JACOBS CONSULTANCY

In association with

Reynolds, Smith and Hills, Inc.
Crawford, Murphy & Tilly, Inc.

DuPage Airport Authority

FINAL REPORT

MASTER PLAN
DuPage Airport

Prepared for

DuPage Airport Authority
West Chicago, Illinois

September 2009

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Chapter 1

INTRODUCTION

This report presents the Master Plan for DuPage Airport (the Airport). The Master Plan was prepared for the DuPage Airport Authority (the Authority), which owns and operates the Airport, between 2008 and 2009 by a Consultant Team led by Jacobs Consultancy in association with Reynolds, Smith and Hills, Inc. and Crawford, Murphy, and Tilly, Inc. This Master Plan provides guidance for the continued improvement of the Airport through a 20-year planning period and beyond and was prepared in accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070 6B, *Airport Master Plans* and other FAA design standards and planning criteria.

AIRPORT SETTING

The Airport is owned and operated by the DuPage Airport Authority (the Authority). As depicted on Figure 1-1, the Airport is located in West Chicago, Illinois, approximately 35 miles west of downtown Chicago and 18 miles from the Chicago – O'Hare International Airport. The Airport is situated in one of the Chicago regions most rapidly developing suburban areas and is approximately seven miles north of Illinois East-West Tollway (I-88), 11 miles south of the Northwest Tollway (I-90), and 11 miles west of the North-South Tollway (I-355). The Geneva and West Chicago stations of the Metra Rail system, which provides commuter rail access to downtown Chicago, are located within a few miles of the Airport.

The Airport primarily accommodates general aviation traffic, with a focus on the business and corporate aviation markets. DuPage is one of Illinois' busiest airports and has nearly 365 based aircraft, more than any other reliever airport in Illinois. The Airport is classified in the National Plan of Integrated Airport System (NPIAS) as a primary designated reliever airport to O'Hare and Midway.

AIRPORT VISION

The Authority's vision for the Airport is to provide premier facilities for high-end business, corporate, and general aviation users in West Chicago and DuPage County and be among the best general aviation airports in the country. The Authority strives to implement aviation facilities that enable the Airport to best serve its core tenants and users. The Authority aggressively pursues opportunities for revenue enhancement from both aviation and non-aviation sources to ensure the Airport remains fiscally sound. Lastly, the Authority endeavors to provide a positive economic impact to DuPage County and the surrounding community. The Authority's mission statement is as follows:

> *To provide general aviation facilities and services to the suburban Chicago area, including corporate aviation service, recreational aviation, charter service, local commuter service and air cargo while fostering aviation related business on the field; and to develop and lease or sell surplus vacant land in a manner compatible with airport uses in order to generate significant long-term income which, along with increased aviation revenues, will stimulate the local economy; provide for*

the creation of jobs; bring outside revenues to local businesses; increase tax revenues for local communities; and reduce the airport's reliance upon property tax levies until the airport operates profitably using revenue from taxpayers.

LEGEND

- DuPage airport
- Commerical airport
- General aviation airport
- Urban areas
- State boundary
- County boundary

N

9 0 9 18

Graphic Scale in Miles

Figure 1-1
VICINITY MAP
DuPage Airport Master Plan
September 2009

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PROJECT BACKGROUND

In the early 1980's, the Authority, FAA, and Illinois Department of Transportation Division of Aeronautics initiated an extensive development plan to position DuPage Airport to better serve the emerging demand for business aviation in the Chicago region and provide additional capacity relief to Chicago – O'Hare International Airport. These efforts resulted in an Airport development program that included extensive land acquisition and the construction of two new runways, a new general aviation terminal complex, and additional infrastructure to accommodate general aviation demand.

The Authority completed a strategic land development plan for the Airport in June 1988 that included an illustrative site plan for the long-term development of Airport property through the year 2000. Overall development since 1988 has followed the recommendations of the land development plan, including the preservation of aviation, commercial, and reserve land uses.

Since the completion of the 1988 plan, the Authority has sponsored several additional studies to improve the Airport's facilities and financial position, including the following:

- FAA Finding of No Significant Impact (FONSI)/Record of Decision, *Runway 2L-20R and 2R-20L Extensions* (February 1996) – Environmental approval for the extensions of Runway 2L-20R by 2,420 feet and Runway 2R-20L by 1,800 feet and adjacent facility relocations and upgrades.
- Airport Layout Plan Update (2002) – Included up-to-date facilities and engineering data compiled by the Authority's on-call engineering consultant Crawford, Murphy & Tilley, Inc.
- Categorical Exclusion, *Widening and Strengthening Runway 2L-20R and Associated Improvements* (May 2005) – A follow-on to the 1996 FONSI, this FAA environmental determination provided approval for the upgrade to Runway 2L-20R, although the project had not been implemented as of June 2009.
- White Paper, *Potential Extension of Runway 10-28* (January 2006) – Assessed the alternatives, costs, benefits, and potential impacts to crosswind Runway 10-28.
- White Paper, *Activity Forecasts and Market Assessment* (August 2006) – Assessed potential benefits and implementation factors associated with other potential aviation markets, such as scheduled passenger, maintenance, and/or air cargo service.
- White Paper, *Justification for Widening and Strengthening of Runway 2L-20R* (April 2007) – A follow-on to the 2005 Categorical Exclusion, this study provided additional detail on the runway's estimated remaining pavement lifecycle and provided further qualification of the project benefits.
- Miscellaneous Financial Planning Studies (2005 through 2008) – Developed financial models to assess the impacts of a property tax levy, revised financial forecasts to reflect actual operating results, and renewed capital needs and funding sources.

While the above projects furthered the development of Airport infrastructure and ensured the financial health of the Authority, more than twenty years have passed since the last comprehensive development plan was prepared. Because of the ample lands owned by the Authority—many of which have yet to be developed—there was a need to prepare an updated land development plan that could provide the framework for the next twenty years of Airport development. As a result, the Authority initiated this Master Plan to reinvestigate the long-term role and disposition of the Airport.

MASTER PLAN OBJECTIVES

The primary purpose of this Master Plan is to establish a long-range plan that maximizes the potential of DuPage Airport in the context of the Chicago region's aviation needs that also serves as a general guide to the logical development of Airport facilities. Additional objectives include the following:

1. **Market Assessments.** Define, confirm, and reach consensus among stakeholders on the Airport's future role (in addition to its existing role serving general aviation activity) given the regional setting and potential demand that could be accommodated. Specifically, document the feasibility, potential benefits, and implementation factors associated with other potential aviation uses, such as passenger, maintenance, and/or air cargo service.
2. **Airfield Requirements.** Investigate the need, benefits, and costs associated with providing additional airfield capacity and/or enhanced accessibility. Depending on the recommendations, identify a strategy (layout, timing, relocation plan, funding, etc.) for developing/redeveloping airfield improvements.
3. **Non-aviation Development.** Determine the land that should be preserved for future aviation development and recommend the highest and best uses for land identified as available for non-aviation development.
4. **Financial Plan.** Prioritize investment decisions recognizing competing needs for Federal and State funds and prepare a comprehensive financial plan that combines a functional Capital Improvement Program (CIP) with a realistic financial plan, placing emphasis on the near-term (five-year) planning horizon and reflecting the Authority's business objectives.
5. **Environmental Approvals.** Develop strategies to smoothly implement recommended Airport improvements and establish the groundwork for any required National Environmental Policy Act (NEPA) documents.

Specific planning objectives and guidelines used to develop a recommended development plan for future airport facilities are presented in Chapter 6.

PROJECT COORDINATION

A Technical Working Group comprised of Authority staff, key stakeholders from Federal and State agencies, and the consultant team assisted with the technical development of the Master

Plan. The Working Group met numerous times over the course of the project to confirm assumptions, review findings, and establish strategy. In addition, two presentations summarizing master planning assumptions and key findings were provided to the Authority Board in September 2008 and March 2009. A third presentation was provided at the completion of the Master Plan process.

DOCUMENT ORGANIZATION

The remainder of this Master Plan report is organized as follows:

Chapter 2: Existing Conditions
Chapter 3: Forecasts of Aviation Demand
Chapter 4: Facility Requirements
Chapter 5: Alternatives
Chapter 6: Recommended Development Plan
Chapter 7: Implementation Plan

The following appendices providing detailed technical data and/or additional information on key analyses are provided at the end of the report:

Appendix A: White Paper, Market Assessment for New Aviation Services
Appendix B: White Paper, Runway 28 Instrument Approach Procedure Assessment
Appendix C: White Paper, Runway 10-28 Increased Landing Distance Evaluation
Appendix D: Memorandum, Proposed Widening of Runway 2L-20R
Appendix E: Non-aviation Development
Appendix F: Airport Layout Plan

Chapter 2

EXISTING CONDITIONS

The following provides a description of existing conditions at DuPage Airport as of summer 2008 and includes other pertinent data essential to the Master Plan analysis.

AIRPORT SITE AND EXISTING LAND USES

Existing Airport land uses are graphically depicted on Figure 2-1. The use and total acreage for Authority controlled land by functional designation is presented in Table 2-1.

As illustrated, the Airport is bounded by North Avenue (Route 64) to the north; Powis and Kress Roads to the east; Roosevelt Road (Route 38) to the south; and Kautz Road to the west. Additional Authority-owned property is located south of the Airport site. This property shares the same eastern and western boundaries as the Airport, but is bounded by Roosevelt Road on the north and the Fermi National Accelerator Laboratory to the south. In total, the Authority owns approximately 2,800-acres of land.

In addition to overseeing the operation and development of the Airport, the Authority controls the following non-aviation commercial endeavors on adjacent properties.

- **Prairie Landing Golf Course.** The Prairie Landing Golf Course occupies approximately 350 acres and is located immediately south of the Airport. The facility features an 18-hole golf course, clubhouse, and restaurant.
- **DuPage National Technology Park.** The DuPage National Technology Park is a 547-acre, high-quality business park located south of the Airport. The facility is being marketed to attract corporate, technology, industrial, and retail developments. The Park was developed in the early 2000s in conjunction with CenterPoint Properties.

As presented on Figure 2-1, a spur of the Union Pacific Railroad traverses the western side of the Airport in a north-south orientation. In addition, a portion of the Illinois Prairie Path recreational trail cuts across the southern side of the bisecting the property between the airfield and Prairie Landing Golf Course.

Approximately 250 acres of Authority land are currently leased for local farming operations. The majority of these lands border Kautz and Kress Roads adjacent to the parallel runways, although a small farming site is present north of North Avenue. These lands are available for future development.

North Avenue (Route 64)
Powis Road
Kress Road
Runway 15-33
Runway 10-28
Runway 2R-20L
Runway 2L-20R
Driving Range
Flight Center Area
Pheasant Run Golf Course
Kautz Road
Union Pacific RR
Charlestowne Mall
Prairie Path
Prarie Landing Golf Course
Roosevelt Road (Route 38)
DuPage National Technology Park
Fabyan Parkway
Fermi National Accelerator Laboratory

LEGEND

- Airport property line
- Railroad

GENERALIZED LAND USES

- Airfield
- Aviation support facilities
- Corporate aviation
- General aviation
- Non-aviation
- Open / reserve
- Recreational
- Undevelopable

N

0' 800' 1,600' 3,200'

Figure 2-1
AIRPORT SITE AND EXISTING LAND USES
DuPage Airport Master Plan
September 2009

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Table 2-1
Existing Airport Land Use Areas
DuPage Airport Master Plan

Land use	Description	Acres	Percent of total
Airfield	Runways, taxiways, aprons, and other areas related to aircraft movement	750	27
Corporate aviation	Aircraft service and storage areas where aviation services are provided to corporate users	150	5
General aviation	Aircraft service and storage areas where aviation services are provided to GA users	125	4
Aviation support	Facilities associated with the operation and upkeep of the Airport, including maintenance, fuel storage, firefighting, etc.	25	1
Non-aviation	Properties leased to private entities for revenue-generating developments that are not directly related to Airport operations	625	22
Recreational	Land reserved for recreational and leisure facilities	400	14
Reserved	Areas owned and controlled by the Authority for future aviation- and/or non-aviation related development	525	20
Undevelopable	Land areas that cannot be developed due to environmental constraints	200	7
Total		**2,800**	**100**

Note: Acreages are rounded.

Source: Jacobs Consultancy, June 2009.

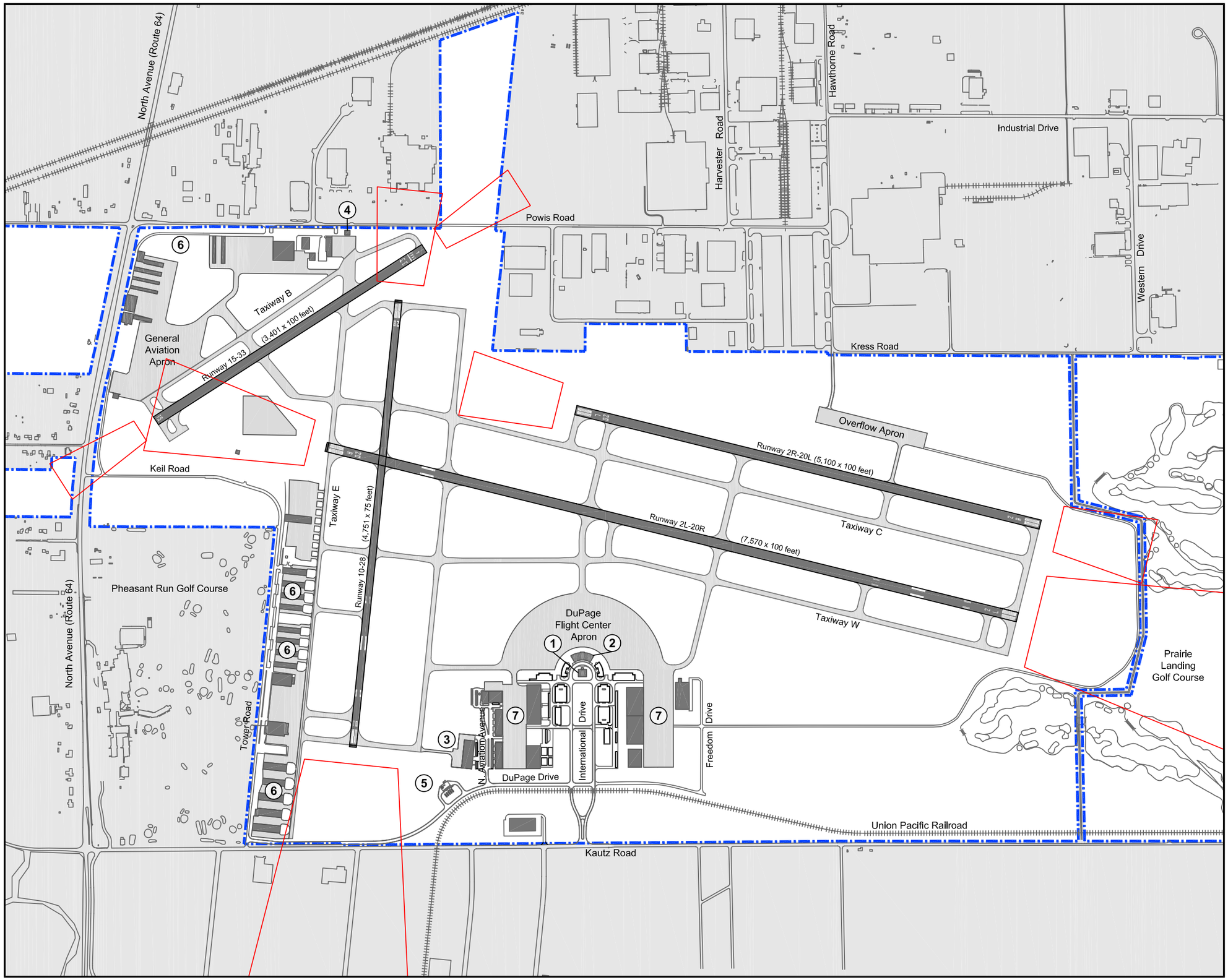
INVENTORY OF AIRPORT FACILITIES

The following sections provide an overview of existing airport facilities. A graphic depiction of existing airport facilities is provided on Figure 2-2.

Airfield Facilities

The majority of airfield facilities meet Airport Reference Code* (ARC) C-III criteria, which can accommodate aircraft with approach speeds between 121 and 141 knots, wingspans between 79 and 118 feet, and tail heights between 30 and 45 feet. The ARC C-III designation is sufficient for the overwhelming majority of aircraft currently and projected to operate from the Airport.

*The Airport Reference Code consists of an Aircraft Approach Category and an Airplane Design Group (e.g. C-III), as specified by FAA AC 150/5300-13, *Airport Design*.



LEGEND

- Airport property line
- Railroad
- Runway protection zone
- Runway pavement
- Taxiway and apron pavement

KEY FACILITIES

1. Airport Traffic Control Tower
2. DuPage Flight Center
3. Airport maintenance facility
4. Airport Rescue and Fire-Fighting facility
5. Fuel farm
6. Aircraft storage hangars
7. Corporate tenants/commercial hangars

N

0' 500' 1,000' 2,000'

Figure 2-2
AIRPORT LAYOUT AND FACILITIES
DuPage Airport Master Plan
September 2009

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Runways

As depicted on Figure 2-2, the Airport has four runways: 2L-20R, 2R-20L, 10-28, and 15-33. Parallel Runways 2L-20R and 2R-20L are situated in a north-south orientation in the southern half of the airfield. Runway 10-28 is perpendicular to and intersects the north end of Runway 2L-20R. Runway 15-33 is located at the northeast corner of the airfield and is primarily used by small general aviation aircraft based in nearby hangars and apron tie-downs.

Detailed characteristics regarding the Airport's runways, including dimensions, lighting, navigational aids, and pavement strengths are summarized in Table 2-2.

The Airport's preferential runway operating configuration during calm winds is arrivals and departures on Runway 2L in north flow, which occurs approximately 80% of the time. During the remaining 20% of the time, the Airport operates in a crosswind configuration where approximately 80% of turbojet operations occur on Runway 2L-20R and the remaining 20% of turbojet and virtually all light single engine aircraft operate on Runway 10-28. Runways 2R-20L and 15-33 are primarily used by lighter, single engine, piston-engine aircraft, with a high concentration of touch-and-go flight training activity.

Taxiways

Figure 2-2 depicts the location of the taxiways that connect the runway system to aircraft parking aprons. All taxiways are at least 50 feet wide, satisfying the dimensional requirement for accommodating Airplane Design Group* (ADG) III aircraft.

Airspace and Air Traffic Control

The Airport includes a 24-hour FAA-operated Airport Traffic Control Tower (ATCT). Airspace surrounding the Airport is designated Class D. Class D airspace extends from the surface to 2,500 feet above the airport elevation and exists only at airports that have an operational ATCT. At DuPage, the Class D airspace extends for a 5 mile radius around the Airport and from 758 feet above mean sea level (MSL) up to 3,300 feet MSL. Nearby Chicago – O'Hare Airport's Class B airspace lies directly over the Airport, beginning at 4,000 feet MSL and extending to 10,000 feet MSL.

Navigation Aids

Navigational aids assist pilots by providing horizontal and/or vertical guidance to an aircraft's instrumentation during landing and facilitate airport access during poor weather/visibility conditions. Current navigational aids are predominately ground-based, but are increasingly becoming satellite-based. Ground-based navigational aids include very-high frequency omni-directional ranges (VOR), non-directional beacons, and instrument landing systems. Satellite systems include global positioning systems (GPS), wide area augmentation systems (WAAS), and local area augmentation systems (LAAS). A summary of navigational aids equipped on each runway end is provided on Table 2-2.

*Airplane Design Group (ADG) is a categorization of aircraft according to their wingspans and tail heights and is expressed in roman numerals per FAA AC 150/5300-13, *Airport Design*.

Table 2-2
Runway Data
DuPage Airport Master Plan

	Runway							
	02L	20R	02R	20L	10	28	15	33
Runway length (feet)	7,571	7,571	5,101	5,101	4,750	4,750	3,339	3,339
Runway width (feet)	100	100	100	100	75	75	100	100
Runway end elevation (ft. above MSL)	751	756	750	754	753	756	757	758
Pavement type/friction	Concrete/grooved	Concrete/grooved	Concrete/grooved	Concrete/grooved	Asphalt/PFC	Asphalt/PFC	Asphalt/none	Asphalt/none
Pavement strength (pounds)								
Single gear	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Dual gear	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
Dual tandem gear	--	--	--	--	--	--	100,000	100,000
Runway markings	Precision	Non-precision	Non-precision	Non-precision	Precision	Non-precision	Visual	Visual
Runway lighting	HIRL	HIRL	MIRL	MIRL	HIRL	HIRL	MIRL	MIRL
Centerline lights	Yes	Yes	No	No	No	No	No	No
Approach lighting	MALSR	--	--	--	LDIN	--	--	--
Approach aids	LOC	PAPI	--	--	REIL	REIL	REIL	REIL
	GS	--	--	--	LOC	VASI	PAPI	--
	--	--	--	--	GS	--	--	--
	--	--	--	--	VASI	--	--	--
Instrument approach procedures	ILS (CAT I)	RNAV (GPS)	--	--	ILS (CAT I)	--	--	--
	VOR/GPS	--	--	--	VOR/GPS	--	--	--
Minimum approach decision height (feet above MSL)	954	1,180	NA	NA	1,006	NA	NA	NA
Minimum approach visibility	2,400 RVR	5,000 RVR	NA	NA	4,000 RVR	NA	NA	NA

GPS = Global positioning system
GS = Glide slope
HIRL = High-intensity runway lights
ILS = Instrument landing system
LDIN = Lead-in light system
LOC = Localizer
MALSR = Medium-intensity approach light system with runway alignment indicator lights
MIRL = Medium-intensity runway lights
NA = Not applicable
PAPI = Precision approach path indicator
PFC = Porous friction course
REIL = Runway end indicator lights
RNAV = Area navigation
RVR = Runway visual range
VASI = Visual approach slope indicator

Sources: Airport Master Record, May 2008.
Federal Aviation Administration, *Digital Terminal Procedures Publication* (Version 0805), May 2008.

General Aviation Facilities

General aviation facilities consist of aircraft parking aprons, indoor aircraft storage, the DuPage Flight Center, and vehicular parking facilities, as discussed below.

Aircraft Parking Aprons

As illustrated on Figure 2-2, the 730,000 square-foot General Aviation Apron is located in the northeast quadrant of the Airport to the northeast of Runway 15-33 and is primarily used to accommodate based aircraft parking. The one million square-foot semi-circular apron adjacent to the DuPage Flight Center is located on the west side of the Airport. This apron primary accommodates itinerant aircraft parking and operating area for based tenants (passenger loading, fueling, etc.). Additional tie-down spaces are located on the north side of the Airport among the hangars located along Tower Road. Lastly, a small apron, located on the east side of the Airport and now in poor condition, was constructed for overflow aircraft parking several years ago but has yet to ever be used.

Indoor Aircraft Storage

As depicted on Figure 2-2, most indoor aircraft parking and storage facilities are located in three areas: (1) the Flight Center on the Airport's west side; (2) to the north of Runway 10-28 along Tower Road; and (3) to the northeast of Runway 15-33 bordering North Avenue and Powis Road.

