parallel runways.

The LTCP for FCM has begun and should be completed by the end of 2009. This plan will analyze existing facilities, forecast future activity, and outline development needed to meet any projected demands.

3.3.5 Lake Elmo Airport (21D)

The MAC completed the LTCP update for 21D in 2008. The plan recommends a new hangar area be constructed in the short-term future. The MAC is analyzing alternatives for soliciting proposals from developers to complete the site preparations and hangar construction.

The LTCP also recommends that the crosswind runway be extended from 2,499 feet to 3,200 feet to better accommodate the existing aircraft at the airport. The plan acknowledges the very long-term future proposal to relocate and extend the primary runway, but this was not justified to occur within the 20-year planning period.

An automated weather observation system was also recommended for installation at 21D. The Minnesota Department of Transportation Office of Aeronautics has already completed the installation, and the system is operational. It is owned and maintained by MnDOT.

3.3.6 St. Paul Downtown Airport (STP)

STP is currently undergoing numerous projects.

Construction of a perimeter floodwall was commenced in 2007, and many of the project components were completed in 2008. The completed components of this project include construction of the permanent floodwall sections and the foundation work for the temporary walls to be erected during flood conditions. The aesthetic improvements remain to be completed in spring 2009. With the floodwall now operational, the airfield will be able to operate to its full capability until flooding occurs. During a flood event, the temporary walls will be installed across runway safety areas along the river; this will effectively shorten the runways, but the airfield will remain open at a reduced capability. This capability will avoid the costly and disruptive dislocation of airport operators as well as extensive property damage. In order to proceed with the floodwall construction, the MAC completed a compensatory excavation project in 2006 that widened the Mississippi River channel so the new floodwall would not result in any upstream or downstream impacts.

A three-year runway safety area enhancement program, which began in 2006 to bring the safety areas for each runway into compliance with FAA regulations, was completed this year. This program included construction of an Engineered Materials Arresting System (EMAS) off each end of Runway 14-32. The installation of the actual EMAS blocks was performed by MAC personnel, saving the MAC over \$3 million.

In addition to the EMAS construction for Runway 14-32, reconstruction of portions of Taxiways D, N, and W was completed in 2008.

In 2008, the MAC began working with the local communities to enact airport safety zoning around STP. A Joint Airport Zoning Board (JAZB) was formed and its first meeting was held in May 2008. The goal of the JAZB is to develop a zoning ordinance for STP for review and approval by the Commissioner of Transportation, and for subsequent adoption by the JAZB and local municipalities. This process is expected to be completed in 2009.

Preparation of the LTCP is underway for STP, and should be completed by the end of 2009. This plan will analyze existing facilities, forecast future activity, and outline development needed to meet the projected demand.