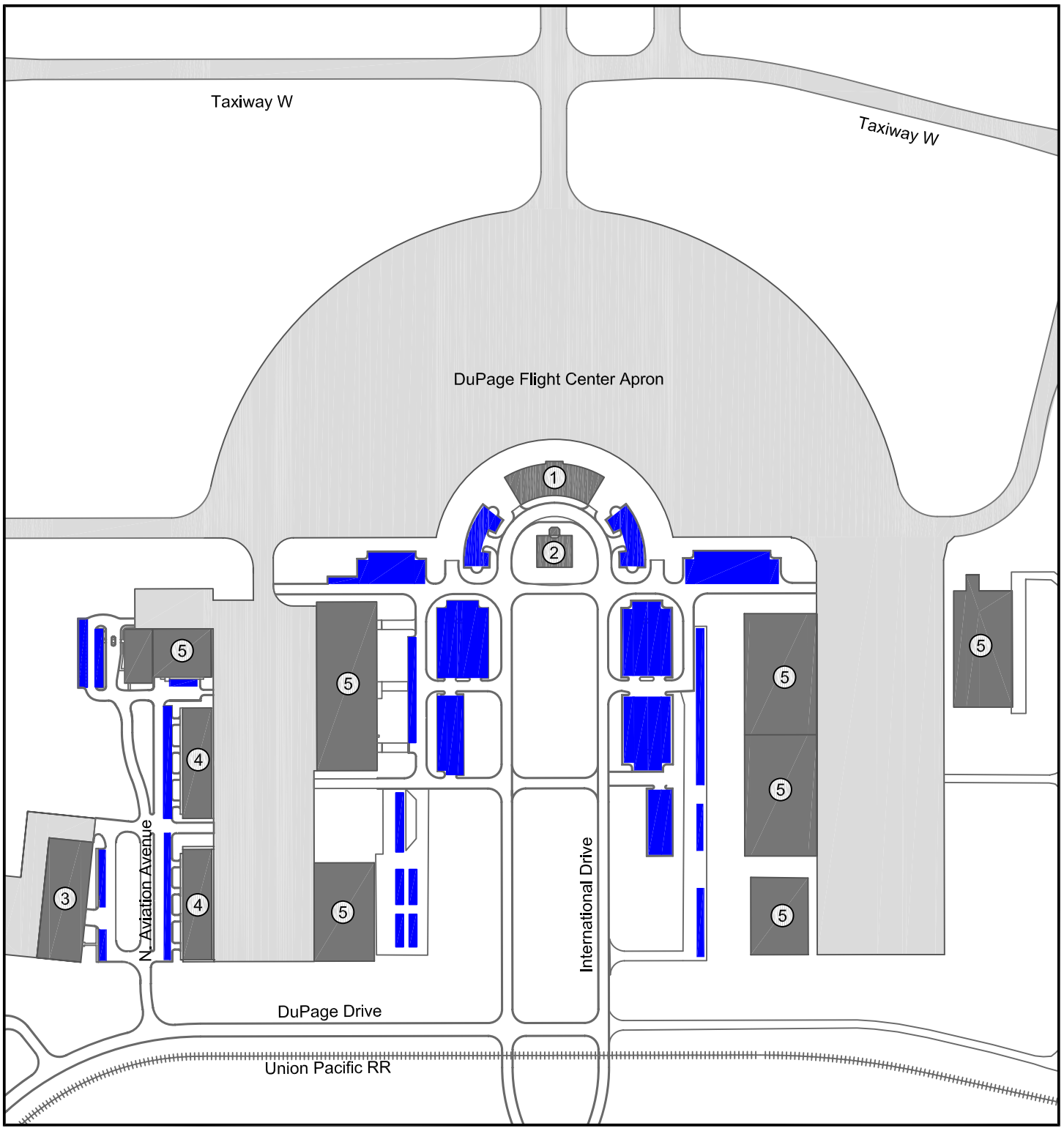
The Airport includes a total of approximately 560,000 square feet of indoor aircraft storage space, including T-hangars and conventional hangars (e.g., four-bay and high-tail hangars). There is approximately 200,000 square feet of T-hangar space allocated among 116 individual units primarily used for small aircraft storage. There are 17 conventional and general use hangars used for larger general aviation jet aircraft servicing and storage. The Authority owns 32 aircraft storage facilities. Remaining hangar buildings are occupied by airport tenants, including the corporate flight departments for several large corporations.

Flight Center Area and Administration Building

A detailed layout of the Flight Center Area is provided on Figure 2-3. The Flight Center Area includes the Administration Building / DuPage Flight Center, vehicular and aircraft parking facilities, numerous large hangars and support facilities, and the ATCT.

The 52,000 square-foot Administration Building / DuPage Flight Center was constructed in 1993 and is located on the east side of the Terminal Area adjacent to the DuPage Flight Center Apron. The facility serves as a headquarters for the DuPage Flight Center, the Authority-managed fixed base operator (FBO). The FBO provides a variety of professional amenities and services for itinerant and based aircraft, including aircraft servicing, U.S. Customs and Immigration processing, pilot lounges, on-site catering and restaurant, flight planning, VIP and conference facilities, courtesy cars, and car rental.

The Administration Building also provides additional office space for both aviation and non-aviation tenants includes including Authority offices.



LEGEND

- Vehicle parking
- (1) DuPage Flight Center
- (2) Airport Traffic Control Tower
- (3) Maintenance facility
- (4) Four-bay hangar
- (5) High-tail hangar

N

0' 175' 350' 700'

Figure 2-3
FLIGHT CENTER AREA
DuPage Airport Master Plan
September 2009

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Vehicular Parking

There are several designated vehicular parking areas throughout the Airport site that collectively provide parking for approximately 1,370 vehicles. Approximately 710 parking spaces are located in the Flight Center area, including the parking lots off of International Drive and North Aviation Avenue. There are approximately 365 spaces in the parking lots south of Tower Road and 295 spaces in the northeast quadrant.

Aviation Support Facilities

Aviation support facilities are depicted on Figure 2-2 and include aircraft rescue, airport maintenance, and aircraft fueling facilities.

Aircraft Rescue and Fire Fighting

The Airport includes a 4,900 square-foot, on-Airport aircraft rescue and fire fighting facility (ARFF) located between Runway 15-33 and Powis Road. The Authority owns and the West Chicago Fire Protection District operates two foam-capable fire trucks that are based at the station in addition to other rescue equipment to provide a high level of response for Airport users. The station is staffed by the West Chicago Fire Protection District, which provides emergency response to both the Airport and the City.

Maintenance Equipment Storage

Authority maintenance functions including airfield, building, and equipment maintenance are housed in a 50,000-square foot Airport Maintenance Facility located on the north side of the Flight Center. This building contains snow removal, landscaping, and mowing equipment as well as assorted vehicles and equipment. The airfield electrical vault, which includes an emergency generator, is also located within the maintenance building.

Fuel and Deicing Storage

As presented on Figure 2-2, the existing fuel storage facility is located off of DuPage Drive near the Airport maintenance facility. The fuel farm includes three 20,000 gallon Jet-A tanks (60,000 total gallons), two 20,000 gallon AvGas / 100LL tank, one 10,000 gallon automobile gasoline tank, as well as one 10,000 gallon automobile diesel tank, of which are located underground.

The DuPage Flight Center provides fueling services for the majority of on-Airport businesses and tenants. Fuel is transported from the fuel farm to the Flight Center via tanker trucks. A self-service AvGas-dispensing tank is located on the General Aviation Apron in the northeast quadrant, allowing aircraft owners and pilots to fuel their own aircraft. The self-service AvGas tank is operated by the Authority.

The Authority maintenance department oversees pavement de-icing operations in conjunction with snow removal efforts. Pavement de-icing equipment is stored at the Authority maintenance facility while potassium acetate, the de-icing chemical, is stored in an 8,000-gallon above-ground tank adjacent to the maintenance building.

Aircraft de-icing is conducted by employees of the DuPage Flight Center. Propylene glycol is stored in a 6,000-gallon tank above-ground tank adjacent to the maintenance facility.

Airport Access and Circulation

Primary access roadways and on-Airport roadways are described below.

Airport Access

Primary access to the Airport is provided via a network of non-limited access highways and arterial streets. North Avenue (Highway 64) and Roosevelt Road (Highway 38) are both four-lane roadway and major east-west corridors that border the Airport to the north and south, respectively. Access to the Flight Center is provided via International Drive, which intersects Kautz Road, a two-lane north-south arterial roadway on the Airport's western side.

Airport Circulation

On-Airport roadways provide Authority and tenant access to and between the general aviation areas on the Airport's western border and those in the northeast and northwest quadrants. DuPage Drive, Tower Road, and Keil Road connect the three areas while International Drive provides access to facilities in the Flight Center area. Portions of Tower and Keil Roads are used by non-Airport traffic seeking to avoid congestion on off-Airport roadways, namely North Avenue. This contributes to congestion at the end of Tower Road where it intersects with Kautz Road and DuPage Drive.

Building Infrastructure

An approximate assessment of the physical condition of Authority-owned buildings is presented in Table 2-3, based on data and analysis prepared for a 20-Year Facilities Assessment Master Plan (Wight Company Architects in 2001). Buildings are classified into the following categories:

- **Excellent** – No structural or exterior imperfections; low maintenance costs
- **Good** – No structural or exterior imperfections; minor maintenance costs
- **Fair** – Requires extensive exterior and/or interior enhancements to extend the useful life of the facilities; moderate maintenance costs
- **Poor** – Abandoned or obsolete

The majority of Authority-owned buildings are in good to excellent condition, particularly in the more recently-developed areas of the Airport along Kautz Road. A number of the hangars along Tower Road are in fair condition, while several hangars in the northeast quadrant of the Airport are in poor condition.

Table 2-3
Airport Building Inventory and Assessment
DuPage Airport Master Plan

Building number	Building description	Building use	Address	Lessor *(a)*	Total area (sq. ft) *(b)*	Year constructed *(c)*	Assessment of condition *(d)*
1	Hangar with office/storage	Hangar -- commercial activity	2727 Freedom Drive	Private *(e)*	30,000	2005	Excellent
2	Hangar with office/storage	Hangar -- commercial activity	2760 International Drive	IFR *(e)*	30,000	2005	Excellent
3	Hangar	Hangar -- aircraft storage	2722 International Drive	Private	72,000	2006	Excellent
4	Hangar with office/storage	Hangar -- commercial activity	2722 International Dr. Bay #1	Camden Aviation	30,240	2003	Excellent
5	Main terminal building	Office	2700 International Dr.	Private	52,000	1993	Excellent
6	Airport Traffic Control Tower	Support facility	2710 International Dr.	FAA	7,500	1993	Excellent
7	Hangar with office/storage	Hangar -- aircraft storage	2715 International Dr.	Private	21,000	1993	Good
7b	Hangar	Hangar -- aircraft storage	2725 International Dr.	Private	21,000	1993	Good
7c	Hangar	Hangar -- aircraft storage	2735 International Dr.	Private	21,000	1993	Good
8	Hangar with office/storage	Hangar -- commercial activity	2755 International Dr.	DuPage Aerospace *(e)*	30,000	2000	Excellent
9	Hangar with office/storage	Hangar -- aircraft storage	2750 N. Aviation Ave.	Private	19,600	1998	Excellent
10	Vehicle bay with office/storage	Support facility	2751 N. Aviation Ave.	Private	49,500	1993/2003	Excellent
11	Hangar with office/storage	Hangar -- aircraft storage	2350 N. Aviation Ave.	Private	19,600	1999	Excellent
12	Hangar with office/storage	Hangar -- aircraft storage	1955 N. Aviation Ave.	Private	25,800	2000	Excellent
13	Storage facility	Support facility	Salt Storage	Private	n/a	2003	Excellent
14	Hangar with office/storage	Hangar -- commercial activity	32W751 Tower Rd.	Illinois Aviation Academy	21,000	1985	Good
15	Hangar with office/storage	Hangar -- aircraft storage	32W731 Tower Rd.	Private	19,956	1985	Good
16	Hangar with office/storage	Hangar -- aircraft storage	32W711 Tower Rd.	Private	19,600	1993	Good
17	T -hangars	Hangar -- aircraft storage	32W671 Tower Rd.	Private	19,000	1993	Good
18	T -hangars	Hangar -- aircraft storage	32W651 Tower Rd.	Private	18,000	1981	Good
19	Hangar with office/storage	Hangar -- commercial activity	32W611 Tower Rd.	Planemasters	18,800	Early 1970's	Good
20	Hangar with office/storage	Hangar -- aircraft storage	32W581 Tower Rd.	CAP / ISP	13,522	1970's	Good
21	Hangar with office/storage	Hangar -- aircraft storage	32W521 Tower Rd.	Private	13,000	1998	Excellent
22	Hangar with office/storage	Hangar -- aircraft storage	32W515 Tower Rd.	Private	10,600	Mid 1970's	Excellent
23	T -hangars	Hangar -- aircraft storage	32W491 Tower Rd.	Private	12,600	1968	Fair
24	T -hangars	Hangar -- aircraft storage	32W475 Tower Rd.	Private	13,400	1968	Fair
25	T -hangars	Hangar -- aircraft storage	32W461 Tower Rd.	Private	13,000	1970	Fair
26	T -hangars	Hangar -- aircraft storage	32W449 Tower Rd.	Private	13,000	1970	Fair
27	T -hangars	Hangar -- aircraft storage	32W415 Tower Rd.	Private	12,800	Mid 1980's	Fair
28	T -hangars	Hangar -- aircraft storage	32W391 Tower Rd.	Private	12,800	1975	Fair
29	T -hangars	Hangar -- aircraft storage	32W365 Tower Rd.	Private	13,700	1975	Fair
30	T -hangars	Hangar -- aircraft storage	32W345 Tower Rd.	Private	15,900	1975	Fair
31	Hangar with office/storage	Hangar -- aircraft storage	2164 Tower Road	Private	19,600	2003	Excellent
32	Hangar	Hangar -- aircraft storage	32W061 North Ave.	Private	3,240	1950's	Poor
33	Office building	Office	31W775 North Ave.	Government Center	20,000	1969	Good

Table 2-3 *(continued)*
Airport Building Inventory and Assessment
DuPage Airport Master Plan

Building number	Building description	Building use	Address	Lessor *(a)*	Total area (sq. ft) *(b)*	Year constructed *(c)*	Assessment of condition *(d)*
34	Hangar with office/storage	Hangar -- commercial activity	31W717 North Ave.	Mukenschnabl	16,500	1979	Fair
35	Hangar	Hangar -- aircraft storage	31W701 North Ave.	Private	9,020	Late 50's/Early 60's	Poor
36	Hangar	Hangar -- aircraft storage	31W681 North Ave.	Private	9,312	Late 50's/Early 60's	Poor
37	T -hangars	Hangar -- aircraft storage	31W665 North Ave.	Private	12,180	1960's	Fair
38	Hangar with office/storage	Hangar -- commercial activity and aircraft storage	31W651 North Ave.	Cameron Aircraft Interiors	15,680	1950's	Fair
39	Hangar	Hangar -- aircraft storage	3N164 Powis Rd. N8	Private	8,280	1970's	Poor
40	Hangar	Hangar -- aircraft storage	3N164 Powis Rd. N9	Private	8,728	1970's	Poor
41	Hangar with office/storage	Hangar -- commercial activity	3N060 Powis Rd.	Travel Express Aviation	40,000	1970/1980	Fair
42	Hangar with office/storage	Hangar -- commercial activity	3N040 Powis Rd.	American Flyers	14,105	1987	Good
43	Office building	Commercial activity	3N028 Powis Rd.	The Pilot Shop	4,860	1970's	Fair
44	Hangar	Hangar -- aircraft storage	3N020 Powis Rd.	Private	12,000	1960's	Good
45	Vehicle bay with office/storage	Support facility	1700 Powis Rd.	Fire station	6,000	1979	Good

Notes:
(a) All buildings owned by DuPage Airport Authority except where noted otherwise.
(b) Does not include office or storage space in hangar facilities
(c) Some dates approximate.
(d) Assessment based on data and analysis from the *20 Year Facilities Assessment Master Plan.*
(e) Privately owned building

Sources: *20 Year Facilities Assessment Master Plan,* Wight Company Architects, September 2001.
DuPage Airport Authority records, June 2008.

ON-AIRPORT BUSINESSES

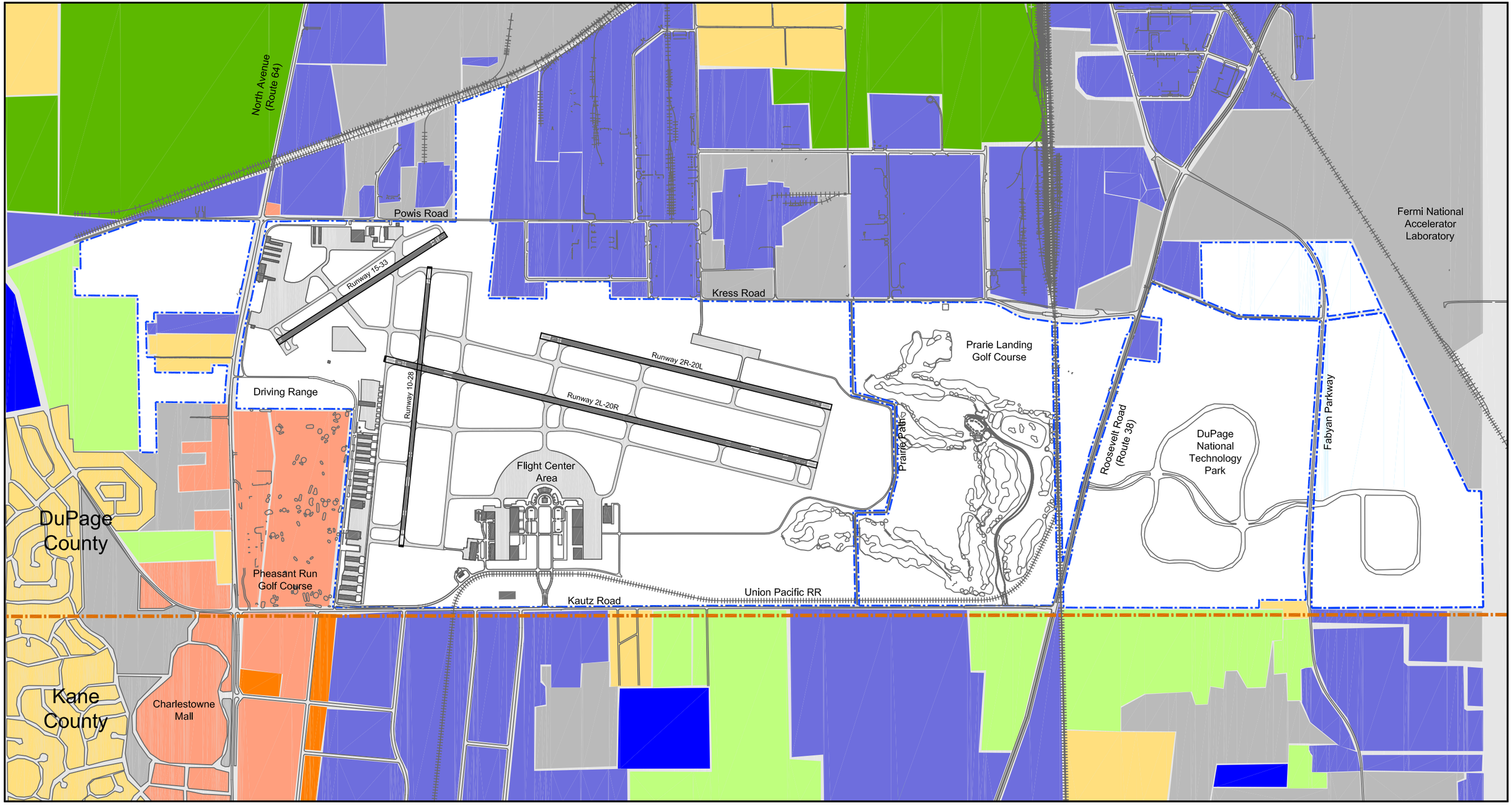
The Airport is home to a number of aviation and non-aviation businesses. On-Airport tenants include the following:

- **American Flyers –** flight training
- **Camden Aviation** – aircraft charters
- **Cameron Aircraft Interiors** – aircraft interior refurbishing
- **DuPage Aerospace** – aircraft maintenance
- **IFR Management** – aircraft charter and management
- **Illinois Aviation Academy** – flight training and rentals
- **Mukenschnabl Incorporated** – aircraft maintenance
- **Travel Express Aviation –** flight training, management, and aircraft rental
- **Travel Express Aviation Maintenance** – aircraft maintenance
- **Planemasters** – aircraft charters

Additionally, several aviation-related businesses that provide aircraft acquisition, sales, and fractional ownership services are located in the Flight Center building. Non-aviation businesses occupying space at the Airport have historically resided within the Flight Center building or the Government Center office building along North Avenue.

AIRPORT ENVIRONS

Land uses within the Airport environs, the area surrounding and most directly affected by the presence and operation of the Airport, are shown on Figure 2-4. Land areas surrounding the Airport were classified into broad categories of use based on the current City of West Chicago's zoning map and site observations. In general, land to the south of the Airport owned by the Authority reflects a mix of recreational, commercial, and undeveloped uses. Land uses to east are light industrial and warehouses, including parcels bordering the Airport property line. To the west, land bordering Kautz Road is a mix of light industrial and agricultural farmland. There are several land areas along North Avenue, in the vicinity of the intersection with Kautz Road, that are currently used for commercial and retail developments. There are few residential developments immediately bordering the Airport.



LEGEND

- Airport property line
- County line
- Railroad

GENERALIZED LAND USES

- Agricultural
- Commercial
- Forrest preserve
- Government/public
- Single-family residential
- Industrial
- Office
- Undeveloped land

N

0' 800' 1,600' 3,200'

Figure 2-4
AIRPORT ENVIRONS
DuPage Airport Master Plan
September 2009

JACOBS CONSULTANCY

Chapter 3

FORECASTS OF AVIATION DEMAND

Historical and forecast annual aircraft operations, peak hour operations, and based aircraft at DuPage Airport for the Master Plan 20-year planning horizon (2007-2027) were analyzed in order to prepare a logical and efficient development plan.

Master Plan forecasts were developed based on the most recent (December 2007) version of the FAA's Terminal Area Forecast (TAF). The FAA TAF projects annual aircraft operations by Federal Fiscal Year (FFY), which ends on September 30th. The December 2007 version of the FAA TAF is based on data collected for FFY 2007 and reported in the FAA's Air Traffic Activity Data System (ATADS). The FAA TAF expresses annual forecasts of aircraft operations in FFYs.

The FAA's TAF, used in previous forecast analyses provided to the Authority, is the preferred forecast for total annual aircraft operations by category (general aviation, air taxi, and military) throughout the planning period. The Authority does not track historical aviation activity or fleet mix data independently, necessitating the use of FAA aircraft operations data as presented in the FAA TAF. Furthermore, aviation activity projected in the TAF appears reasonable when compared to the FAA's Aerospace Forecast and other Jacobs Consultancy-developed projections of operations per based aircraft and trends in Airport activity.

The forecasts presented in this chapter were prepared in July 2008 and submitted to the FAA for approval. The forecasts were approved on October 22, 2008, by the FAA Chicago Airports District Office. At the time of submission, the forecasts reflected the most up to date data on industry trends and conditions. Because the forecasts are based on a trendline, it is possible that there will be peaks and valleys in activity and that observed results will vary year to year.

HISTORICAL AIRCRAFT OPERATIONS AND FLEET MIX

Base year 2007 aircraft operations and fleet mix operating at the Airport, summarized in Table 3-1, were developed using available historical data, interviews with tenants operating at the Airport, and FAA ATCT staff. Separate fleet mixes were developed for operations occurring under visual flight rules (VFR) and instrument flight rules (IFR), as described in the following sections.*

IFR Activity

The fleet mix for IFR activity is based on instrument operations data** for the period January – December 2007 that records IFR operations arriving or departing from the Airport. The data were used to estimate the percentage share of IFR operations by make and model of aircraft. Some operations are identified in the data as "blocked," whereby the aircraft type is not distinguishable. Because "blocked" aircraft are likely to be flown by corporate users, it was assumed that 90% of "blocked" operations were jet aircraft and 10% were multi-engine turboprop aircraft.

*VFR weather is defined as cloud ceilings at least 3,000 feet above ground level (AGL) *and* visibility at least one mile. IFR weather is defined as cloud ceilings below 3,000 feet *or* visibility less than one mile.
**Data from the FAA's Enhanced Traffic Management System provided by Flightaware.

Table 3-1
Historical Aircraft Operations and Fleet Mix
Federal Fiscal Year 2007
DuPage Airport Master Plan

	Total aircraft operations		
	IFR	VFR	Total
Business jet			
Heavy +	140	--	140
Heavy	2,359	737	3,096
Medium	6,986	737	7,723
Light	5,372	848	6,220
Helicopter	4	1,931	1,935
Multi-engine piston	2,165	5,764	7,929
Multi-engine turboprop	3,439	2,072	5,511
Single-engine piston	5,838	56,825	62,663
Single-engine turboprop	1,176	7,961	9,137
Total	27,480	76,874	104,354
	Percent of total operations		
Business jet			
Heavy +	0.1 %	0.0 %	0.1 %
Heavy	2.3	0.7	3.0
Medium	6.7	0.7	7.4
Light	5.1	0.8	6.0
Helicopter	0.0	1.9	1.9
Multi-engine piston	2.1	5.5	7.6
Multi-engine turboprop	3.3	2.0	5.3
Single-engine piston	1.1	7.6	8.8
Single-engine turboprop	5.6	54.5	60.0
Total	26.3 %	73.7 %	100.0 %

Note: Totals may not add as a result of rounding

Sources: IFR operations and fleet mix – Developed from data from the FAA's Enhanced Traffic Management System (provided by Flightaware), adjusted by Jacobs Consultancy, July 2008.

VFR operations and fleet mix – Estimated by Jacobs Consultancy, July 2008.

Calendar year (CY) 2007 was used as the period on which to establish the IFR fleet mix and assumed to be analogous to the fleet mix for the FAA TAF's operations in FFY 2007. The overall share of IFR operations in the Airport's annual total was developed by comparing recorded IFR operations in CY 2007 to total activity as reported in the FAA ATADS for the same period.

Because the instrument operations data does not distinguish between FAA air taxi and general aviation operations categories, it was assumed that the split between the two market segments is the same in the IFR fleet mix as it is in the FAA TAF.

VFR Activity

The fleet mix for VFR activity is not tracked in any FAA or other readily available data source. Accordingly, an operations fleet mix for FFY 2007 VFR activity was developed based on input from FAA ATCT staff and professional judgment. Military activity, for which there is no available data, was assumed to operate under VFR, of which 50% consist of light multi-engine business jets and the other 50% multi-engine turboprop aircraft operations.

The historical fleet mix presented in Table 3-2 for FFY 2007 is used as the basis for the forecast fleet mix described in subsequent sections of this memorandum. In FFY 2007, IFR activity accounted for approximately 26% of total airport operations and business jet activity accounted for 16% of total airport operations.

Table 3-2
Historical and Forecast Based General Aviation Aircraft in the U.S.
DuPage Airport Master Plan

	Piston			Turbine					
	Single-Engine	Multi-engine	Total	Turboprop	Jet	Total	Helicopter	Other	Total
Based aircraft									
1995	137,049	15,739	152,788	4,995	4,559	9,554	5,830	19,917	188,089
2000	149,422	21,091	170,513	5,762	7,001	12,763	7,150	27,107	217,533
2006	148,236	19,364	167,600	8,026	10,032	18,058	9,232	31,533	226,422
2010	150,444	19,184	169,628	8,248	13,436	21,684	11,344	40,111	242,766
2015	154,007	18,986	172,994	8,504	17,999	26,503	13,571	48,336	261,404
2020	155,570	18,817	174,387	8,761	22,797	31,558	15,231	53,738	274,914
CAGR									
1995-2006	0.7%	1.9%	0.8%	4.4%	7.4%	6.0%	4.3%	4.3%	1.7%
2006-2010	0.4	(0.2)	0.3	0.7	7.6	4.7	5.3	6.2	1.8
2010-2020	0.3	(0.2)	0.4	0.6	6.0	4.1	3.7	3.8	1.5
2006-2015	0.4	(0.2)	0.4	0.6	6.7	4.4	4.4	4.9	1.6
2006-2020	0.3	(0.2)	0.3	0.6	6.0	4.1	3.6	3.9	1.4
Percent of total based aircraft									
1995	72.9%	8.4%	81.2%	2.7%	2.4%	5.1%	3.1%	10.6%	100.0%
2000	68.7	9.7	78.4	2.6	3.2	5.9	3.3	12.5	100.0
2006	65.5	8.6	74.0	3.5	4.4	8.0	4.1	13.9	100.0
2010	62.0	7.9	69.9	3.4	5.5	8.9	4.7	16.5	100.0
2015	58.9	7.3	66.2	3.3	6.9	10.1	5.2	18.5	100.0
2020	56.6	6.8	63.4	3.2	8.3	11.5	5.5	19.5	100.0

CAGR = Compound annual growth rate

Note: Active aircraft defined as aircraft with a current registration and flown at least one hour during the year

Source: Federal Aviation Administration, *Aerospace Forecasts Fiscal Years 2007 - 2020*, 2007.

The "Heavy +" category of multi-engine business jets includes aircraft such as the Boeing Business Jet, Gulfstream G500, and Bombardier Global Express. This category also includes aircraft with maximum takeoff weights in excess of 80,000 pounds and an ARC of C-III.

FACTORS AFFECTING AVIATION DEMAND

The aviation demand forecasts were developed for distinct aircraft categories based upon our experience with and understanding of current and projected industry trends and input from current tenants at the Airport. Factors and trends that may affect forecast aviation activity at the Airport are summarized below.

- **Based Aircraft.** Utilizing FAA forecast data (as summarized in Table 3-2), turbine aircraft based at the Airport are expected to increase at a compound annual growth rate (CAGR) of 4.1% between 2006 and 2020. Piston aircraft based at the Airport are expected to experience a much slower CAGR of 0.3% over the same period.

- **Business Jets.** Business jet operations will experience above-average growth, particularly in the "Heavy +" and "Heavy" categories, reflecting increased use of corporate aviation aircraft to longer-haul (including international) destinations. The "Light" category is also expected to grow faster than the "Medium" category, given its value as an entry-level segment of the corporate aviation market. In addition to increasing air carrier airport security requirements, declining airline service levels, the overall reduction in the frequency of airline service between city pairs and available seat miles increases the attractiveness of the business jet to corporations, particularly those needing to transport employees to and from remote destinations.

- **Turboprop Aircraft.** Turboprop aircraft will also experience above-average growth in operations, serving both the corporate aviation segment as well as replacing aging piston-engine aircraft.

- **Piston Aircraft.** Piston-engine aircraft are projected to represent a reduced share of total operations. The absolute numbers of piston-engine aircraft are projected to decrease, given that many of these aircraft, particularly multi-engine piston aircraft, are aging with no major replacement programs in place and the decline in recreational general aviation, caused in large part by increasing operating costs.

- **Aviation Fuel.** Since 2003, the price of aviation fuel has increased dramatically, driven by a multitude of factors including global supply and demand for crude oil, refining capacity and refined product distribution issues, international hostilities, and market price speculation. As a result, crude oil has increased at an unprecedented pace from approximately $31 per barrel in 2003 to peak at more than $140 in the summer of 2008. While the high cost of aviation fuel has placed a downward pressure on all segments of aviation, recreational general aviation operations, flown primarily by piston-engine aircraft, is likely to be the most seriously affected. Further increases in the price of aviation fuel is projected to continue to depress aviation activity.

FORECAST AIRCRAFT OPERATIONS AND FLEET MIX

Forecast aircraft operations and fleet mix for the Airport are presented in Table 3-3 and Table 3-4. Total operations are expected to increase from 104,354 in 2007 to 157,742 in 2027 at an annual compound rate of 2.1%. Overall, aviation activity is expected to increase at a higher rate in the first half of the planning period (2007 through 2017), with strong growth in the jet and turboprop categories and modest decreases in the piston categories.

In 2027, business jet activity on a whole is expected to account for 24.7% of total aircraft activity, up from 15.9% in 2007. Within the business jet category, "Heavy +" aircraft operations are projected to grow more rapidly than other categories on a percentage basis from 0.1% to 0.6% of total aircraft activity. This rapid growth can be attributed to the overall increase in long-haul corporate activity within the general aviation market, a trend that the Chicago area at-large is likely to experience. Turboprop activity is also projected to experience a significant increase, growing from 14.1% in 2007 to 36.0% of total aircraft activity by 2027. Piston aircraft, which are projected to experience the biggest decrease in operations, will drop from 67.6% in 2007 to 37.4% of total aircraft activity by 2027. Single-engine piston aircraft operations will be most significantly reduced, accounting for 53,841 operations in 2027 and representing an annual compound decrease of 0.8%. .

Table 3-3
Forecast Itinerant and Local Aircraft Operations
DuPage Airport Master Plan

	Historical	Forecast		CAGR	
	2007	2017	2027	2007-2017	2007-2027
General Aviation					
Itinerant	63,455	92,783	116,719	3.9 %	3.1 %
Local	36,656	36,656	36,656	0.0	0.0
Air Taxi					
Itinerant	4,021	4,021	4,139	0.0 %	0.1 %
Military					
Itinerant	150	150	154	0.0 %	0.1 %
Local	72	73	74	0.1	0.1
Total	104,354	133,683	157,742	2.5%	2.1%
Operational split					
Itinerant	67,626	96,954	121,012	3.7 %	3.0 %
Local	36,728	36,729	36,730	0.0	0.0
Total	104,354	133,683	157,742	2.5 %	2.1 %

CAGR = Compound annual growth rate

Source: FAA Terminal Area Forecasts, with the exception of data for 2027, which was extrapolated from the FAA TAF projection for 2025 by Jacobs Consultancy, July 2008.

Table 3-4
Forecast Aircraft Operations and Fleet Mix
DuPage Airport Master Plan

	Total aircraft operations				
	Historical	Forecast		CAGR	
	2007	2017	2027	2007-2017	2007-2027
Business jet					
Heavy +	140	704	956	17.5 %	10.1 %
Heavy	3,096	5,956	8,062	6.8	4.9
Medium	7,723	11,819	15,794	4.3	3.6
Light	6,220	10,293	14,118	5.2	4.2
Helicopter	1,935	2,471	2,914	2.5	2.1
Multi-engine piston	7,929	6,330	5,220	(2.2)	(2.1)
Multi-engine turboprop	5,511	12,256	17,168	8.3	5.8
Single-engine piston	62,663	57,466	53,841	(0.9)	(0.8)
Single-engine turboprop	9,137	26,388	39,669	11.2	7.6
Total	104,354	133,683	157,742	2.5%	2.1 %

	Percent of total operations		
	Historical	Forecast	
	2007	2017	2027
Business jet			
Heavy +	0.1 %	0.5 %	0.6 %
Heavy	3.0	4.5	5.1
Medium	7.4	8.8	10.0
Light	6.0	7.7	9.0
Helicopter	1.9	1.8	1.8
Multi-engine piston	7.6	4.7	3.3
Multi-engine turboprop	5.3	9.2	10.9
Single-engine piston	60.0	43.0	34.1
Single-engine turboprop	8.8	19.7	25.1
Total	100.0 %	100.0 %	100.0 %

CAGR = Compound annual growth rate

Note: Percent totals may not add due to rounding

Sources: Historical/estimated – Developed from data from the FAA's Enhanced Traffic Management System (provided by Flightaware), adjusted by Jacobs Consultancy, and estimates of VFR fleet mix, July 2008.
Forecast – Jacobs Consultancy, July 2008.

FORECAST PEAK AVIATION ACTIVITY

While the level and type of annual aviation activity at an airport can provide an indication of general facility requirements, a level of activity of shorter duration, typically a busy day or hour, provides a better measure for assessing specific needs. Table 3-5 presents forecast peak-day and peak-hour aircraft operations for the planning period allocated among the forecast fleet mix at the Airport.

The peak day and hour forecasts are representative of activity that would occur during an average day in the peak month. The peak month (July) and average day were determined based on analyses of monthly FAA ATADS data and instrument operations data, respectively, from CY 2007. The IFR component of aviation activity was assumed to be the instrument operations of an average day in the peak month, while the VFR activity was assumed to be the difference between total operations for an average day in the peak month and the IFR activity. Forecasts for the peak day assumed that the peak would grow at the corresponding annual IFR and VFR category growth rates.

The peak hour was calculated by sorting the time and day of operations in the IFR fleet mix into rolling 60-minute peaks for arriving, departing, and total aircraft operations. The VFR activity was then added to the peak hour, assuming that it would be proportional to the ratio of annual IFR to VFR activity. Forecasts for the peak hour assumed that the peak would grow at approximately 70% of the corresponding annual IFR or VFR category growth rates.

As shown in Table 3-5, there were approximately 385 total operations in the peak day in 2007. By 2027, there will be a total of 594 operations, growing at an annual compound rate of 2.2%. There were approximately 49 total operations in the peak hour in 2007. By 2027, there will be a total of 64 operations, growing at an annual compound rate of 1.3%. Approximately one quarter of peak-day and peak-hour operations consist of IFR activity throughout the planning period.

FORECAST BASED AIRCRAFT

Forecasts of based aircraft were developed based on the same industry and market trends expected to affect overall general aviation aircraft operations. Numbers of based business jets at the Airport are expected to grow at above-average rates. However, there will be limited increases in the number of multi- and single-engine aircraft due to the replacement of older piston engine aircraft with newer turboprop aircraft.

Table 3-6 presents the forecast of based aircraft for the Airport. During the planning period, based aircraft are expected to increase by 23 aircraft, reaching a total of 387 by 2027 and reflecting a compound growth rate of 0.3%. Based aircraft data for 2007 were obtained from Authority records, which report a lower number of based aircraft than is shown in the FAA TAF.

Table 3-5
Forecast Peak Day and Hour Aircraft Operations
DuPage Airport Master Plan

	2007		2017		2027	
	Peak Day	Peak Hour	Peak Day	Peak Hour	Peak Day	Peak Hour
Business jet						
Heavy +	--	--	--	--	--	--
Heavy	8	3	17	4	24	5
Medium	26	3	41	4	55	5
Light	19	3	31	4	43	5
Helicopter	10	1	11	1	12	1
Multi-engine piston	34	6	27	5	22	4
Multi-engine turboprop	8	1	28	2	43	3
Single-engine piston	49	5	123	12	184	16
Single-engine turboprop	231	27	219	26	211	25
Total	385	49	497	58	594	64
Instrument approaches *(a)*	30	5	40	6	50	7

CAGR = Compound annual growth rate

Note: Data in the table includes both IFR and VFR aircraft activity.

(a) Number represents total aircraft operations requiring use of the instrument landing system, assumed to be 80% of the IFR arrival activity.

Sources: Developed from data from the FAA's Enhanced Traffic Management System (provided by Flightaware), FAA ATADS data, adjusted by Jacobs Consultancy, and estimates of VFR fleet mix, July 2008.

MARKET ASSESSMENT CONSIDERATIONS

The pursuit of any new aviation market, whether it be commercial passenger service, air cargo service, and/or a or a maintenance, repair, and overhaul (MRO) service provider, is a significant undertaking that would likely require substantial investments in time, effort, and capital on behalf of the Authority. In the highly-competitive Chicago aviation market environment for passenger and air cargo service, coupled with existing and expected near-term economic conditions, it is unlikely the Authority would be successful in securing meaningful and sustained levels of scheduled commercial passenger or regularly scheduled air cargo service.

However, the Airport's obvious commercial strength is servicing the high-end business and corporate general aviation markets. Hence, a natural extension of this line of business is the development of a general aviation aircraft MRO service provider. This type of business often provides high-visibility and potential local economic development, but often generates only modest financial returns to the airport. MROs are also highly dependent on economic and financial subsidies provided by the airport and state and local governments.

Table 3-6
Historical and Forecast Based Aircraft Fleet Mix
DuPage Airport Master Plan

	Total based aircraft				
	Historical	Forecast		CAGR	
	2007	2017	2027	2007-2017	2007-2027
Business jet					
Heavy +	1	3	3	10.9%	6.2%
Heavy	8	10	12	2.1	1.9
Medium	25	29	34	1.4	1.5
Light	23	29	34	2.3	2.0
Helicopter	5	5	5	--	--
Multi-engine piston	36	34	34	(0.7)	(0.4)
Multi-engine turboprop	14	17	18	1.9	1.3
Single-engine piston	231	230	220	(0.1)	(0.3)
Single-engine turboprop	21	26	27	2.0	1.2
Total	364	382	387	0.5 %	0.3 %

CAGR = Compound annual growth rate

Sources: Historical – DuPage Airport Authority Records, 2007.
Forecast – Jacobs Consultancy, July 2008.

Establishing state and local funding commitments for this type of development is likely to require a coordinated local effort. Reaching a decision to pursue an MRO development should not be done without careful consideration of the market potential, barriers to entry, and capital investment requirements. A potential MRO development should also be compared to other potential capital projects and commercial development which may require significantly less local investment and provide greater financial returns and enhanced Airport prestige.

A White Paper summarizing the assessment for new aviation markets at the Airport is provided in Appendix A.

Chapter 4

FACILITY REQUIREMENTS

Facility requirements were developed for DuPage Airport to accommodate forecast demand presented in Chapter 3. Facility requirements were derived from an assessment of existing conditions and demand-capacity evaluations for major functional components, including airfield facilities, aircraft parking and storage, aviation support facilities, and access and parking. Facility requirements were prepared for near-, mid-, and long-term levels of aviation activity approximately corresponding with the 5-, 10-, and 20-year (2012, 2017, and 2027) intervals. A summary of key primary facility requirements for the 20-year planning period is provided in Table 4-1.

AIRFIELD FACILITIES

Facility requirements were evaluated for several key airfield elements, including airfield capacity, runway wind coverage, runway and taxiway geometric design, FAA design standards, navigational aids, and instrument approach capability. The results of the analyses are summarized in the following paragraphs.

Critical Aircraft for Airport Design

Critical aircraft types for airport design are used in conjunction with aviation demand forecasts to determine future aviation facility requirements. The most demanding group of aircraft utilizing the Airport is ARC C-III, defined in FAA AC 150/5300-13, *Airport Design* as aircraft with approach speeds between 121 and 141 knots, wingspans between 79 and 118 feet, and tail heights between 30 and 45 feet. These include aircraft such as the DC-9 and large corporate jets, including the Boeing Business Jet, Gulfstream G500, and Bombardier Global Express. This critical design aircraft category is commensurate with past planning analyses performed for the Airport. Total operations for the ARC C-III aircraft category are projected to increase from 140 in 2007 to approximately 950 in 2027.

The majority of existing airfield facilities satisfy ARC C-III criteria. The ARC C-III designation is sufficient for the overwhelming majority of aircraft currently and projected to operate from the Airport. Runway takeoff length requirements for these critical aircraft, primarily the Bombardier Global Express and the Boeing Business Jet, were also assessed to ensure adequacy of the existing airfield. These requirements are based on performance information provided in the aircraft manufacturer's Airport Planning Manual for both aircraft. Takeoff runway length requirements were identified for aircraft operating at maximum takeoff weight (MTOW) using performance information corresponding to an ambient temperature of 84° Fahrenheit, which approximates the mean daily maximum temperature during the hottest month at the Airport. MTOW, which represents a "most demanding" takeoff scenario, was used to verify that the Airport's existing 7,570-foot runway (Runway 2L-20R) would be sufficient to accommodate the aircraft in the projected fleet mix forecast to use the Airport. The required takeoff length under these conditions is 6,720 feet for the Global Express and 7,450 feet for the Boeing Business Jet, rendering Runway 2L-20R adequate for the design aircraft.

Table 4-1
Summary of Facility Requirements
DuPage Airport Master Plan

	Units	Existing (2007)	Estimated requirement Near-term (2012)	Mid-Term (2017)	Long-term (2027)
Airfield Facilities					
Annual service volume	operations	355,000	105,000	130,000	155,000
Airport Reference Code	--	C-III	C-III	C-III	C-III
Runway 2L-20R					
Length	feet	7,571	7,571	7,571	7,571
Width	feet	100	150	150	150
Strength	Single wheel	45	45	175	175
Instrument approach					
Runway 2L	--	ILS (Cat. I)	ILS (Cat. I)	ILS (Cat. I)	ILS (Cat. I)
Runway 20R	--	RNAV/GPS	RNAV/GPS	RNAV/GPS	RNAV/GPS
Runway 2R-20L					
Length	feet	5,101	6,444	6,444	6,444
Width	feet	100	100	100	100
Instrument approach	--	--	--	--	--
ARC	--	B-II	C-II	C-II	C-II
Runway 10-28					
Length	feet	4,750	5,000	5,000	5,000
Width	feet	75	75	75	75
Instrument approach					
Runway 10	--	ILS (Cat. I)	ILS (Cat. I)	ILS (Cat. I)	ILS (Cat. I)
Runway 28	--	--	RNAV/GPS	RNAV/GPS	RNAV/GPS
Runway 15-33					
Length	feet	3,339	3,339	3,339	3,339
Width	feet	100	100	100	100
Instrument approach	--	--	--	--	--
General Aviation Facilities					
Aircraft parking apron *(a)*					
Based aircraft parking	SF	730,000	182,300	178,200	173,100
Itinerant aircraft parking	SF	1,000,000	516,200	581,800	694,500
Indoor aircraft storage					
Conventional hangars	SF	360,000	457,900	555,800	653,700
T-hangars	units	115	90	90	90
Administration building	SF	52,000	52,000	52,000	52,000
Fixed base operator (FBO)	Operators	1	1	1	1
Vehicle parking					
Flight Center vicinity	spaces	710	260	300	360
Other airport areas	spaces	660	150	152	152
Aviation Support Facilities					
Aircraft rescue and fire fighting	SF	4,900	4,900	4,900	4,900
Maintenance equipment storage	SF	50,000	50,000	60,000	60,000
Fuel and deicing storage					
Avgas (100 LL)	gallons	40,000	10,000	10,000	10,000
Jet A	gallons	60,000	60,000	63,000	96,000
Pavement deicing chemical	gallons	8,000	8,000	8,000	8,000
Aircraft deicing chemical	gallons	6,000	6,000	6,000	6,000

(a) Areas inclusive of taxilanes and other operating areas.

Source: Jacobs Consultancy and Reynolds, Smith and Hills, Inc., April 2009.

Airfield Capacity

The Airport has an annual service volume (ASV) of approximately 355,000 annual aircraft operations. The ASV, determined in accordance with FAA AC 150/5060-5 *Airport Capacity and Delay*, is the annual number of aircraft operations that can be accommodated on the Airport's runways. There were 105,000 annual aircraft operations in 2007, a number that is expected to increase to approximately 158,000 annual operations by 2027. Therefore, additional runway capacity is not needed during the planning period.

Maximum runway capacity is achieved through the exclusive use of the Airport's two parallel runways: Runways 2R-20L and Runway 2L-20R. In this configuration, aircraft arrivals and departures operate independently on the two runways. Simultaneous use of the parallel runways with Runway 10-28 and/or Runway 15-33 reduces the overall airfield capacity due to the intersecting configuration with the parallel runways and the flight paths beyond the runway ends. The use of intersecting runways can require increased separation between successive aircraft operations on one runway to accommodate an aircraft operation on the intersecting runway. This increased separation is enhanced when the intersecting operation is with two parallel runways and their extended flight paths. While the *Airport Capacity and Delay* handbook does not provide service volumes for three intersecting runway orientations, which exists at the Airport, the aircraft coordination and separation requirements for three intersecting runways result in significantly reduced annual service volumes.

Wind Coverage

Runway wind coverage refers to the percent of time that the crosswinds associated with a particular runway orientation are within an acceptable level. Airport wind coverage is determined by considering all runways simultaneously. Crosswinds, which are the components of wind that flow in a direction perpendicular to a runway's orientation, can effectively close a runway for use. The maximum allowable crosswind components for a particular aircraft are determined largely by aircraft size, aircraft weight, and pilot capabilities. In general, larger and heavier aircraft can land and take off in higher crosswinds than smaller and lighter aircraft.

The FAA's *Airport Design* recommends providing overall wind coverage of 95 percent for all classifications of aircraft. Based on observed weather conditions, existing wind coverage provided at the Airport, as well as for each individual orientation (Runways 2-20, Runway 10-28, and Runway 15-33) is summarized in Table 4-2. Separate coverage estimates are provided for visual flight rules (VFR), instrument flight rules (IFR), and all weather conditions*.

As shown in Table 4-2, the wind coverage for the combined runway system exceeds 99% for all weather conditions and all crosswind components, well above the FAA-recommend threshold of 95%. Overall, the Runway 2-20 orientation provides greater wind coverage on its own than the other two. However, when combined with one of the other two orientations, Runway 2-20 and Runway 10-28 together provide greater coverage than do Runway 2-20 and Runway 15-33.

*VFR weather is defined as cloud ceilings at least 3,000 feet above ground level (AGL) *and* visibility at least one mile. IFR weather is defined as cloud ceilings below 3,000 feet *or* visibility less than one mile.

The combined Runway 2-20 and Runway 10-28 wind coverage exceeds 97.8% for all weather conditions and crosswind components.

Many corporate jets operating at the Airport are required to use Runway 2L-20R or Runway 2R-20L due to runway length and width requirements. For these aircraft types, this orientation provides adequate coverage 93.5% in all weather conditions. Based on 2007 activity levels, approximately 960 annual aircraft operations were theoretically unable to arrive or depart from the Airport because of wind coverage. That number will grow to approximately 2,200 annual operations by the end of the 20-year planning period. Facility improvements to either Runways 2-20 or one of the two secondary runways are required to increase the wind coverage and increase the Airport's accessibility for these operations.

Table 4-2
Wind Data Summary
DuPage Airport Master Plan

	All weather			VFR *(a)*			IFR *(b)*		
Runway	10.5 knot	13 knot	16 knot	10.5 knot	13 knot	16 knot	10.5 knot	13 knot	16 knot
All runways	99.3%	99.8%	100.0%	99.3%	99.8%	100.0%	98.8%	99.6%	99.9%
Runway 2-20	88.3	93.5	97.8	88.2	93.4	97.7	88.5	93.9	98.0
Runway 15-33	84.4	91.0	97.0	84.5	91.2	97.1	82.0	89.1	95.9
Runway 10-28	86.1	92.2	97.7	86.2	92.3	97.7	84.5	91.2	97.4
Runways 2-20 & 10-28	98.3	99.6	99.9	98.4	99.6	99.9	97.9	99.3	99.9
Runways 2-20 & 15-33	93.4	97.1	99.0	93.5	97.1	99.0	92.5	96.6	98.8
By runway end									
Runway 2	45.7%	48.6%	50.9%	45.1%	47.9%	50.2%	51.4%	54.6%	56.9%
Runway 20	51.9	54.3	56.3	52.4	54.8	56.8	45.2	47.4	49.2
Runway 10	44.3	46.7	49.0	43.2	45.5	47.7	51.9	55.7	59.1
Runway 28	51.2	54.9	58.1	52.3	56.1	59.3	45.2	47.4	49.2

(a) VFR (Visual Flight Rules) weather is defined as a cloud ceiling of at least 3,000 feet and reported visibility of at least one mile.
(b) IFR (Instrument Flight Rules) weather is defined as a cloud ceiling less than 3,000 feet or reported visibility of less than one mile.

Source: Reynolds, Smith and Hills, Inc. based on weather data from the National Climatic Data Center for January 1998 – December 2007.

Runway Requirements

The following summarizes requirements for runway facilities.

- **Runway 2L-20R.** Primary Runway 2L-20R is 7,570 feet long by 100 feet wide, which is sufficient for the design aircraft operating at maximum take-off weights. However, the existing runway width does not meet the 150-foot design requirements* for larger aircraft like the Boeing Business Jet. The increasing number of operations by this and other larger and heavier aircraft is accelerating pavement deterioration necessitating a complete rehabilitation in the near-term. Therefore, it is recommended that pending runway upgrade projects include both strengthening and widening of the runway to better accommodate the larger aircraft.

- **Runway 2R-20L.** Runway 2R-20L is 5,100 feet long by 100 feet wide. Upgrading this Runway from ARC B-II to C-II and extending the runway will (1) provide a better-equipped secondary runway to Runway 2L-20R; (2) improve operational flexibility and airfield capacity; (3) complement future aviation-related development on the east side of the Airport; and (4) protect for continuous access by all aircraft types using the Airport. Upgrading the ARC will necessitate implementation of more conservative runway safety and object free areas as well as larger runway protection zones. Runway extension alternatives are evaluated in Chapter 5.

- **Runway 10-28.** Runway 10-28, which is 4,750 feet long by 75 feet wide and includes a precision instrument approach procedure on Runway 10, has sufficient length for use by many piston and turboprop aircraft in the fleet mix. However, during periods of inclement weather or strong east-west winds, larger corporate jets that are unable to land on the longer Runway 2L-20R due to crosswinds or on Runway 10-28 due to insufficient length are forced to either wait for improved weather conditions or divert to an alternate airport. Additional length would improve the accessibility of the Airport to this core group of users. Surveys conducted with corporate jet operators indicate that a runway length of 6,000 feet is desired. Runway extension alternatives are evaluated in Chapter 5.

- **Runway 15-33.** Runway 15-33 is currently 3,401 feet long by 100 feet wide and is used by piston and light turboprop aircraft that are generally based in adjacent hangars or apron areas. The runway, which currently does not meet FAA design criteria (as discussed in the subsequent paragraphs), needs to be brought into compliance with standards through physical improvements, procedural changes, or a combination of the two. However, because the runway is neither required for airfield capacity nor wind coverage, consideration should be given to decommissioning the runway prior to its next major maintenance cycle.

*Per FAA AC 150/5300-13, *Airport Design*, facilities "designated Airplane Design Group III serving airplanes with maximum certificated weight greater than 150,000 pounds (68,100 kg), the standard runway width is 150 feet…"

FAA Runway Design Standards

All existing and future airfield facilities were evaluated and planned to ensure compliance with design standards set forth in FAA's *Airport Design*. The following require modification to obtain compliance with design standards:

- **Runway 15.** Trees located on properties outside of Authority control penetrate the imaginary approach surface, as defined in FAR Part 77, *Objects Affecting Navigable Airspace*, to Runway 15 and are considered obstructions to the operation of the runway. Objects penetrating the approach surface should be removed or modified to ensure compliance with safety standards. If the obstruction can not be removed, modifications should be undertaken to Runway 15 to obtain a penetration-free approach surface.

- **Runway 33.** The existing airfield perimeter fence and Powis Road, located to the east of the Runway 33 threshold, transgress into the Runway Safety Area (RSA) and Object Free Area (OFA). *Airport Design* requires that the RSA be cleared, drained, graded, and free of objects except for those required to be located within the RSA due to their function (i.e. navigational aids). The OFA is required to be free of above ground objects with the exception of objects that need to be located in this area for air navigation or aircraft ground maneuvering purposes. Relocation of the fence and road or modifications to the Runway 33 end-of-runway is required to ensure compliance with *Airport Design*.

- **Runway 10-28.** The localizer antenna, which supports the existing Instrument Landing System (ILS) in place for Runway 10, is located east of the Runway 28 threshold outside of the RSA. The localizer antenna has a "critical area" surrounding it to prevent the degradation of the signal from the localizer to aircraft using the instrument landing system. In its current configuration, the Airport's perimeter fence and a portion of Powis Road currently penetrate the localizer critical area. However, there is no degradation in the antenna's signal despite these penetrations and therefore both the fence and roadway can remain.

Taxiways

All taxiways meet or exceed FAA-required design standards for taxiway width. Taxiway E, which parallels Runway 10-28 to the north, occasionally experiences head-to-head aircraft movements by aircraft moving between the Tower Road hangars and the general aviation facilities in the northeast quadrant of the Airport. Mitigation of this conflict should be considered in conjunction with other airfield development alternatives.

Navigation and Visual Aids

Navigational and visual aids provide assistance to pilots during landing and facilitate access during poor weather and visibility conditions. The Airport's existing navigational and visual aids are in good working order and there is no need for additional or enhanced navigational aid facilities. A summary of the specific navigational and visual aids supporting each runway end is provided in Table 2-2 in Chapter 2.

Instrument Approach Capability

The Airport currently includes Category I ILSs that enable approaches to Runway 2L and Runway 10 during periods of inclement weather when cloud ceilings and visibilities are above specific thresholds (see Table 2-2 in Chapter 2 for details). The ILS approaches allow the Airport to remain accessible for properly-equipped aircraft when winds are calm or out of the north or east. Additionally, Runway 20R is equipped with a non-precision area navigation (RNAV/GPS) approach that, while less capable than an ILS, provides additional approach capability when winds are out of the south.

However, strong winds out of the south or west combined with poor visibilities preclude approaches to the Airport due to the limited number of ILS approaches. Furthermore, the approach to Runway 20R has limited accessibility due to the following:

- **Approach minimums.** The non-precision RNAV/GPS approach procedure does not have visibility and cloud ceiling minimums as low as the ILS procedures, thereby limiting use during severe inclement weather conditions.
- **Air Traffic Control.** Availability of the 20R approach procedure is inconsistent because the approach is only authorized at the discretion of the Chicago Terminal Radar Approach Control. The airspace north of the Airport, in which aircraft landing Runway 20R would maneuver, is beneath east-west traffic flows arriving and departing for Chicago – O'Hare Airport. If at any point there is controller concern regarding separation with DuPage traffic, O'Hare activity has priority. In general, the approach is available during off-peak hours when O'Hare activity is at low to moderate activity levels. Due to the unpredictable nature of air traffic control and O'Hare activity, it can not be assumed that the RNAV/GPS approach to Runway 20R will always be available when required.
- **Flight Path Conflicts.** Large and heavy aircraft departing O'Hare to the west do not always climb at anticipated rates, resulting in flight paths that restrict usability of the Runway 20R approach. As new east-west runways are opened at O'Hare as part of ongoing facility improvements there, the availability and reliability of the Runway 20R approach will be further restricted.

Therefore, the accessibility of the Airport should be enhanced through implementation of additional instrument-based approaches. Additional discussion of airport/airspace interactions and opportunities to provide an instrument approach to Runway 28 is provided in Chapter 5 and Appendix B.

GENERAL AVIATION FACILITIES

General aviation facility requirements were developed for aircraft parking apron, aircraft storage facilities, and other supporting infrastructure.

Aircraft Parking Apron

Aircraft parking aprons are required for use by both based and itinerant aircraft using the Airport, as follows:

- **Based Aircraft Parking Apron.** Based aircraft tie-down spaces are located predominately on the general aviation apron in the Airport's northeast quadrant. A total of 730,000 square feet of apron is currently available for based aircraft parking. In recent years, utilization of outdoor parking aprons by based aircraft has fallen concurrently with declines in the recreational aircraft market segment as a whole and at the Airport in particular. As a result, only 182,300 square feet of based aircraft parking apron is required at the near-term, declining to 173,100 square feet in the long-term.

- **Itinerant Aircraft Apron Parking.** Apron parking for itinerant aircraft primarily takes place on an approximately 1,000,000 square-foot apron adjacent to the DuPage Flight Center. The apron, which is striped to accommodate a mix of large and small general aviation aircraft, is currently sized and constructed to accommodate the design aircraft as well as the long-term projected demand of 694,500 square feet.

Indoor Aircraft Storage

Indoor aircraft parking and storage requirements were evaluated as follows.

- **Conventional Hangars.** The Airport currently has approximately 360,000 square feet of conventional hangar space of varying sizes. As shown in Table 4-1, 653,700 square feet of conventional hangar space will be required to accommodate long-term demand, an increase of 293,700 square feet over the planning period.

- **T-Hangars.** There are approximately 115 T-hangars at the Airport today. Near-, mid-, and long-term demand for T-hangars is expected to remain constant at 90 units. However, a certain number of T-hangars will need to be replaced or rehabilitated during the planning period. Based on stakeholder input and observations, approximately 30 T-hangars located in the northeast quadrant of Airport and an additional 30 T-hangar units along Tower Road will exceed their maximum useful life beyond repair and will require replacement.

Fixed Base Operator

The DuPage Flight Center, operated by the Authority, provides comprehensive professional amenities and services for both based and itinerant aircraft. The existing facility is capable of accommodating higher levels of traffic than it currently experiences and is in a good state of repair, having been constructed in 1993. On the basis of forecast aviation demand as well as Authority policy objectives, the Flight Center is expected to be able to service future demand with high levels of service throughout the planning period. There is no need for an additional full-service FBO at the Airport, although other aircraft maintenance providers, charter operators, and niche aviation-related businesses should be encouraged to do business at the Airport and land should be preserved for these uses.

Vehicle Parking

Existing vehicle parking in the vicinity of the Flight Center totals approximately 710 spaces and provides sufficient capacity to accommodate demand throughout the planning period. Available land adjacent to the existing parking lots provides ample expansion capability to accommodate unforeseen growth. Furthermore, the 660 parking spaces provided in other Airport areas are also sufficient to accommodate forecast parking demand. However, based on Authority feedback, a small addition to vehicular parking is needed adjacent to the Airport maintenance facility, where there is an ample amount of land to accommodate additional parking.

AVIATION SUPPORT FACILITIES

Various facilities in all parts of the Airport support aviation operations, as follows:

- **Aircraft Rescue and Fire Fighting.** The ARFF is located on Powis Road near threshold for Runway 33. The facility supports both the Airport for aircraft rescue and firefighting needs as well as the West Chicago Fire Protection District for structural response and contains a mix of equipment for both functions. The existing 4,900-square foot facility is sufficient to accommodate Airport needs throughout the planning period based on current plans for structural response duties for the West Chicago Fire Protection District to move to an alternate location.

- **Maintenance Equipment Storage.** The existing Airport maintenance facility is approximately 50,000 square feet and located between Runway 10-28 and the Flight Center. Forecast growth in traffic and based aircraft storage facilities will require approximately 10,000 square feet of additional equipment storage areas at the mid-term.

- **Fuel and Deicing Storage.** The existing aviation fuel storage area is located to the west of the Airport maintenance facility and provides underground storage for 40,000 gallons of AvGas / 100LL and 60,000 gallons of Jet-A fuel. Based on projected traffic levels and Authority feedback, there is sufficient storage capacity for AvGas throughout the planning period. Approximately 3,000 additional gallons of Jet-A fuel are required at mid-term and an additional 33,000 gallons by 2027. De-icing fluid for both aircraft and airfield pavements is stored in above-ground tanks adjacent to the Airport maintenance facility. The existing tanks provide sufficient storage capacity for de-icing fluid throughout the planning period.

- **Security and Access.** Security and access fencing around the Airport meets the Authority's desired six-foot height minimum. Improvements are underway to improve access control and install a wildlife access protection skirt.

- **Utilities.** Utilities at the Airport should be sufficient throughout the planning period. However, additional utility infrastructure may be required to support construction of new or expanded facilities specific areas, such as in the northeast and southeast quadrants of the Airport.

AIRPORT ACCESS AND CIRCULATION FACILITIES

The requirements for ground access and circulation facilities were developed as follows.

Airport Access

Although the Authority does not have the jurisdiction to make facility improvements to off-Airport roadways and transportation corridors, the importance of the relationship between efficient ground access to and from the Airport on future long-term growth of air traffic is recognized. Major east-west arterial roadways to the north (North Avenue) and south (Roosevelt Road) of the Airport proper experience congestion during various peak periods throughout the day. Furthermore, the lack of high-speed north-south roadway corridors make access to Interstates 88 and 90 arduous and time-consuming during peak periods.

Local jurisdictions have considered and are considering transportation improvements to several of these areas. Transportation projects under consideration include:

- **Eola Road Corridor.** Would provide improved north-south access to and from Interstate 88 along the Airport's eastern border, preferably utilizing the Kautz Road corridor.
- **Roosevelt Road Grade Separation.** The proximity of the Kautz – Roosevelt Road intersection to an at-grade crossing with the heavily-used Union Pacific Railroad track causes substantial traffic congestion and blocked access from the south for prolonged periods throughout the day. This railroad track feeds into a switching yard, so passing trains are often moving at slow speeds. Elevating the roadway intersection so that it is free from interference with the railroad track would not only improve the safety of the intersection but also its throughput capacity.
- **North Avenue and Kautz Road Intersection.** Capacity increases and re-signalization to the intersection to reduce delays during peak periods.

Additional corridor improvements that would provide better roadway access could include modifications to the Kirk Road/Farnsworth Avenue corridor (access to Interstate 88) and North Avenue (access to Interstate 355). While the exact configuration of these improvements is not presently known, improved access to the regional transportation system in the Airport environs is in the Authority's best interest.

Airport Circulation

The Airport has based aircraft and support facilities grouped in developed areas in the northeast quadrant, along the northern border and Tower Road, and along the west side of the Airport. As a result, improved on-Airport circulation for both public and service vehicles is desirable, as summarized below.

- **Kautz Road/Tower Road/DuPage Drive Intersections.** Portions of Tower and Keil Roads are used by non-Airport traffic seeking to avoid congestion during peak periods on off-Airport roadways, particularly North Avenue. This trend contributes to congestion at the western end of Tower Road, where it intersects with Kautz Road and DuPage Drive. The proximity of the two intersections along Tower Road at heavy traffic volumes is problematic due to hazardous situations caused by parallel roads, minimal road separations, poor sight lines, and vehicle movement conflicts.

- **North Avenue Frontage Road.** Circulation between the Tower Road and west-side portions of the Airport to facilities in the northeast quadrant is provided by Tower and Keil Roads, which link to a narrow frontage road bordering the southern edge of North Avenue. A portion of this frontage road experiences bi-directional traffic and is only wide enough to handle a single vehicle. Thus, when two vehicles come head-to-head, both must slow and proceed with caution. This frontage road is an important on-Airport roadway as long as aviation-related businesses continue to exist in disparate areas of the Airport.

- **Perimeter Service Road.** The Perimeter Service Road provides secure "within-the-fence" circulation for official Airport and authorized tenant vehicles around the airfield. Only portions of the road, primarily along the Airport's southern and eastern edges, exist today. A complete perimeter service road should be implemented to enhance safety, security, wildlife control, and facility access. To do this, a new roadway should be constructed to the west of Runway 10-28, between the Tower Road and northeast quadrant developed areas, and around the east side of Runway 10-28.

Chapter 5

ALTERNATIVES

Various development alternatives were identified and evaluated in the Master Plan to meet the projected facility requirements identified in Chapter 4. The alternatives evaluation covered the following major issues:

- **Airfield Improvements.** Extensions, upgrades, and enhancements to the capability of all four runways and selected taxiways.
- **On-Airport Land Uses.** Evaluations of on-Airport locations for future corporate, general aviation, aviation support, and non-aviation developments.

AIRFIELD ALTERNATIVES

Based on the facility requirements identified in Chapter 4, alternatives for the following airfield and airspace improvements were identified and evaluated:

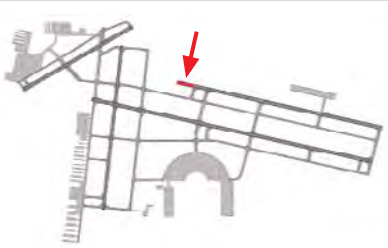
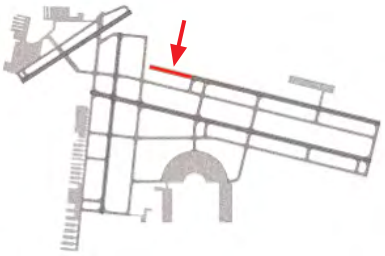
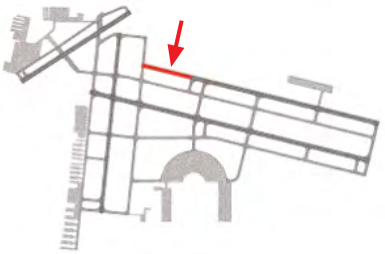
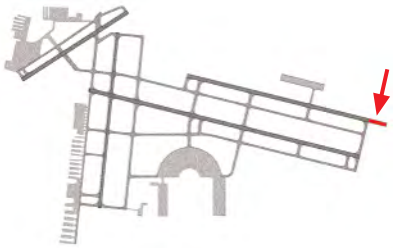
- Runway 2R-20L lengthening
- Runway 10-28 lengthening
- Runway 15-33 design standards compliance
- Improved instrument approach capability
- Taxiway E bi-directional flow conflict resolution

Past Authority planning efforts evaluated alternatives for widening and strengthening Runway 2L-20R. These efforts concluded that it is prudent to both widen Runway 2L-20R to 150 feet as well as strengthen the pavement to better accommodate aircraft in the future fleet mix. Therefore, detailed alternatives for upgrading Runway 2L-20R were not considered in the Master Plan. Chapter 6 describes the recommended improvements for Runway 2L-20R.

Runway 2R-20L Lengthening

The primary purpose for extending Runway 2R-20L is to (1) provide redundant/backup facilities that replicate Runway 2L-20R; (2) improve operational flexibility and capacity; (3) complement future development on the east side of the Airport; (4) protect for continuous access by all aircraft types using the Airport; and (5) increase operating safety when maintenance is being performed on Runway 2L-20R. In order to position Runway 2R-20L—currently 5,101 feet long—for this role, the runway should be upgraded to ARC C-II standards and extended to accommodate operations by larger aircraft. Each Runway 2R-20L extension alternative described below satisfies FAA-required design standards (e.g., RSA, OFA, runway protection zones, etc.) and obstruction clearance associated with ARC C-II.

Five alternatives were considered for lengthening Runway 2R-20L. Four of the alternatives explored extensions to the north while the fifth looked at extending to the south. These alternatives are described and evaluated in Figure 5-1.

	KEY ELEMENTS	PROS	CONS
ALTERNATIVE 1			
	• Extend to northeast by 440 feet • Total usable length of 5,540 feet • Upgrade runway to ARC C-II	• Extend to northeast by 440 feet • Airfield independence with Taxiway G and Runway 10-28 • Avoids impacts to Prairie Landing Golf Course and clubhouse	
ALTERNATIVE 2			
	• Extend to northeast by 1,140 feet • Total usable length of 6,240 feet • Upgrade runway to ARC C-II	• Airfield independence with Runway 10-28 • Avoids impacts to Prairie Landing Golf Course and clubhouse	
ALTERNATIVE 3			
	• Extend to northeast by 1,343 feet • Total usable length of 6,443 feet • Upgrade runway to ARC C-II	• Sufficient length to be functional secondary runway for key users • Taxiway G provides access to Runway 20L threshold • Avoids impacts to Prairie Landing Golf Course and clubhouse	
ALTERNATIVE 4			
	• Extend to northeast by 1,643 feet • Total usable length of 6,743 feet • Upgrade runway to ARC C-II	• Sufficient length to be functional secondary runway for key users • Avoids impacts to Prairie Landing Golf Course and clubhouse	• Runway 10-28 and Taxiway E encompassed by runway safety area • Taxiway G intersects runway • Requires new connector taxiway to access new Runway 20L threshold
ALTERNATIVE 5			
	• Extend to southwest by 500 feet • Total usable length of 5,601 feet • Upgrade runway to ARC C-II	• Maintains airfield independence with other airfield facilities	• Insufficient length to be functional secondary runway for key users • Requires new connector taxiway to access new Runway 2R threshold • Requires extension to Taxiway C • Runway safety area and protection zone impact Prairie Landing Golf Course and clubhouse

DPA511 F-0003

Figure 5-1

RUNWAY 2R-20L EXTENSION ALTERNATIVES

DuPage Airport Master Plan

September 2009

JACOBS CONSULTANCY

Extensions to Runway 2R-20L should be undertaken to cost-effectively enhance the Airport's accessibility for its key users while minimizing impacts on existing facilities on or near the Airport. While Alternatives 1 and 2 avoid conflicts between a lengthened Runway 2R-20L and Runway 10-28, the additional length is not sufficient for many key users of the Airport and therefore would restrict the runway's ability to function redundantly with Runway 2L-20R. Alternatives 3 and 4 both provide sufficient length but would extend Runway 2R-20L far enough to the northeast such that its RSA encompasses Runway 10-28 to the north. This would require that air traffic control monitor traffic using the two runways to ensure that they are not used simultaneously. Alternative 5 would not provide sufficient length for key users and also would require modifications to the Prairie Landing Golf Course and clubhouse to clear the RSA and RPZ.

Alternative 3 most closely meets the requirements for additional runway length while minimizing impacts on existing Airport facilities. Aligning the departure threshold with existing Taxiway G permits access to the Runway 20L departure threshold without requiring new taxiway pavements. Furthermore, Alternative 2 avoids extending the runway safety area to Taxiway E and thus encompasses only Runway 10-28 and Taxiway G. Therefore, it is recommended that Runway 2R-20L be lengthened as proposed in Alternative 3. The timing of this recommendation, which is based on planned improvements to Runway 2L-20R, funding capacity, anticipated environmental permitting, and project construction schedules, is discussed in Chapter 6.

Runway 10-28 Lengthening

As discussed in Chapter 4, an extension to Runway 10-28 (currently 4,750 feet long) would provide increased accessibility for aircraft that currently cannot use the Airport during periods of inclement weather conditions when wind speed and direction result in the inability to operate on Runway 2L-20R. Previous planning studies considered a wide range of alternatives to increase the length of Runway 10-28 to approximately 6,000 feet, including a realignment and/or extension to the runway and incorporating the use of an Engineered Materials Arresting System (EMAS). The estimated costs of these concepts ranged from $20 million to $60 million, largely because of the need to acquire off-Airport property, and therefore were impractical to implement. Hence, this Master Plan focused on providing at least 250 feet of additional length to Runway 10-28, which would provide an overall length of 5,000 feet commensurate with the minimum requirements of many, but not all, corporate jet users. This analysis considered extensions of Runway 10-28 to both the east and the west.

West Extension to Runway 10-28

Extension of Runway 10-28 to the west was considered in previous planning efforts but dismissed because of challenges associated with acquiring off-Airport property and removing obstructions west of Kautz Road. However, a 250-foot west extension to Runway 10-28 would be feasible and could be accommodated entirely on existing Airport property. This improvement would entail:

- Lengthening Runway 10-28 and adjacent Taxiways E and G to the west by 250 feet and constructing new access taxiways at the new west end of the runway
- Maintaining the Runway 10 arrival threshold at the existing end of runway to mitigate impacts from obstructions located off-Airport to the west
- Maintaining the ILS approach to Runway 10 in its existing configuration
- Modifying the existing lead-in approach lighting system for Runway 10 to install in-pavement lights in the extended runway pavement
- Using the concept of declared distances, as described in *Airport Design*, to provide 5,000 feet of usable length on Runway 10-28 for all operations with the exception of arrivals to Runway 10

East Extension to Runway 10-28

Alternatives were considered to extend Runway 10-28 to the east to provide 5,000 feet of usable length for aircraft landing on Runway 10. East extension alternatives explored in the past would require land acquisition, relocation of Powis Road, demolition of on- and off-Airport buildings, and relocation of the localizer antenna supporting the Runway 10 ILS and therefore were considered impractical in past planning studies.

Five additional east extension alternatives, proposing extensions between 250 and 850 feet long, were identified in this Master Plan. In addition to the factors previously-described, the southeastern end of Runway 15-33 would complicate and east extension of Runway 10-28. A full description and evaluation of these runway extension alternatives is provided in Appendix C.

As with the previously-considered alternatives, all five of these new alternatives were determined to be impractical and therefore are not recommended in this Master Plan.

Runway 15-33 Design Standards Compliance

The following paragraphs describe alternatives considered to address existing deficiencies where Runway 15-33 does not meet FAA design standards as set forth in *Airport Design*.

Runway 15

Trees currently penetrate the imaginary approach surface to Runway 15 as specified in FAR Part 77, *Objects Affecting Navigable Airspace*. These obstructions should be maintained or removed to avoid penetration of the surface and could be cleared through implementation of one or a combination of the following actions:

- Relocate the Runway 15 threshold to the southeast, shortening the total usable runway length and shifting the Part 77 surface clear of the obstructions
- Acquire the property on which the obstructions are located so that the obstructions could be removed or lowered

- Acquire avigation easements for the property on which the obstruction are located so that the obstructions could be removed or lowered

Shortening Runway 15-33 is not desirable because the runway, at 3,339 feet long, is already too short to accommodate all but the piston and light turboprop aircraft in the fleet mix under normal operating conditions. Additionally, because the land on which the obstructions are located is on the north side of North Avenue, it is more practical to simply acquire easements for obstruction clearance than outright property acquisition. Therefore, if Runway 15-33 is to be maintained throughout the planning period, it is recommended that the Authority purchase easement acquisitions to allow the trimming or removal of the trees and provide the Authority with long-term control of these obstructions.

Runway 33

Both Powis Road and the airfield fence penetrate the Runway 33 runway object free area. These non-standard conditions can be cleared through either physical or procedural changes. Coordination with the relevant agencies, completed as part of the definition and evaluation of alternatives, determined that both the roadway and the fence could remain in place if shown as a modification of standards on the submittal of the Airport Layout Plan to the FAA at the conclusion of the Master Plan. If physical changes were required, the alternatives would be:

- Relocate the Runway 33 end to the northwest such that the runway object free area was no longer encompassing the non-compatible objects
- Acquire property east of the Airport such that Power Road and the airfield fence could be relocated outside of the runway object free area

Because of the high costs of property acquisition and difficulty associated with relocating a public off-Airport roadway, it is recommended that the Runway 33 threshold be relocated to the northwest in order to satisfy design standards if the runway is to be maintained throughout the planning period. Implementation of this alternative would require the remarking of the runway to identify that the last 50 feet of runway to the southeast is unusable. This alternative also would require relocation of runway end lights.

Upgrade Instrument Approach Capability

As summarized in Chapter 4, Airport accessibility during periods of low cloud ceilings or poor visibility would be enhanced with additional instrument approach procedures to augment the existing Runway 2L and Runway 10 ILSs and Runway 20R RNAV/GPS approaches. Upgrades (i.e. reduction of minimum criteria) to the Runway 10 ILS and Runway 20R RNAV/GPS were not considered in depth in the Master Plan because of off-Airport obstructions and nearby congested airspace, respectively. However, additional instrument approaches were evaluated for Runway 2R, Runway 20L, and Runway 28.

Because of congested airspace to the north of the Airport, primarily due to east-west traffic flows from Chicago – O'Hare International Airport, an instrument approach procedure from the north for Runway 20L would likely encounter similar constraints as the existing Runway 20R

RNAV/GPS approach (described in Chapter 4). Implementation of an instrument approach procedure to Runway 2R would require more restrictive obstacle identification and clearance surfaces and trigger impacts to the Prairie Landing Golf Course and clubhouse beyond those identified as part of the ARC upgrade to Runway 2R-20L. In addition, the Airport already has an instrument approach from the south on Runway 2L that is accessible when winds are calm or out of the north.

An RNAV/GPS instrument approach to Runway 28 would provide instrument approach capability when winds are out of the east. As summarized in Table 4-2 in Chapter 4, the predominant wind conditions at the Airport are out of the south and west. With the congested airspace to the north of the Airport limiting the reliability of the Runway 20R RNAV/GPS approach, establishing a new instrument approach to Runway 28 would increase the overall accessibility of the Airport. In order to implement the approach, obstructions currently located off-Airport to the east of the runway would need to be cleared. A full description and evaluation of a RNAV/GPS instrument approach to Runway 28 is provided in Appendix B.

Therefore, the most practical means of upgrading the Airport's instrument approach capability is to implement an RNAV/GPS approach to Runway 28. It is not recommended that instrument approaches be implemented to either end of Runway 2R-20L.

Taxiway E Bi-directional Flow

The facility requirements identified an operational issue with opposite direction aircraft movements on Taxiway E, primarily caused by aircraft moving between general aviation facilities on the south side of Tower Road and either the self-serve fuel facility in the northeast quadrant of the Airport or Runway 15-33. This head-to-head conflict could be mitigated by constructing either a full or partial-length taxiway parallel to Taxiway E or removing the sources of the conflict.

An evaluation of the highest and best use for on-Airport land areas (discussed in the following section) recommends phasing out general aviation facilities in the northeast quadrant and redeveloping those facilities in the southeast quadrant of the Airport. Additionally, since it is recommended that Runway 15-33 be decommissioned during the planning period, existing conflicts on Taxiway E will be mitigated. Therefore, no taxiway improvements or additions are recommended for the planning period.

ON-AIRPORT LAND USE ALTERNATIVES

Alternatives to evaluate potential development of all Authority-owned lands were prepared to ensure that future development recommendations make the highest and best use of Airport properties. Development of on-Airport lands should be considered in any planning exercise to make good use of available land to support Airport operations as well as enhance and diversify future Airport revenue streams.

Airport land use alternatives are presented on Figure 5-2 and are described below. It should be noted that each land use alternative would retain the following land use areas:

- Flight Center area reserved for corporate aviation uses
- Aviation support functions retained immediately north of the Flight Center
- General aviation facilities along the south side of Tower Road
- Non-aviation uses to the west of the Flight Center, between the Chicago & Northwestern Railroad spur and Kautz Road

- **Alternative 1.** This alternative would reserve the area in the northeast quadrant of the Airport for a mix of general aviation, aviation-related businesses, and non-aviation uses. The area to the east of the parallel runways would be reserved for general aviation. The Flight Center and areas to the south on the west side of the parallel runway system would be reserved for corporate aviation and a portion of the Prairie Landing Golf Course.

- **Alternative 2.** This alternative would reserve the area in the northeast quadrant of the Airport for a mix of general aviation, aviation-related businesses, aviation support, and non-aviation uses. The area to the east of the parallel runways would be split between general aviation and recreational uses. The area to the west of the parallel runways would be reserved for general aviation.

- **Alternative 3.** This alternative would reserve the area in the northeast quadrant of the Airport for a mix of general aviation, aviation-related businesses, aviation support, and non-aviation uses. The area to the east of the parallel runways would be reserved for a mix of aviation-related businesses and recreational uses. The area to the west of the parallel runways would be reserved for general aviation.

- **Alternative 4.** This alternative would reserve the area in the northeast quadrant of the Airport for both aviation-related businesses and non-aviation uses. The area to the east of the parallel runways would be reserved for general aviation. The area to the west of the parallel runways would be reserved for a mix of general aviation and recreational use, maintaining portions of the existing Prairie Landing Golf Course.

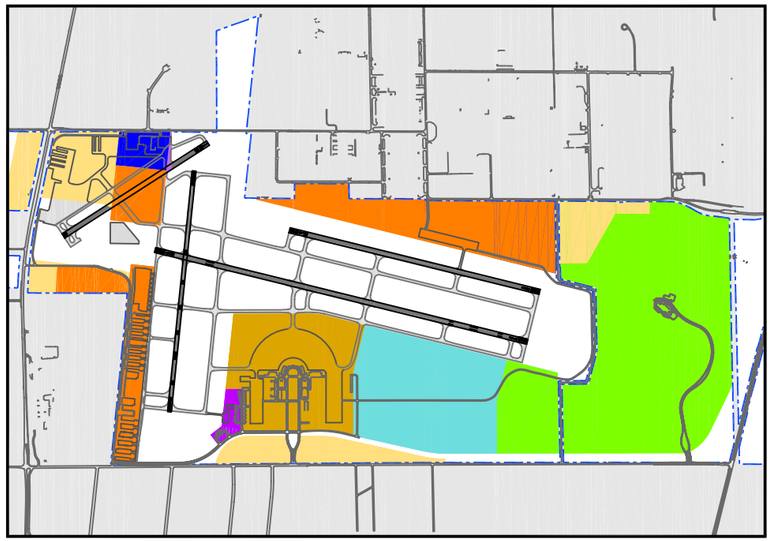
- **Alternative 5.** This alternative would reserve the area in the northeast quadrant of the Airport for a mix of general aviation, aviation support, and non-aviation uses. The area to the east of the parallel runways would be reserved for a mix of aviation-related businesses and recreational uses. The Flight Center and areas to the south on the west side of the parallel runway system would be reserved for corporate aviation.

- **Alternative 6.** This alternative would reserve the area in the northeast quadrant of the Airport for a mix of general aviation, aviation support, and non-aviation uses. The area to the east of the parallel runways would be reserved for a mix of aviation-related businesses and recreational uses. The area to the west of the parallel runways would be reserved for both corporate aviation as well as aviation-related businesses.

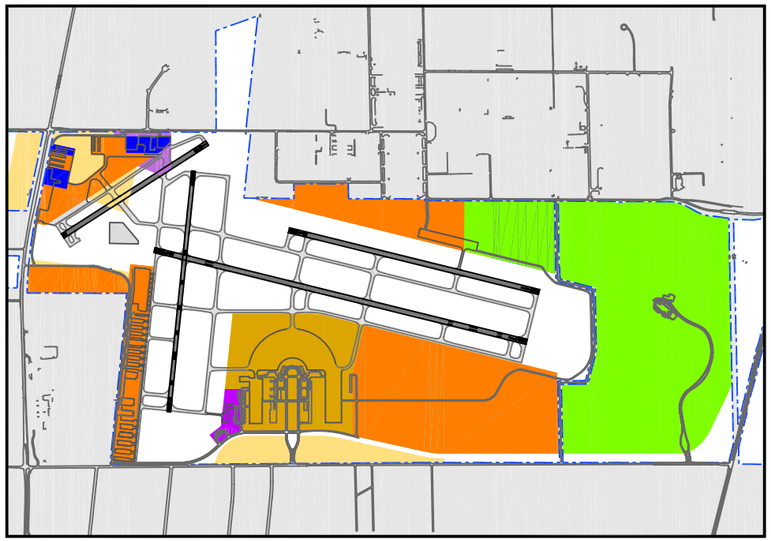
Evaluation of on-Airport land use alternatives considered the following factors:

- Provide land area necessary to accommodate the facility requirements identified in Chapter 4 and satisfy the overarching planning objectives and guidelines presented in Chapter 6 (Table 6-1)
- Evaluate future uses for land areas made available through implementation of the preferred airfield alternatives (i.e. future decommissioning and removal of Runway 15-33)
- Provide sufficient reserve land areas to accommodate growth beyond the Master Plan 20-year horizon
- Consider the surrounding Airport environs, depicted in Figure 2-4, to ensure that on- and off-Airport land uses are complementary

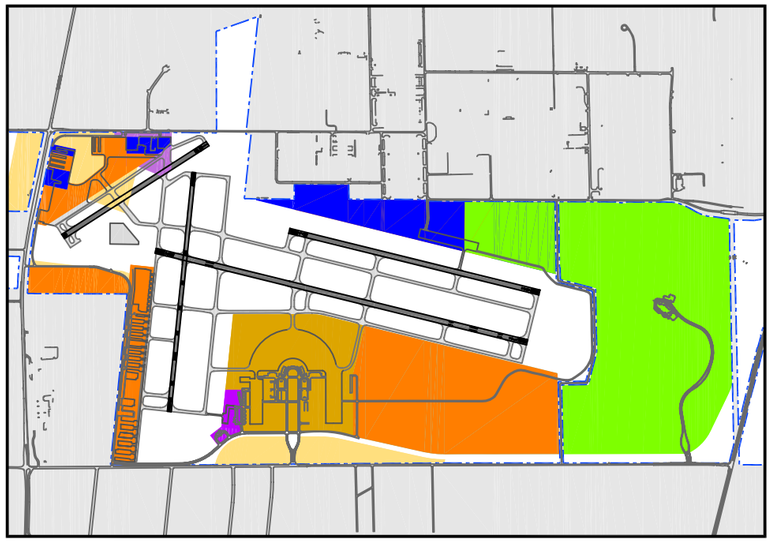
The preferred concept for future on-Airport land uses is described in detail in Chapter 6.



Alternative 1

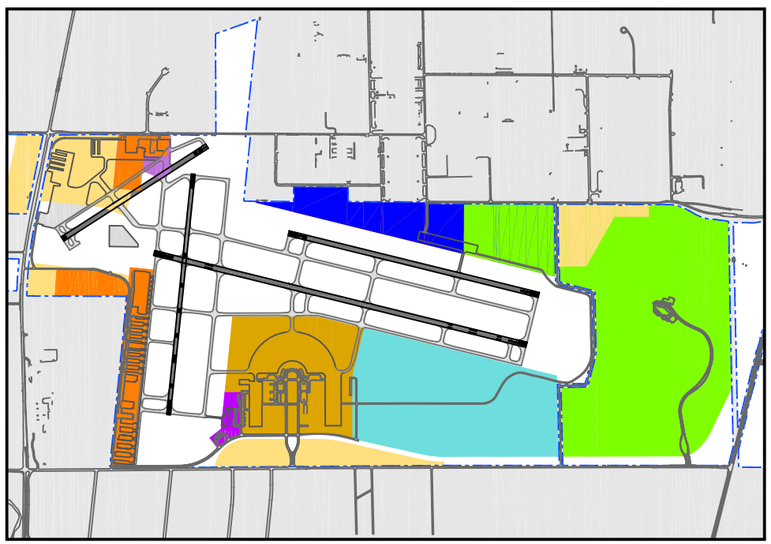


Alternative 2

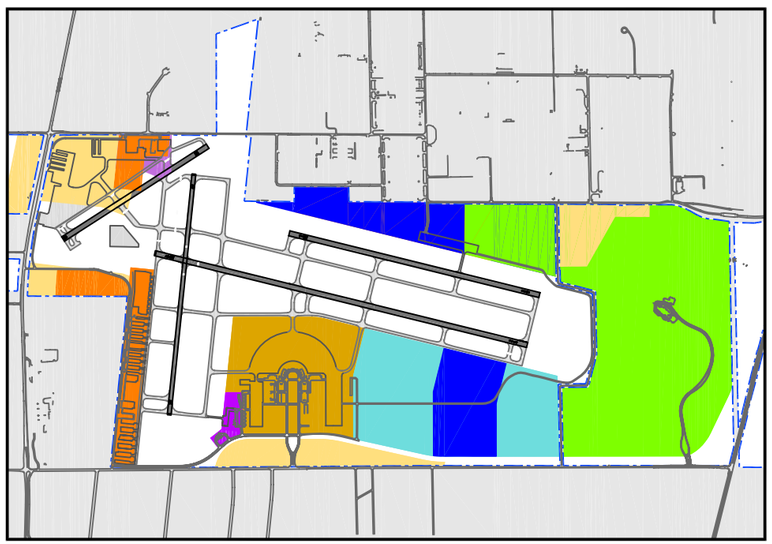


Alternative 3

Alternative 4



Alternative 5



Alternative 6

LEGEND

Airport property line

GENERALIZED LAND USES

- Airfield
- Aviation-related business
- Aviation support
- Corporate aviation
- General aviation
- Non-aviation
- Recreational
- Reserved for future development

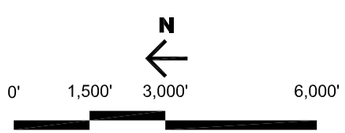


Figure 5-2
FUTURE ON-AIRPORT LAND USE ALTERNATIVES
DuPage Airport Master Plan
September 2009

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Chapter 6

RECOMMENDED DEVELOPMENT PLAN

Based on Master Plan analysis, a Recommended Development Plan (RDP) for DuPage Airport has been prepared through 2027, the final year of the planning period considered in this Master Plan. The RDP incorporates the recommended alternatives for various facilities evaluated in Chapter 5 as well as additional facility expansions to meet facility requirements.

SUMMARY

Planning guidelines and objectives were established in coordination with Authority staff to guide the overall direction for the planning effort, facilitate screening of alternatives, and select projects to include in the RDP. These planning guidelines are summarized in Table 6-1.

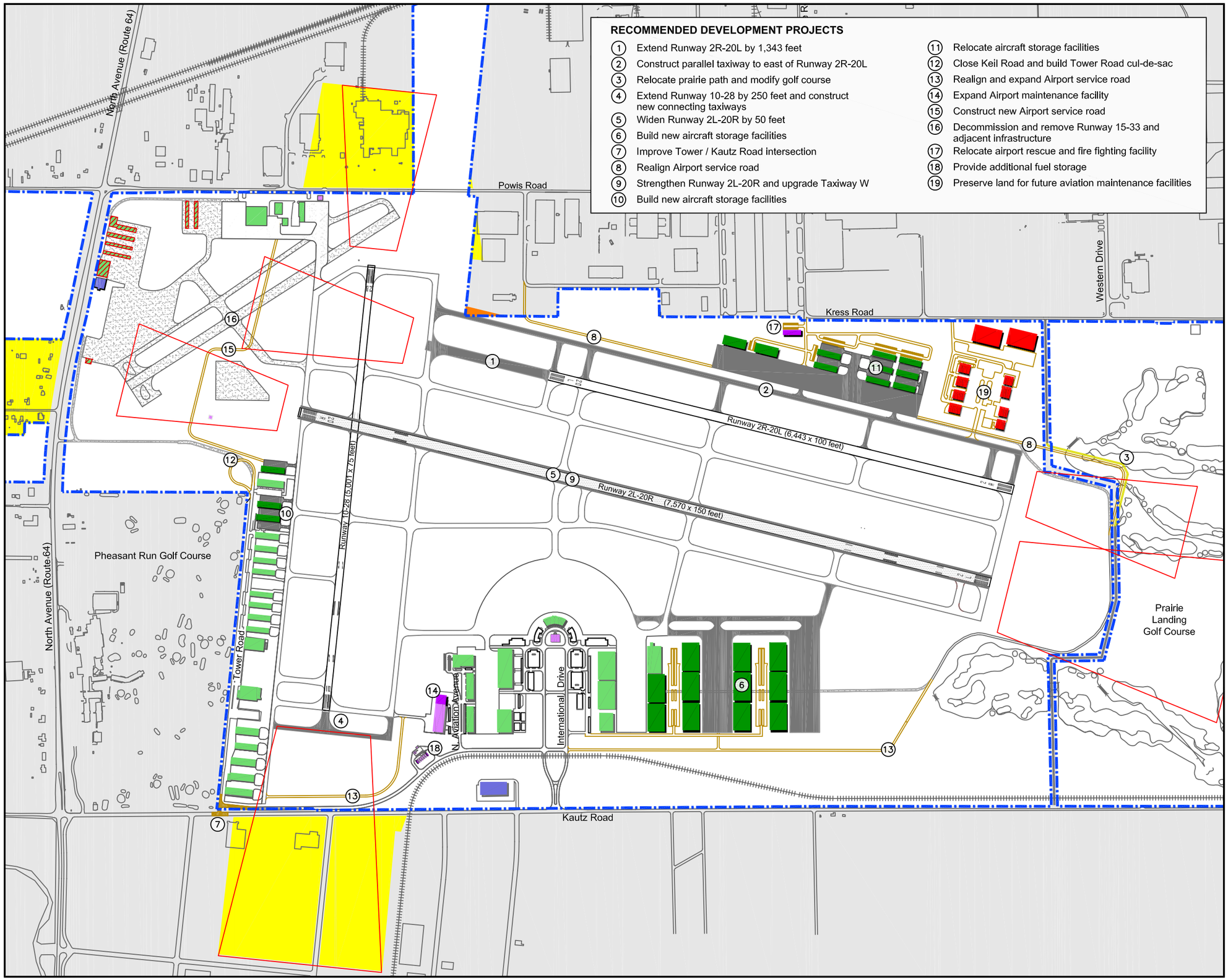
The following projects* are recommended for implementation over the planning period to meet the facility requirements and are depicted on Figure 6-1:

- Widen Runway 2L-20R to a total width of 150 feet, strengthen the pavement, and upgrade pavement strength and fillet geometry on adjacent Taxiway W
- Extend Runway 2R-20L by 1,343 feet to the north such that the Runway 20L threshold is aligned with existing Taxiway G and upgrade its ARC to C-II
- Extend Runway 10-28 to the west by 250 feet and construct new connecting taxiways
- Decommission Runway 15-33 and remove airfield pavements
- Construct a full-length parallel taxiway to the east of Runway 2R-20L
- Relocate the prairie path and modify one hole of the Prairie Landing Golf Course to satisfy FAA design standards for runway safety and object free areas
- Provide new based aircraft hangars, aprons, and support facilities for corporate and general aviation activity
- Undertake infrastructure and utility improvements to support future aviation- and non-aviation-related development in the northeast and southeast quadrants of the Airport
- Reconfigure the Tower / Kautz Road intersection and construct a cul-de-sac at the east end of Tower Road
- Construct a secure service roadway around the perimeter of the airfield

*Projects are listed in no particular order.

Table 6-1
Planning Objectives and Guidelines
DuPage Airport Master Plan

Airport role/market	Enhance the Airport's role as a premier business airport and general aviation reliever general aviation reliever Continue to focus on general aviation as the primary aviation market Identify sites and requirements for potential MRO facilities and operations
Land use	Allow for the orderly and systematic development of the Airport with flexibility to adapt to changing conditions Identify areas not required for aviation uses; and recommend the ultimate disposition for lands not needed to support aviation demand Consider potential relocation/replacement of older general aviation facilities to facilitate development of higher-yield land uses
Financial factors	Identify development and phasing plans consistent with forecast demand and funding capacity Consider opportunities to develop new revenue sources and/or make positive economic impacts to the county and surrounding communities Consider all funding sources and opportunities for revenue enhancement
Airfield/airspace	Identify projects that enhance Airport accessibility for the primary market Enhance accommodation of the BBJ and other large general aviation aircraft
Terminal area	Reserve space for core development beyond the 20-years planning horizon Continue to maintain high levels of service to based tenants and transient customers
General aviation	Site future hangar and apron areas based on airfield geometry and proximity to amenities and servicing facilities Locate new development areas to maximize operational efficiency and minimize construction of new infrastructure
Access and parking	Address traffic constraints resulting from public use of on-Airport roadways Enhance on-Airport circulation and ensure continuous access to all facilities
Airport support	Maintain a consolidated site for operations and maintenance functions



LEGEND

- Airport property line
- Additional roadway pavement
- Runway protection zone
- Additional airfield / apron pavement
- Pavement to be strengthened
- Pavement to be removed
- Structures to be removed
- Avigation easement acquisition
- Property acquisition

	Existing	Recommended
General aviation		
Aviation maintenance		
Non-aviation		
Aviation support		

Notes: Layout of future facilities for illustrative purposes only.

Not all projects depicted are included in the 20-year capital improvement plan.

N

0' 500' 1,000' 2,000'

Figure 6-1
RECOMMENDED DEVELOPMENT PLAN
DuPage Airport Master Plan
September 2009

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- Relocate the ARFF facility to the west side of the Airport south of existing location
- Expand the Airport maintenance facility
- Provide 36,000 gallons of additional Jet-A storage adjacent to the existing facility

RECOMMENDED FUTURE LAND USE PLAN

An important goal of the Master Plan was to determine appropriate land use "envelopes" for accommodating the major Airport functions for the 20-year planning horizon and beyond. The recommended future land use plan is presented on Figure 6-2. A comparison of existing and recommended future land use areas (in acres) is provided in Table 6-2.

Table 6-2
Existing and Future Airport Land Use Areas
DuPage Airport Master Plan

		Existing		Future	
Land use	Description	Acres	% of total	Acres	% of total
Airfield	Runways, taxiways, aprons, and other areas related to aircraft movement	750	27	750	27
Corp aviation	Aircraft service and storage areas where aviation services are provided to corporate users	150	5	325	12
General aviation	Aircraft service and storage areas where aviation services are provided to GA users	125	4	125	4
Aviation support	Facilities associated with the operation and upkeep of the Airport, including maintenance, fuel storage, firefighting, etc.	25	1	50	2
MRO operations	Land reserved for future maintenance, repair, and overhaul facilities	--	--	40	1
Non-aviation	Properties leased to private entities for revenue-generating developments that are not directly related to Airport operations	625	22	700	25
Recreational	Land reserved for recreational and leisure facilities	400	14	360	13
Reserved	Areas owned and controlled by the Authority for future aviation- and/or non-aviation related development	525	20	250	9
Undevelopable	Land areas that cannot be developed due to environmental constraints	200	7	200	7
Total		**2,800**	**100**	**2,800**	**100**

Source: Jacobs Consultancy, June 2009.

Aviation Uses

Areas reserved for future aviation-related uses are summarized below:

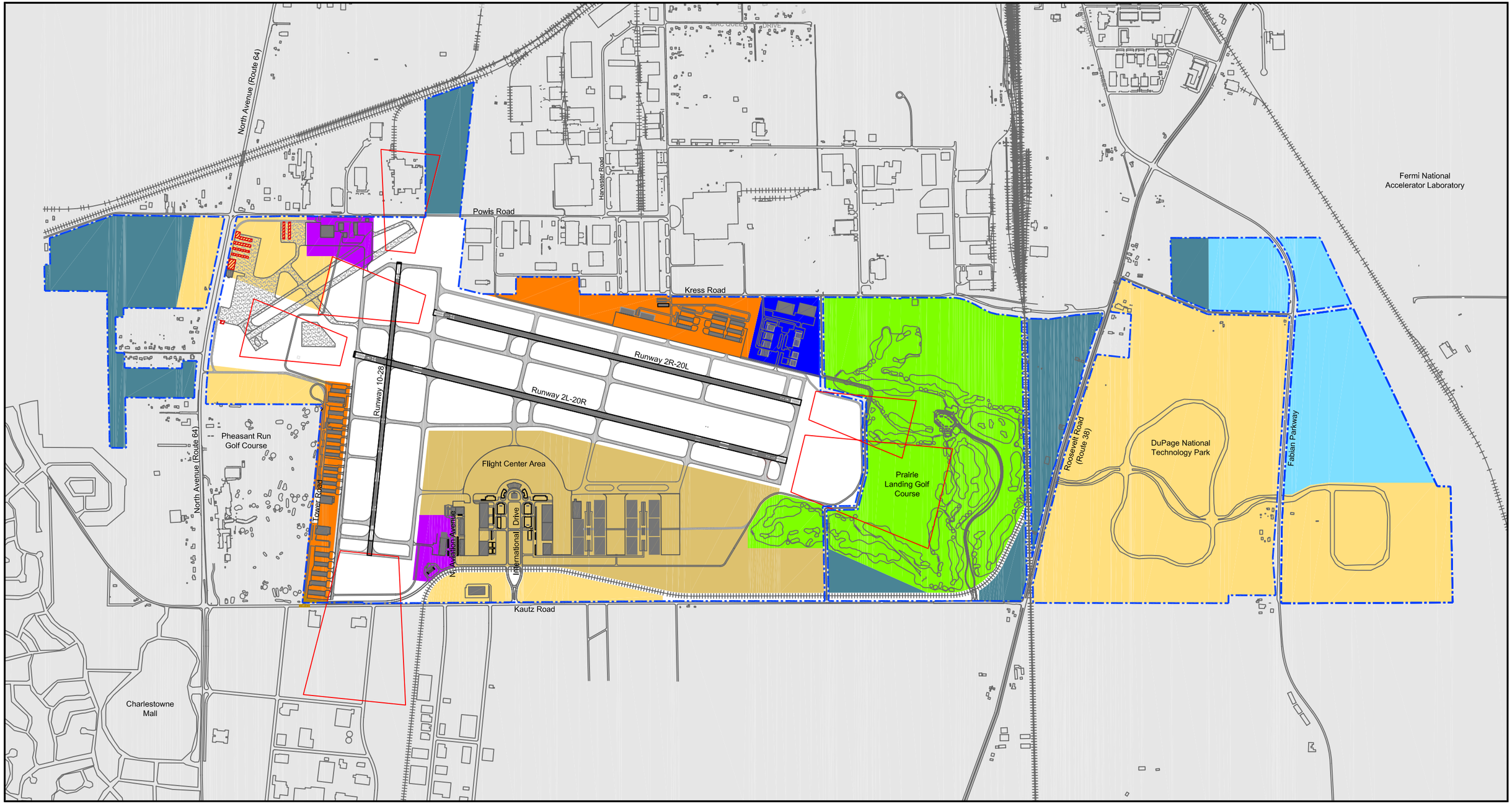
- **Airfield.** As depicted on Figure 6-2, the area reserved for airfield use includes the runways, taxiways, and FAA-required protection areas. Assuming the decommissioning of Runway 15-33, areas designated for airfield use remain in the Airport's northeast quadrant to support the Runway 2L-20R and 2R-20L Runway Protection Zones (RPZs) and a protection area for the Runway 20R approach. Other existing airfield areas remain as they are today.

- **Corporate Aviation.** Areas reserved for corporate aviation are located south of the Flight Center area since critical infrastructure is already in place (or readily accessible) and sufficient land is available to accommodate demand well beyond the 20-year planning period. Given this recommendation, the majority of corporate aviation functions remain on the west side of the Airport so that core tenant development is concentrated proximate to the Flight Center, primary runway, and servicing functions. While not anticipated during the 20-year planning horizon, future growth beyond the planning period may require that approximately 25 acres (holes #5 and #6) of land currently occupied by the Prairie Landing Golf Course be relocated to open areas south of the prairie path and utility easement.

- **General Aviation.** As presented on Figure 6-2, two areas remain reserved for general aviation. The existing general aviation infrastructure along Tower Road is preserved and rehabilitated primarily for aircraft storage. An additional 65 acres in the southeast quadrant of the Airport parallel to Runway 2R-20L is also reserved for general aviation and will primarily accommodate the replacement of facilities displaced by changes in the northeast quadrant.

- **Maintenance Repair and Overhaul (MRO).** As presented on Figure 6-2, an area reserved for a potential third-party MRO development is reserved on the east side of the Airport south of the area reserved for general aviation. This approximately 36-acre site was chosen for its airfield access and compatibility with the adjacent industrial off-Airport land uses.

- **Aviation Support.** The Airport's primary aviation support functions are planned to remain in their existing locations immediately to the north of the Flight Center area. The ARFF, which is presently located along Powis Road near the Runway 33 threshold, is planned to be relocated to a location further south along the Airport's eastern border with Kress Road.



LEGEND

- Airport property line
- Runway protection zone
- Pavement to be removed
- Structures to be removed

GENERALIZED LAND USES

- Airfield
- Aviation support
- Corporate aviation
- General aviation
- MRO operations
- Non-aviation
- Recreation
- Reserved for future development
- Undevelopable

N

0' 800' 1,600' 3,200'

Figure 6-2
FUTURE ON-AIRPORT LAND USE PLAN
DuPage Airport Master Plan
September 2009

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Non-aviation Uses

In addition to the various lands that support the direct operation of the Airport, there are several portions of the Authority's property adjacent to the Airport that are envisioned to be occupied by non-aviation uses in the future. Future non-aviation development is subject to review and approval by the FAA in accordance with grant and surplus property requirements. Specifics related to non-aviation development on Airport properties are provided at the end of this chapter and discussed in detail in Appendix E. Land areas recommended for non-aviation development are described below.

- **Northeast Quadrant.** With the ultimate decommissioning of Runway 15-33 during the planning period (discussed in greater detail in subsequent paragraphs), approximately 70 acres in the northeast quadrant of the Airport along North Avenue are reserved for non-aviation development, which may include commercial office space and/or retail facilities. As shown on Figure 6-2, the land available for non-aviation use would be split into two parcels: (1) a 25-acre parcel to the west of the Runway 2L-20R RSA and RPZ that includes the driving range for Pheasant Run Golf Course, which is on property currently leased from the Authority; and (2) a 45-acre parcel in the corner of the Authority's property adjacent to the Powis Road / North Avenue intersection. Land to the north of the Runway 20R RPZ would not be developed to keep the approach to the runway clear. As summarized in Chapter 5, due to its location adjacent to highly-trafficked North Avenue, these parcels are well-suited to support non-aviation commercial office space and/or retail development. A third parcel, located south of the aforementioned 45-acre parcel along Powis Road and totaling 19 acres, could be used for either aviation or non-aviation uses given its proximity to the airfield.

- **North Side.** The Authority owns approximately 120 acres on the north side of North Avenue. A portion of these properties could be used for non-aviation uses if demand warranted. Figure 6-2 depicts the portion of this property, which totals approximately 20 acres, that is available for future non-aviation development.

- **West Side.** Approximately 35 acres on the west side of the Airport are reserved for non-aviation use. This area is best suited for office developments given current uses on the site.

- **Prairie Landing Golf Course.** The area encompassed by the Prairie Landing Golf Course south of the prairie path remains reserved for recreational uses and is not be needed for aviation-related purposes during the 20-year planning period. Future growth beyond the planning period may require that approximately 25 acres (holes #5 and #6) of land currently occupied by the golf course north of the prairie path be relocated to open areas south of the prairie path and utility easement.

In addition to the above, the Authority's Technology Park has available land for continued development of commercial, office, and light industrial properties.

RECOMMENDED PROJECTS

The following sections summarize the individual projects that comprise the RDP. Phasing of specific improvements is discussed later in this chapter.

Airfield Facilities

Recommended airfield projects are depicted on Figure 6-1 and summarized below:

- **Extend and Upgrade Runway 2R-20L.** Extending Runway 2R-20L to the north by 1,343 feet to provide a total runway length of 6,443 feet and upgrading its ARC designation from B-II to C-II improves the operational flexibility of the airfield and enhances the Airport's role as a premier business airport and a designated reliever. This project positions Runway 2R-20L to provide better secondary capability to Runway 2L-20R during peak periods as well as facilitates intermittent closures to Runway 2L-20R for operations and maintenance. This project also enables Runway 2L-20R to be closed for extended durations to accommodate the proposed widening and strengthening project discussed below. In conjunction with the upgrade to the runway's ARC, the existing prairie path and perimeter service road need to be relocated to the east in order to satisfy FAA design standards for the RSA. Relocating these facilities may require minor design modifications to the Prairie Landing Golf Course.

- **Construct Runway 2R-20L Parallel Taxiway.** As aviation-related facilities are developed in the southeastern quadrant of the Airport, a full-length parallel taxiway is recommended to support aircraft operations and minimize runway crossings. This taxiway provides access between new aviation facilities, Runway 2R-20L, and Runway 10-28 via Taxiway G. Approximately 0.5 acres of off-Airport property, depicted on Figure 6-1, needs to be acquired to satisfy FAA design requirements.

- **Strengthen and Widen Runway 2L-20R.** Strengthening and widening Runway 2L-20R is recommended to enhance the Airport's role as a designated reliever as well as enable it to accommodate larger aircraft in the forecast fleet mix. As discussed in Chapter 3, total operations for ADG III aircraft (such as the Boeing Business Jet, Bombardier Global Express, and Gulfstream 550) are projected to increase from 140 in 2008 to approximately 956 in 2027. The existing Runway 2L-20R pavements were originally designed to accommodate aircraft up to 45,000 pounds. By comparison, the Boeing Business Jet—weighing approximately 145,000 pounds—is three times the design strength of the runway's pavement. Prudent planning supports a simultaneous widening effort to (1) meet FAA design standards for these larger aircraft; (2) provide additional crosswind capability for corporate jet aircraft unable to use Runway 10-28; (3) position the Airport to serve alternative aviation markets; and (4) increase Airport accessibility. Along with the runway strengthening, taxiways that facilitate access between Runway 2L-20R and the Flight Center (Taxiways W, W-2, W-4, W-8, and the west side of E) will also be strengthened.

- **Extend Runway 10-28.** Extending Runway 10-28 to the west by 250 feet to a total length of 5,000 feet is recommended to better accommodate medium-sized corporate jet aircraft, particularly during periods of strong east-west winds or low visibilities. This extension can be accommodated entirely within the Airport's existing property line and is compliant with FAA design standards. Because of obstructions located off-Airport to the west, the Runway 10 arrival threshold is maintained in its current location. Thus, the landing distance available for Runway 10 arrivals remains 4,750 feet. All other operations are able to take advantage of the additional pavement length. Taxiways E and G are extended to the west to facilitate access to the end of the extended runway.

- **Develop Instrument Approach for Runway 28.** Developing a GPS-based instrument approach improves accessibility during periods of strong winds or low visibility. In many situations, an instrument approach to Runway 28 provides aircraft with an alternative to the existing Runway 20R instrument approach, the use of which is at the discretion of Chicago air traffic controllers and affected by arrival and departure traffic at nearby Chicago – O'Hare Airport. Furthermore, as ongoing modernization is realized at O'Hare, decreased dependence on the use of O'Hare Runway 4R-22L by both arrivals and departures increases the availability of use for a Runway 28 instrument approach. A White Paper detailing this recommendation is provided in Appendix B of the Master Plan.

- **Decommission Runway 15-33.** Decommissioning Runway 15-33 is recommended prior to its next major maintenance cycle for numerous reasons. Use of the runway reduces the overall airfield capacity as it conflicts with traffic flows on both Runway 2-20 and Runway 10-28 systems. The runway is not needed to meet wind coverage requirements and is used today primarily out of convenience for aircraft based in hangars and on aprons in the northeast quadrant of the Airport. As these based aircraft facilities reach the end of their useful lives and are replaced in an alternative location, as is recommended and discussed in subsequent paragraphs, it is projected that use of the runway will continue to decline. Furthermore, satisfying FAA design standards for the RSA and OFA requires shortening the runway to an undesirable length for all but a narrow segment of the forecast fleet mix.

- **Acquire Avigation Easements.** Acquisition of avigation easements over off-Airport property to the north, east, and west of the Airport is recommended to ensure operational safety for aircraft flying over close-in off-Airport parcels. Acquiring these easements provides the Airport with greater authority to prevent future development that would negatively impact the accessibility of the Airport to aircraft. The easements would also enable the Authority to perform required obstruction clearance and maintenance functions (i.e. tree clearing). Recommended avigation easement acquisitions are shown on Figure 6-1 and total approximately 115 acres.

General Aviation Facilities

Recommended general aviation development and future based-aircraft facilities are depicted on Figure 6-1 and summarized below:

- **Corporate Aviation.** It is recommended that future corporate aviation facilities be developed in the area south of the Flight Center on the west side of the Airport to take advantage of available developable land, existing utility infrastructure, and the proximity of the many aviation support services offered by the Flight Center and adjacent service providers. This location also provides a central location to the core airfield infrastructure used by corporate aircraft—primarily Runway 2L-20R. Initial development of additional corporate aviation facilities in-fills available space among existing facilities near the Flight Center. Additional hangar development occurs to the south of the Flight Center and includes additional aprons, hangars, access roadways, and vehicular parking. An approximation of future corporate aviation facilities to meet forecast demand within the 20-year planning period is illustrated on Figure 6-1.

- **Southeast Quadrant.** It is recommended that general aviation facilities be developed on an approximately 45-acre site in the southeast quadrant of the Airport. These facilities, which would include hangars, aircraft parking aprons, access roadways, vehicular parking, and various general aviation-related businesses (e.g. self-service fueling or maintenance providers), are intended to replace the existing aged facilities on the Airport's northeast quadrant.

- **Tower Road.** Existing general and corporate aviation facilities along Tower Road, many of which are in good condition, should be preserved for general aviation aircraft storage. It is recommended that these hangars be maintained and rehabilitated as necessary, likely during the latter half of the planning period. Retention of this area for general aviation uses is based on the proximity of the Tower Road hangars to Runway 10-28 as well as the useful life remaining in many of the structures. Discussions are ongoing regarding the relocation of the Airport's Remote Transmitter and Receiver (RTR) facility to a co-located site with a new radar installation south of the Airport. If the RTR facility is relocated, additional hangars could be constructed along Tower Road to take advantage of existing infrastructure.

Aviation Support Facilities

Recommended aviation support facility projects are depicted on Figure 6-1 and summarized below:

- **Airport Rescue and Fire Fighting Facility.** A new ARFF facility is recommended to be constructed on the east side of the Airport near the intersection of Hawthorne Lane and Kress Road. This location satisfies the Part 139 response time requirement and locates the ARFF in a more central location on the Airport while still providing direct access to the City of West Chicago. The ARFF location identified, shown on Figure 6-1, is adjacent to future general aviation facilities recommended for development in the southeast quadrant.

- **Airport Maintenance Facility.** An expansion to the existing Airport maintenance facility is recommended to meet forecast facility requirements and provide additional enclosed space for storage of maintenance and snow removal equipment. This expansion provides 10,000 square feet of new equipment storage, additional salt storage, and expanded vehicular parking for employees.

- **Fuel Storage.** Additional fuel storage tanks are recommended so that the Airport can maintain three-day storage for aviation fuels throughout the planning period. It is recommended that 36,000 gallons of additional Jet-A storage be added to the existing fuel farm through provision of additional tanks or replacement of existing tanks with larger ones based on economic, environmental, and maintenance considerations. Alternatively, the Airport has the option of converting under-utilized AvGas / 100LL tanks to additional Jet A storage, thereby reducing the total storage that must be built new.

- **Security Fencing.** Security fencing around the perimeter of the airfield should be upgraded to meet minimum FAA height requirements that comply with Part 139 standards. This is recommended given the Airport's role as a premier business and corporate aviation facility. In addition, a new controlled access system should be implemented at all airfield gates and access points. Installation of a wildlife access protection skirt is also recommended.

- **Infrastructure.** Various utility extensions and drainage infrastructure will be required throughout the planning period in association with many of the projects in the Recommended Development Plan. In particular, infrastructure projects are required to support (1) development of the southeast quadrant for general aviation facilities and potential MRO operations; (2) decommissioning and removal of Runway 15-33 and general aviation facilities in the northeast quadrant; (3) site preparations in the northeast quadrant to support non-aviation development; and (4) future corporate aviation facilities to the south of the Flight Center.

Airport Access and Circulation

The following summarizes recommended Airport access and circulation improvement projects. Because the Authority does not have direct control and jurisdiction over regional transportation initiatives, the recommended projects are limited to on-Airport improvements. However, it is recommended that the Authority continue work with regional transportation planning entities to advocate for improved regional access. Unforeseen changes in regional access may warrant additional or modified on-Airport roadway improvements to ensure that the Airport continues to enhance its accessibility.

- **Tower Road / Kautz Road Intersection Reconfiguration.** It is recommended that the intersection of Tower and Kautz Roads be reconfigured by closing Tower Road to eastbound traffic between Kautz Road and DuPage Drive in order to mitigate an existing hazardous situation caused by the proximity of the two Tower Road intersections. Physical improvements include reconfigured curbs, new signage and markings, and landscaping enhancements. Tower Road, which provides access to general aviation facilities located

along its southern side, is a vital link in the on-Airport public roadway system that connects the Flight Center to general aviation and aviation support facilities located in the northeast quadrant. Closure of this segment of Tower Road to eastbound traffic prevents traffic from turning from Kautz Road onto Tower Road. Vehicles accessing Tower Road from the south may turn from Kautz Road onto International Drive and use DuPage Drive to travel north to Tower Road. Vehicles accessing Tower Road from the north may use North Avenue east to Keil Road, make a right turn, and follow Keil Road to the south as it becomes Tower Road. This change does not eliminate the ability for the public to circumvent North Avenue congestion by using Tower Road when traveling eastbound, but it does mitigate the existing safety and traffic hazard while preserving most Airport-related uses of Tower Road.

- **Tower Road Cul-de-sac.** It is recommended that a cul-de-sac be constructed at the east end of Tower Road, thereby disconnecting Tower Road from Keil Road, so that non Airport-related use of Tower Road be prevented and the road can provide a higher level-of-service for Airport users (particularly those utilizing general aviation facilities on the south side of Tower Road). This improvement would be coupled with reinstatement of bi-directional east-west flow on Tower Road at its intersection with Kautz Road. It is recommended that this project be constructed once general aviation and aviation support facilities are no longer located in the northeast quadrant and thus no longer dependent on Tower Road to provide public on-Airport roadway access to the Flight Center.

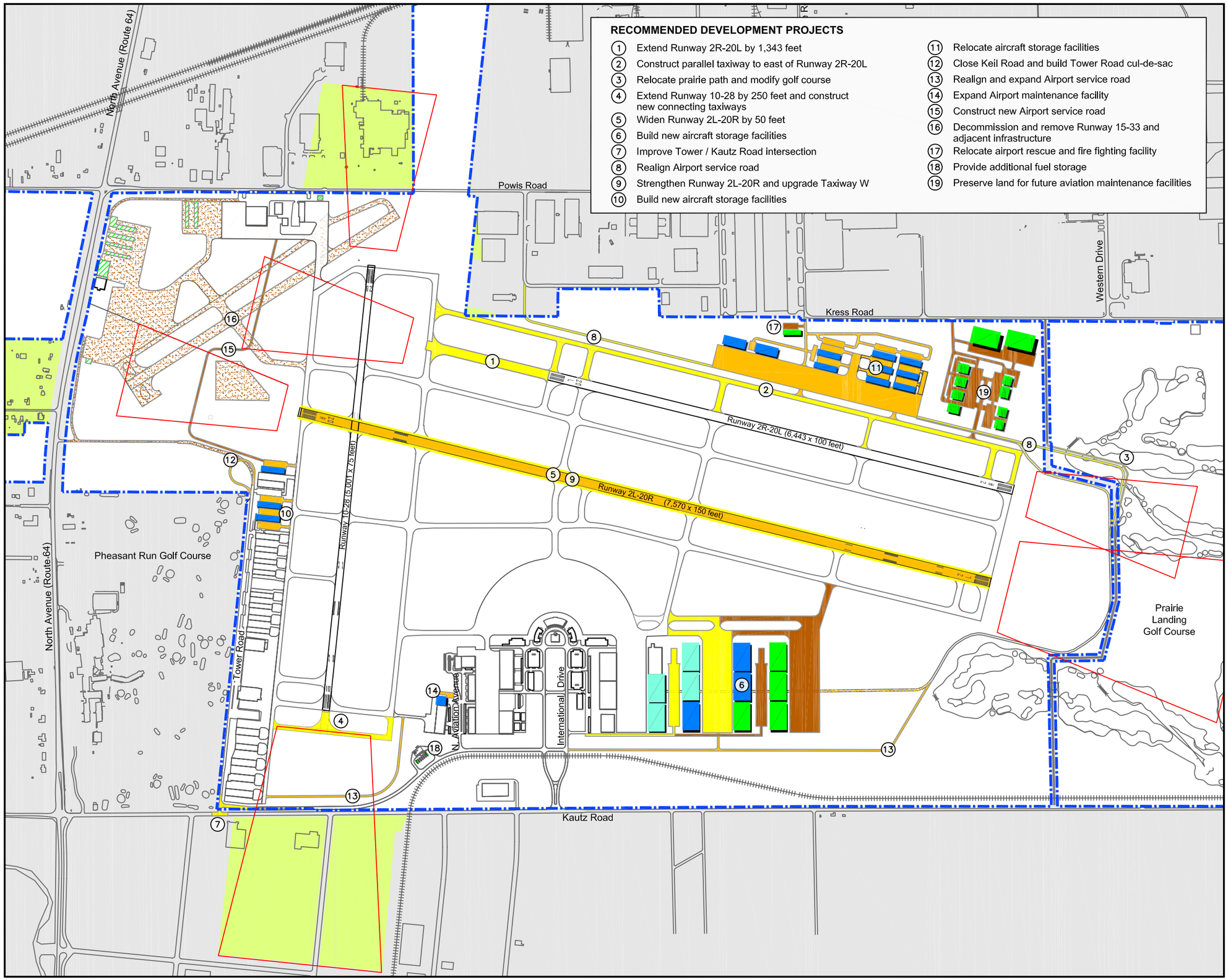
- **Airport Perimeter Road.** A full perimeter roadway should be implemented around the boundaries of the airfield to facilitate the safe and expeditious movement of maintenance trucks, snow removal and mowing equipment, fuel trucks, and emergency equipment (including ARFF vehicles). Portions of a perimeter roadway exist today on the south side of the airfield. Over the planning period, it is recommended that this roadway be extended along the east, west, and north sides where practicable as shown on Figure 6-1.

PHASING PLAN AND COST ESTIMATES

Figure 6-3 presents a phasing plan for the Recommended Development Plan that groups projects into the following distinct phases of development:

Near-term—corresponds with planned development between 2008 and 2012
Mid-term—2013 to 2017
Long-term—2018 to 2027

Cost estimates are summarized for the RDP in Table 6-3. In total, the plan is estimated to cost approximately $135 million over the 20-year planning period. A financial plan identifying potential sources and uses of funds is presented in Chapter 7.



LEGEND

- Airport property line
- Runway protection zone
- Pavement to be removed
- Structures to be removed

Pavement / Structure / Property

- Near-term (2008 - 2012)
- Mid-term (2013 - 2017)
- Long-term (2018 - 2027)

Notes: Layout of future facilities for illustrative purposes only.

Not all projects depicted are included in the 20-year capital improvement plan.

N

0' 500' 1,000' 2,000'

Figure 6-3
RECOMMENDED PHASING PLAN
DuPage Airport Master Plan
September 2009

JACOBS CONSULTANCY

Table 6-3
Recommended Development Plan Cost Estimates
DuPage Airport Master Plan

Project number *(a)*	Development	Estimated cost *(b)*
Near-term (2008 - 2012)		
1	Runway 20L 1,343-foot Extension	$ 3,204,300
2	Prairie Path Relocation / Golf Course Modification	901,700
3	Runway 2R-20L Parallel Taxiway (East)	7,200,000
4	Runway 10 250-foot Extension and Taxiways	1,582,000
5	Runway 2L-20R Widen and Shoulders	6,850,000
6	New Conventional Hangars – 97,900 SF	16,942,000
--	Avigation Easement Acquisition	2,875,000
7	Tower Rd/Kautz Rd Intersection Reconfiguration	50,000
--	Southeast Drainage Project	4,004,000
--	Southeast Utility Extensions	718,800
8	Service Road – Southeast	441,300
--	Environmental Assessments - Airfield Projects	500,000
	Sub-total	**$ 45,269,100**
Mid-term (2013 - 2017)		
9	Runway 2L-20R Strengthen and Taxiway Improvements	$20,928,000
--	Tower Road T-Hangar Rehabilitation	462,000
10	Tower Road T-Hangar Replacement	6,025,800
--	Tower Road Conventional Hangar Rehabilitation	1,414,100
6	New Conventional Hangars – 97,900 SF	16,942,000
6	Conventional Hangar Apron and Taxiway	3,978,100
11	T-Hangar Relocation	3,363,100
11	Southeast Quadrant--Apron Construction	1,370,256
11	Southeast Quadrant--Access Roadways and Parking	333,840
12	Tower Road Cul-de-sac	80,000
13	Perimeter Road--North and West	820,000
14	Airport Maintenance Facility Expansion	1,125,000
--	Environmental Assessment (Decommission Runway 15-33)	500,000
	Sub-total	**$ 57,342,196**
Long-term (2018 - 2027)		
--	Tower Road Conventional Hangar Rehabilitation	$ 2,649,300
6	New Conventional Hangars – 97,900 SF	16,942,000
6	Conventional Hangar Apron and Taxiway	2,441,500
15	Perimeter Road—North	400,300
16	Northeast Quadrant--Airfield Pavement Removal	1,636,800
--	Northeast Quadrant--Airfield Public Road Development	5,055,200
--	Northeast Quadrant--Airfield Utility Extensions	632,500
17	Airport Rescue and Fire Fighting (ARFF) Facility	1,667,500
18	Fuel Farm Improvements - Additional JetA Storage	493,000
	Sub-total	**$ 31,918,100**
	Recommended Development Plan Total	**$134,529,396**

(a) Corresponds to the listing of projects on Figure 6-3, Recommended Development Plan.
(b) Costs are presented in 2009 dollars.

Source: Reynolds, Smith and Hills, Inc., and Jacobs Consultancy, September 2009.

GROWTH BEYOND THE PLANNING PERIOD

Several projects considered in past development plans for the Airport and included on the prior FAA-approved Airport Layout Plan (ALP) are to be retained on the updated future ALP. These projects are not specifically addressed in the Master Plan but will be retained on the ALP for long-term planning purposes.

- **Future Taxiway H.** A parallel taxiway to the south of existing Taxiway E, which runs east-west between general aviation facilities along Tower Road and Runway 10-28. This taxiway would alleviate head-to-head conflicts on Taxiway E and could be pursued in the future should additional activity warrant.
- **Future Taxiway J.** A parallel taxiway to the south of existing Taxiway G, which runs east-west to the south of Runway 10-28. This taxiway would alleviate head-to-head conflicts on Taxiway G and would provide an additional means of access between the Flight Center and the future Runway 20L threshold. The easternmost portion of this Taxiway, which would extend as far as the Runway 28 threshold, would define the limits of the airfield that ought to be preserved should DuPage County and other jurisdictions move forward with improvements to the Powis / Kress Road corridor.
- **Future Widening of Runway 10-28.** Past planning efforts for Runway 10-28 have recommended widening the runway from its existing 75-foot width to a 100-foot width in order to better accommodate use by aircraft with faster approach speeds and future instrument approach procedures.

Because these projects are not required for implementation in the 20-year planning period, they are not included in the overall RDP, cost estimates, or financial plan accompanying this Master Plan.

NON-AVIATION DEVELOPMENT OPPORTUNITIES

The future land use plan for the Airport is depicted in Figure 6-2. As shown, approximately 125 acres of on-Airport land were identified for future non-aviation development, of which 70 acres in the northeast quadrant are currently in direct aviation use while 53 acres elsewhere on Airport property are undeveloped. Pursuing non-aviation development on land not needed for future Airport facilities would enable the Authority to supplement its existing aviation-based revenue stream to help fund Airport capital improvements and operations. A full discussion of non-aviation development opportunities, considerations, and procedures is provided in Appendix E.

Chapter 7

IMPLEMENTATION PLAN

The implementation plan for the Recommended Development Plan presented in Chapter 6 includes an environmental strategy as well as a recommended financial plan.

ENVIRONMENTAL STRATEGY

Given the nature of the recommend facility changes, it is important to have a strategy for obtaining required environmental approvals for the RDP.

Background

The following projects included in the near-term RDP will be subject to environmental review under the National Environmental Policy Act of 1969 (NEPA) and will require an FAA environmental determination before implementation:

- Runway 2R-20L 1,343-foot extension and ARC upgrade
- Runway 2R-20L parallel taxiway
- Prairie path and Prairie Landing Golf Course modification
- Runway 10-28 250-foot extension and adjacent taxiway extensions
- Runway 2L-20R widening and strengthening

The following additional projects included in the near-term RDP may or may not require environmental review depending on sponsorship (Authority-sponsored versus Federal or state), funding sources, funding availability, and potential environmental impact.

- Tower Road/Kautz Road intersection reconfiguration
- Southeast quadrant drainage improvements and utility extensions
- Southeast quadrant airfield and landside access roads
- Southeast quadrant roadway development

The requested federal action necessitating NEPA review for the above airfield-related projects will be FAA approval of the Airport Layout Plan (ALP)* and airspace approval for those projects resulting in changes to airspace procedures, including changes to existing FAR Part 77 or TERPS surfaces. Depending on the funding source used for each project, additional federal actions may include formal requests for federal funding. The prairie path is recreational path managed by DuPage County and subject to the requirements of DOT Section 4(f) and any Authority-sponsored alteration will also necessitate NEPA review. Other NEPA-related environmental considerations may include drainage and wetland facilities in the southeast quadrant, off-Airport noise exposure, and potentially hazardous waste sites in the northeast quadrant.

*It is anticipated that FAA approval of the ALP will be conditional upon environmental review, and therefore, the requested federal action will be ALP approval.

Near-term Environmental Strategy

It is expected that NEPA review of the near-term projects can be accomplished through the completion of an Environmental Assessment (EA) rather than a more comprehensive Environmental Impact Statement (EIS). However, it is unknown at this time whether the projects can be assessed under a single comprehensive EA or multiple individual EAs. Projects that have independent utility can be assessed separately in an EA. The decisions on independent versus a "packaged" NEPA review should be made in consultation with FAA and will be influenced by implementation timing, funding sources, and funding availability.

An additional consideration is NEPA review of projects that are related but divided among the near- and mid-term phases. For example, the widening (near-term) and strengthening (mid-term) of Runway 2L-20R are currently segregated into the two phases primarily for funding purposes; however, the larger project can not be "segmented" or assessed independently. Hence, the timing as to when this environmental review can be accomplished must take multiple factors into consideration, including the shelf-life of FAA environmental approvals.

Upon completion of the Master Plan and approval of the ALP, a recommended near-term environmental strategy is provided below:

1. Develop an implementation strategy on specific near- and mid-term projects given sponsorship decisions and funding sources.

2. Conduct coordination meetings with the FAA to discuss the environmental approval process, obtain direction on whether near-term projects can be handled with an EA rather than the more comprehensive EIS, and determine whether projects should be evaluated in a "packaged" format or evaluated individually.

3. Initiate the NEPA process, including refinement of the scope, purpose and need, alternatives, and stakeholder coordination, etc.

Environmental Strategy for Decommissioning Runway 15-33

The RDP recommends decommissioning and removal of Runway 15-33 when the pavement reaches the end of its useful life in the latter half of the planning period. FAA requirements for decommissioning a runway are fairly straight-forward and provided in Code of Federal Regulations (CFR) Title 14, Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*.

- **Planning Background.** The initial step in the decommissioning process is to prepare planning data and collect background evidence to demonstrate that Runway 15-33 is not needed for operational or capacity purposes at present or in the future. As supported by data and material included in this Master Plan, the closure case should demonstrate that that Airport is better served by not having the runway from an operational perspective, is able to accommodate the forecast fleet mix with other airfield facilities; and should re-designate land areas in the northeast quadrant for non-aviation uses. The Authority will also have to

provide evidence that the Airport is released from any grant obligations associated with the runway. FAA support and approval of this plan is crucial.

- **NEPA Processing.** The level of NEPA processing and review would be determined through an initial review of potential impacts, including but not limited to changes in noise exposure, impacts associated with redevelopment of the land, and alternations to surface traffic patterns associated with redevelopment. Potential impacts must be coordinated with the FAA, which will make the final determination as to what type of processing is required. The typical NEPA review for a runway closure is an EA or an EIS.

- **Environmental Determination.** Once the environmental processing is complete and the FAA makes a determination (a Finding of No Significant Impact [FONSI] for an EA, or Record of Decision [ROD] for an EIS), the decommissioning can take place. Coordination with various offices of the FAA would be necessary to ensure that the runway is removed from FAA databases, published charts, and aeronautical directories. In the case of Runway 15-33, the process is somewhat simplified since there are no published instrument approach procedures that need to be cancelled.

- **Physical Closure.** Lastly, the physical runway would need to re-marked as "closed" until the pavement can be removed so that it is clear to pilots that the runway is no longer usable. If the runway is to temporarily serve as a taxiway or other airfield movement area, it may need to have the lighting changed accordingly.

The duration of the decommissioning process can vary greatly. Typically, approval of the ALP can take anywhere between six months and two years. Subsequent environmental processing may take an additional one to two years to complete. Unless the Airport is self-funding the environmental review, time must also be added for grant applications, approvals to fund the environmental work, and FAA determinations. Altogether, the decommissioning process could take several years to complete.

FINANCIAL PLAN

The financial plan identifies capital funding sources required to implement projects included in the RDP. In support of the development of the financial plan, financial analyses were conducted throughout the Master Plan, as follows:

- A preliminary financial capacity analysis was completed at the beginning of the Master Plan process to facilitate identification of projects include in the RDP.

- A Capital Improvement Program (CIP) was developed coincident with the RDP; the CIP allocates funding sources expected to be available through the planning period to RDP projects.

Assumptions

The financial plan was developed according to information and assumptions that provide a reasonable basis for analysis at a level appropriate for an airport master plan. Some of the assumptions used to develop projected funding and cost estimates may not be realized, and unanticipated events and circumstances may occur. Therefore, the actual results will vary from those projected, and such variations could be material.

The financial plan is preliminary in nature and not intended to be used to support the sale of bonds or to obtain any other forms of financing. More detailed cost estimates and financial analyses are required to implement the RDP. It is also important to note that some projects presented in the RDP could be postponed or eliminated if expected aviation activity levels are not achieved, construction costs rise significantly, or if projected funding levels are not available.

Cost estimates for RDP projects were prepared based on criteria specific to the Chicago region. Cost estimates include construction costs as well as a variety of soft costs, including items such as project design, construction administration, general conditions, owner soft costs, and contingencies, as follows:

- 39% for the majority of civil engineering projects
- 28% for larger airfield projects to acknowledge the likely economies of scale to be realized
- An inflation increase relative to the anticipated year of project implementation. Inflation was assumed to be 1.8 % per year.*

Funding Sources

The baseline aviation activity forecasts presented in Chapter 3 and historical funding sources were used to determine financing capacity. Conservative assumptions were used to avoid overestimating the financial capacity of the Authority during the planning period; key among these being the assumption that net revenues generated from Authority operations to fund capital projects would be negligible. Other key planning assumptions were:

- FAA Airport Improvement Program (AIP) entitlement grants were projected assuming the annual maximum amount would be received.
- AIP discretionary grants, State Division of Aeronautics grants, and other State capital outlay funds were assumed to be available for specific eligible projects at or below the average annual historical levels for projects with similar eligibility.

The total financial capacity of the Authority during the planning period was projected to be $163 million. Assumed funding sources are described in greater detail in the sections herein.

*The basis for this inflation rate is the difference between projected nominal and real interest rates on United States Treasury Notes and Bonds over a 20-year period. Source: United States Office of Management and Budget (OMB) Circular No. A-94, Appendix C, December 2008.

Each of the funding sources to be used by the Authority has unique availability, eligibility, and time constraints. For all funding sources considered, the availability of funds does not necessarily mean that all funds projected to be available would be allocated to projects in the RDP. In some circumstances, certain funds would remain available and could be allocated to future projects or to future capital development not anticipated in the RDP.

Airport Improvement Program Grants

The Airport Improvement Program is the FAA's grant program for funding capital development at eligible airports, including general aviation airports such as the Airport that are designated reliever airports. The AIP program is authorized by the Airport and Airway Improvement Act of 1982, which authorized funding from the Airport and Airway Trust Fund for airport development; airport planning; and noise compatibility planning and programs. The Airport and Airway Trust Fund is funded through several aviation user taxes (including a 10% federal tax on airline tickets), air cargo, and aviation fuels.

The AIP provides annual entitlement grants to airports, which is based on 20% of the five-year cost of need, for an annual maximum of $150,000. When additional funding is required, the FAA may issue discretionary AIP grants to supplement entitlement funds. AIP funds can be used for most airport development, including airfield improvements such as pavement construction and rehabilitation or reconstruction; land acquisition; safety and security projects, on-airport roadways; access road construction; and noise mitigation. There are exceptions to these broad categories of eligibility that are not discussed here.

The State of Illinois participates in the FAA's State Block Grant Program, under which the Illinois Division of Aeronautics (Division) receives a block AIP grant from the FAA. The Division administers this amount and allocates sub-grants to non-primary airports such as the Airport. The Division undertakes a number of responsibilities that would otherwise be administered by the FAA, such as determining the level of environmental assessment required for a project and approving the Airport Layout Plan. State Block Grant Program participants generally follow the guidelines established by the FAA. The Division has sole responsibility for deciding the distribution of federal funds and discretion to distribute funds based on knowledge of local, regional, and statewide conditions.

Grant-specific assumptions made for this analysis are as follows:

- **Entitlement grants.** As the operator of a non-primary airport, the Authority is eligible for an AIP entitlement apportionment in each federal fiscal year in which the AIP is funded at a level of $3.2 billion or more. The entitlement is calculated as 20% of the five-year cost of the need listed for the Airport in the most recent NPIAS, with an overall cap of $150,000 annually. It was assumed that the FAA's current methodology for allocating entitlements will not change. According to this assumption, a total of approximately $3.0 million in AIP entitlement grants would be available during the planning period.

- **Discretionary grants.** It was assumed that the Authority will receive $45.1 million during the planning period. Actual grants may be concentrated over several years, or may be higher or lower than anticipated. Close coordination with the FAA and the State is necessary to realize assumed funding levels.

State Funds

The Division administers a trust fund for airports in the State. Matching grants for the local share of project costs are issued by the State based on eligibility criteria similar to those for the AIP. Additionally, the State provides half of the local matching share for FAA-funded capital development, subject to funding availability.

The Illinois Legislature and the Division may also fund specific capital projects. In addition to Trust Fund monies, Division funding may be available for certain roadway projects. There are no limitations to eligibility for Legislature capital outlay requests. However, State general funds are typically reserved for projects that are of a broader purpose, often with the goal of promoting economic development.

In the financial capacity analysis, it was assumed that (1) State Trust Fund amounts would be available to fund half of the local matching share for AIP-funded projects; and (2) other Division monies would be available to fund certain roadway projects. According to these assumptions, approximately $2.5 million in State grants would be received through the planning period.

Authority Property Tax Levy

The Airport Authorities Act*, allows each authority created under the act "to levy and collect a general tax on all of the taxable property within the corporate limits of such Authority for the purpose of paying the cost of operating and maintaining any public airport or public airport facility of the Authority, and any other corporate expenses of the Authority." The Authority currently levies a fixed $6.5 million annual tax on the assessed valuation of real property located in DuPage County. This property tax is assumed to continue during the planning period at the same amount in 2009 dollars, such that in the final year of the planning period, $4.7 million in real property tax revenues would be available to fund project costs. According to this assumption, approximately $112.3 million would be available during the planning period.

Authority-issued Bonds

The Authority could issue two kinds of debt to help fund RDP projects: general obligation bonds and general airport revenue bonds. The Authority has issued general obligation bonds secured by property tax revenues to fund major capital projects in the past. The last bond series was fully defeased in 2007. The Authority has not issued general airport revenue bonds in the past, which are secured by revenues generated by airport tenants (such as fuel sales and building rental revenues).

*Section 13 of Illinois Chapter 70 Special Districts, 70 ILCS 5/, Airport Authorities Act.

It was assumed that the Authority would not issue general obligation bonds or general airport revenue bonds in the future, as consistent with current Authority policy. Therefore, no funds were assumed to be available from Authority-issued bonds.

Other Authority Funds

Under management directives, certain property tax revenues are deposited to the Authority's Capital Reserve Fund each fiscal year. Amounts are budgeted each year for specific capital projects and can be expended only as budgeted. The Authority also accumulates surpluses in the Operating Fund that can be used to fund capital projects.

For the purpose of this analysis, it was assumed that (1) amounts on deposit in the Capital Reserve Fund would be available to fund RDP projects; and (2) incremental operating and maintenance costs resulting from the implementation of the RDP would be funded from Authority operations. Otherwise, Authority-generated funds for RDP projects were assumed to be negligible and are not included as a funding source in the financial plan.

Tenant or Third-party Funding

The RDP includes general aviation hangars and related support facilities. Although planning-level design layouts are provided in the RDP, it is possible that funding for the detailed design and construction of these facilities would be provided by an Airport tenant or third party that has entered into a long-term ground lease with the Authority for the development space.

For strategic business reasons, Authority management has indicated that they prefer to maintain control over hangar pricing but is open to third-party development projects. However, no third-part financing was assumed as a funding source.

Summary of Capital Improvement Program

Table 7-1 summarizes the CIP for near-term (2008-2012), mid-term (2013-2017), and long-term (2018-2027) projects. Estimated capital expenditures total approximately $151.9 million (in escalated dollars) and include all projects in the RDP. Table 7-2 shows that projected funding sources are sufficient to meet projected uses for near-term projects.

As shown in Table 7-2, total estimated capital expenditures approximately equal the Authority's financial capacity during the planning period. Numerous assumptions underlie the projected financial capacity, some of which may underestimate the financial capacity. It is possible that any maintenance projects not shown in the CIP (particularly in later years) could be funded by excess sources of funds should such funds become available.

Financial Capacity Summary

The financial capacity analysis presented herein shows that the RDP is feasible and implementable given the assumptions listed above. Any operational surpluses generated by the Authority during the planning period would represent additional monies to fund capital development projects not outlined in this document.

Table 7-1
Capital Improvement Program
DuPage Airport Master Plan

	Project cost *(a)*	Funding Sources: Federal AIP Grants *(b)* Entitlement	Federal AIP Grants *(b)* Discretionary	State Grants	Local Funds
Near-term (2008-2012)					
Runway 20L 1,343-foot Extension	$ 3,250,000	$ 750,000	$ 2,338,000	$ 81,000	$ 81,000
Runway 2R-20L Parallel Taxiway (East)	7,422,000	--	7,051,000	186,000	185,000
Prairie Path Relocation / Golf Course Modification	918,000	--	872,000	23,000	23,000
Runway 10 250-foot Extension and Taxiways	1,625,000	--	1,544,000	41,000	40,000
Runway 2L-20R Widen and Shoulders	7,201,000	--	--	1,948,000	5,253,000
New Conventional Hangars – 97,900 SF	17,405,000	--	--	--	17,405,000
Avigation Easement Acquisition	2,901,000	--	2,756,000	73,000	72,000
Tower Rd/Kautz Rd Intersection Reconfiguration	50,000	--	--	45,000	5,000
Southeast Drainage Project	4,113,000	--	3,907,000	103,000	103,000
Southeast Utility Extensions	745,000	--	708,000	19,000	18,000
Service Road - Southeast	457,000	--	434,000	11,000	12,000
Environmental Assessments - Airfield Projects	500,000	--	475,000	13,000	12,000
Subtotal	$ 46,587,000	$ 750,000	$20,085,000	$2,543,000	$ 23,209,000
Mid-term (2013-2017)					
Runway 2L-20R Strengthen and Taxiway Improvements	$ 22,577,000	$ 750,000	$20,698,000	$ 564,000	$ 565,000
Tower Road T-Hangar Rehabilitation	525,000	--	--	--	525,000
Tower Road T-Hangar Replacement	6,852,000	--	--	--	6,852,000
Tower Road Conventional Hangar Rehabilitation	1,608,000	--	--	--	1,608,000
New Conventional Hangars – 97,900 SF	19,029,000	--	--	--	19,029,000
Conventional Hangar Apron and Taxiway	4,468,000	--	--	--	4,468,000
T-Hangar Relocation - 30 units	3,845,000	--	--	--	3,845,000
SE Apron Construction	1,512,000	--	1,436,000	38,000	38,000
SE Access Roadways and Parking	360,000	--	--	--	360,000
Tower Road Cul-de-sac	92,000	--	--	--	92,000
Service Road - West and North Phase 1	921,000	--	--	413,000	508,000
Airport Maintenance Facility Expansion	1,298,000	--	1,233,000	32,000	33,000
Environmental Assessment (Decommission Rwy 15-33)	567,000	--	539,000	14,000	14,000
Subtotal	$ 63,654,000	$ 750,000	$23,906,000	$1,061,000	$ 37,937,000
Long-term (2018-2027)					
Tower Road Conventional Hangar Rehabilitation	$ 3,370,000	$ --	$ --	$ --	$ 3,370,000
New Conventional Hangars – 97,900 SF	22,052,000	--	--	--	22,052,000
Conventional Hangar Apron and Taxiway	3,122,000	--	--	--	3,122,000
Service Road - North Phase 2	496,000	--	471,200	12,400	12,400
NE Airfield Pavement Removal	2,147,000	--	--	--	2,147,000
NE Airfield Public Road Development	6,786,000	--	--	--	6,786,000
NE Airfield Utility Extensions	849,000	--	--	--	849,000
Airport Rescue and Fire Fighting (ARFF) Facility	2,199,000	1,500,000	589,050	54,975	54,975
Fuel Farm Improvements - Additional JetA Storage	680,000	--	--	--	680,000
Subtotal	$ 41,701,000	$1,500,000	$ 1,060,250	$ 67,375	$ 39,073,375
Total	**$151,942,000**	**$3,000,000**	**$45,051,250**	**$3,671,375**	**$100,219,375**

Notes:
(a) Project costs have been escalated to year of construction assuming an annual rate of 1.8%.
(b) AIP = Airport Improvement Program.

Source: Jacobs Consultancy, September 2009.

Table 7-2
Sources and Uses of Funds—Near-Term Projects
DuPage Airport Master Plan

	Total	2009	2010	2011	2012
Sources of funds					
Federal grants					
AIP entitlement grants	$ 750,000	$ 148,000	$ 602,000	$ --	$ --
AIP discretionary grants	20,085,000	2,303,000	10,785,000	5,102,000	1,895,000
Subtotal	$20,835,000	$2,451,000	$11,387,000	$ 5,102,000	$ 1,895,000
State grants	$ 2,543,000	$ 109,000	$ 300,000	$ 519,000	$ 1,615,000
Local funding *(a)*					
Annual property tax receipts *(b)*	$20,635,000	$4,305,000	$ 4,611,000	$ 5,558,000	$ 6,161,000
Drawdown of existing balances	2,574,000	--	--	--	2,574,000
Subtotal	$23,209,000	$4,305,000	$ 4,611,000	$ 5,558,000	$8,735,000
Total sources	**$46,857,000**	**$6,865,000**	**$16,298,000**	**$11,179,000**	**$12,245,000**
Uses of funds					
Runway 20L 1,343-foot Extension	$ 3,250,000	$ 641,000	$ 2,609,000	$ --	$ --
Runway 2R-20L Parallel Taxiway (East)	7,421,000	--	3,928,000	$ 1,731,000	1,762,000
Prairie Path Relocation / Golf Course Modification	918,000	--	918,000	--	--
Runway 10 250-foot Extension and Taxiways	1,625,000	--	805,000	820,000	--
Runway 2L-20R Widen and Shoulders	7,201,000	--	--	1,420,000	5,781,000
New Conventional Hangars – 97,900 SF	17,405,000	4,236,000	4,312,000	4,389,000	4,468,000
Avigation Easement Acquisition	2,901,000	1,438,000	1,463,000	--	--
Tower Rd/Kautz Rd Intersection Reconfiguration	50,000	50,000	--	--	--
Southeast Drainage Project	4,113,000	--	2,038,000	2,075,000	--
Southeast Utility Extensions	745,000	--	--	745,000	--
Service Road - Southeast	458,000	--	225,000	--	233,000
Environmental Assessments - Airfield Projects	500,000	500,000	--	--	--
Total uses	**$46,587,000**	**$6,865,000**	**$16,298,000**	**$11,180,000**	**$12,244,000**

Notes:
(a) For the purposes of this report, all contributions from the Capital Fund assumed to be from the annual property tax levy.
(b) Discounted assuming 1.8% inflation per year.

Source: Jacobs Consultancy, September 2009.

Appendix A

WHITE PAPER

MARKET ASSESSMENT FOR NEW AVIATION SERVICES

JACOBS
CONSULTANCY

WHITE PAPER

MARKET ASSESSMENT FOR NEW AVIATION SERVICES
DUPAGE AIRPORT

Prepared for:

DuPage Airport Authority

September 2008

WHITE PAPER

Market Assessment for New Aviation Services
DuPage Airport

This White Paper summarizes the potential for the DuPage Airport Authority (the Authority) to establish service in new aviation markets at the DuPage Airport (the Airport). The assessment focuses specifically on the potential for obtaining scheduled commercial passenger service, air cargo service, or a maintenance, repair, and overhaul (MRO) service provider. In addition, the White Paper outlines the process generally recommended to pursue these additional aviation services markets.

BACKGROUND AND OVERVIEW

In August 2006, Jacobs Consultancy presented the results of an "Aviation Activity Forecast and Market Assessment" to Authority staff. The Market Assessment indicated that, although the Airport has high-quality general aviation infrastructure and is located within a large metropolitan area with a strong economic base, there are significant barriers to entry to establishing sustainable scheduled passenger service, air cargo air service, or an MRO service provider. These barriers to entry include:

- ***Existing Provisions for Air Service.*** Established passenger air service is already provided by airlines at multiple airports within or near the Chicago region, including: Chicago O'Hare International (O'Hare) and Chicago Midway International (Midway). In addition, intermittent passenger service has been provided at Chicago Rockford International (Rockford) and Gary/Chicago International (Gary). Rockford, which has had much greater success attracting air cargo service, has limited scheduled passenger service (6 to 7 weekly departures) on Allegiant Airlines and currently, Gary has no scheduled passenger service.

- ***Existing and Well Established Air Cargo Infrastructure.*** Air cargo service is dependent on significant industry distribution-chain infrastructure, including freight forwarders/consolidators, all-cargo airlines, local trucking and transportation companies, and warehouse and storage facilities. This industry infrastructure is already well established at or near O'Hare and Midway. In addition, there are firmly established air cargo operations by FedEx and other all-cargo carriers at O'Hare and UPS at Rockford that provide integrated freight transportation services to the Chicago region. Recently, Rockford broke ground on a cargo facility that could be completed by the end of 2008, designed to accommodate up to Boeing 747 sized aircraft in hopes of luring long-haul international cargo traffic from O'Hare.

- ***Lack of Air Service Initiatives.*** Development of scheduled passenger or air cargo air service typically requires significant advance planning and an ongoing investment in airline recruiting and preparation of airport facilities to accommodate such traffic. To date, the Authority has not initiated any of the above.

- ***Lack of MRO Incentives.*** MROs serving commercial airlines are typically located at large airline flight stations or connecting hub airports to reduce ferrying costs and logistical efforts. MROs serving corporate/business, military, and other aviation sectors are often located where the operator can get the "best deal" in terms of financial incentives and facility availability.

- ***Community and Quality of Life Issues.*** Transformation from a general aviation airport to a commercial service airport can result in actual and perceived changes to the "quality of life" within the community.

A summary and review of the 2006 Market Assessment was presented by Jacobs Consultancy at a Master Plan Visioning Session held in April 2008 during which additional feedback was received from Authority staff and stakeholders. This feedback indicated the Authority was interested in developing a more comprehensive understanding of the process involved in pursuing and implementing additional aviation services at the Airport.

POTENTIAL AVIATION SERVICE MARKETS

An airport serves many roles in addition to providing aviation services to a community. Airports are (1) critical components of the local transportation infrastructure and a stimulus to the local economy; (2) commercial enterprises which must be managed in a fiscally responsible manner; and (3) large and often imposing neighbors to local residents. Therefore, the process of deciding if and how to expand the role of the airport should start with the consideration of a number of key issues, which include:

- A clear definition of the Airport's purpose and future objectives (strategic/business plan);

- A realistic assessment of both local market potential and the Airport's ability to compete for this business;

- An understanding of a project's financial feasibility including potential risks and rewards; and

- Estimation of the benefits the Airport is seeking and the tradeoffs involved.

The following provides an assessment of the three primary aviation service sectors that the Authority may consider for future development potential – commercial passenger service, air cargo service, and MRO development. This memorandum is not an exhaustive study of the process required to initiate this service, but rather (1) provides a comprehensive summary of the market assessments conducted to date, and (2) outlines the considerations and steps involved in pursuing new aviation markets.

Commercial Passenger Service

Commercial passenger service is defined by regularly scheduled air service – at least two scheduled departures and two scheduled arrivals per week – on an air carrier to a domestic or international destination. This service could be provided on mainline jet aircraft (120 to 180 seats), regional jet aircraft (35 to 85 seats), and/or turboprop aircraft (19 to 75 seats).

Scheduled commercial service can be provided by the following types of air carriers:

- ***Mainline Network Carriers***—Such as United or American airlines, which provide point-to-point and connecting service to domestic and international destinations
- ***Low Cost Carriers***—Such as Southwest Airlines or AirTran Airways, which provide low-fare, point-to-point, and connecting flights to primarily domestic destinations
- ***Specialty Carriers***—Such as Allegiant Airlines, which provide nonstop, low-fare, limited schedule (two to three frequencies per week) service to a small group of popular leisure destinations (Las Vegas, Orlando, Phoenix), typically from small, underserved markets
- ***Charter Airlines***—Provide air transportation for tour operators and travel planners primarily to leisure destinations

Market Potential

DuPage is located in the Chicago region which is primarily served by O'Hare and Midway airports, which provide service via a wide-range of carriers and airlines to domestic and international destinations. These carriers also provide a choice of service quality which includes aircraft type (mainline, regional jet, turboprop), seating class (first, business, coach), nonstop or connecting flights, and fare levels. Depending on the time of day, both airports are within a one hour drive from DuPage. In summary, the Chicago region has excellent existing air service choices. For example, in June 2008 nonstop service was available from O'Hare and Midway to a combined 200 unique destinations, including 143 domestic markets and 53 international markets. Table 1 presents the top 25 most popular air service markets from the Chicago region as measured in terms of average daily scheduled departures and scheduled seats. Most of these markets are served from both O'Hare and Midway by at least three airlines.

Most airports with existing commercial service conduct regular air service market demand analyses to identify potential city-pair markets (Chicago – Denver, Chicago – Cancun, etc.) that may be underserved or not served at all from their airport. An air service analysis typically starts by identifying origin and destination (O&D) demand, which is the number of passengers that either begin or end their journey at a particular airport.* This type of analysis identifies the true demand for a particular market. For example, if O&D demand from Denver to Peoria was high enough, an airline may be interested in adding a direct nonstop flight from Denver to Peoria, bypassing O'Hare. Similarly, if it could be demonstrated through an air fare analysis that fares on a particular city-pair route were unusually high and O&D demand appeared strong, an airline may be willing to initiate service on a route in hopes of stimulating traffic through lower fares and more service. Such information collected by airports is used to solicit air service from potential airlines. Table 2 demonstrates the strength of local air service demand as it presents

*For example, a passenger who lives in Denver and travels to Peoria for business may fly from Denver to O'Hare, transfer planes at O'Hare and then travel to their final destination in Peoria. This passenger would be recorded as an O&D passenger in Denver and Peoria.

the Chicago region's top 25 originating passenger markets for 2007 ranked by average daily passengers.

Airlines also regularly conduct air service demand studies to identify market opportunities and encroaching competition, but they simply do not have the capacity to analyze every potential market to a high degree of detail. In situations like this, local information provided by an airport operator can be used to attract air service. For example, if a large company was relocating to DuPage County and this firm was expected to attract other companies to the area and together they were expected to generate significant air service demand, this type of information may be unknown to most airlines.

Barriers to Entry

The following summarize the barriers to entry to establishing sustainable scheduled passenger service at DuPage.

- ***Supply and Pricing Power.*** Airports and airlines compete vigorously for passengers and air service in an open unregulated market. When new air service is initiated at any airport, a competitive response from a competing airline at the same or nearby airport is expected if the size of the market justifies such a response. For example, if an airline initiated service from Rockford to a major United Airlines market, United would have the marketing power to reduce fares on a specific number of seats going to the same market from O'Hare – without adding a single departure, seat, or aircraft – and effectively pull demand away from Rockford. In this example, United would not have to attract all of the Rockford passengers, just enough to prevent the new entrant carrier from succeeding.

- ***Schedule Redundancy.*** Airlines have the advantage of offering schedule redundancy. For example, if a passenger misses a morning flight from O'Hare to Dallas there is a very good chance there will be reasonable flight options available on the same day. If the passenger missed the same flight from Rockford there would not likely be another flight that day. This type of scheduling flexibility may not be important to leisure travelers, but it is critical to business travelers, and therefore presents a significant entry barrier for an airport attempting to develop air service in a highly competitive market such as Chicago.

- ***Cost of Entry.*** The start-up costs associated with establishing service at a new airport is a major entry barrier. Airlines requires the following to provide service:

Table 1
Chicago Region's Top 25 Markets
By Average Daily Scheduled Seats – June 2007

Rank	Airport	Average daily scheduled Departures	Seats	Airlines providing service O'Hare	Midway
1	New York - LaGuardia	36	4,700	AA, UA	DL
2	Denver	30	4,522	AA, UA	SW, FR
3	Los Angeles	28	4,435	AA, UA	SW
4	Atlanta	39	4,326	AA, DL, UA	AT, FR
5	Minneapolis/St. Paul	36	4,234	AA, NW, UA	NW, SC
6	St. Louis	33	3,800	AA, UA	SW
7	Philadelphia	28	3,728	AA, UA	SW
8	Detroit	33	3,693	AA, NW, UA	NW, SW
9	Las Vegas	24	3,488	AA, UA, US	SW
10	Boston	24	3,322	AA, UA, JB	AT
11	Dallas/Ft. Worth	24	3,258	AA, UA	None
12	Phoenix	23	3,220	AA, UA, US	SW
13	San Francisco	19	3,212	AA, UA	SW
14	London - Heathrow	12	3,199	AA,BA,UA, VA	None
15	Kansas City, MO	22	2,904	AA, UA	SW
16	Seattle	19	2,801	AL, AA, UA	SW
17	Orlando	19	2,764	AA, UA	AT, SW
18	Washington, D.C. - National	21	2,605	AA, UA	None
19	New York - Newark	20	2,485	AA, CO, UA	None
20	Washington, D.C. - Dulles	15	2,241	UA	SW
21	Baltimore	19	2,226	AA, UA	SW
22	Columbus	24	2,138	AA, UA	SW
23	Cleveland	23	2,057	AA, CO, UA	SW
24	San Diego	15	2,057	AA, UA	SW
25	Nashville	21	1,976	AA, UA	SW

Legend:
AA = American Airlines
AT = AirTran Airways
BA = British Airways
CO = Continental Airlines
DL = Delta Air Lines
FR = Frontier Airlines
JB = jetBlue Airways
NW = Northwest Airlines
SC = Sun Country Airlines
SW = Southwest Airlines
UA = United Airlines
US = US Airways
VA = Virgin Atlantic Airlines

Source: Official Airline Guides, Inc.

Table 2
Chicago Region's Top 25
Originating Passenger Markets

Rank	Airport Market	2007 Originating Passengers (a) Total	Average daily	Percent total
1	New York-LaGuardia	1,044,310	2,933	4.4%
2	Las Vegas	795,840	2,236	3.4
3	Los Angeles	733,450	2,060	3.1
4	Orlando	730,560	2,052	3.1
5	Phoenix	688,220	1,933	2.9
6	Minneapolis/St. Paul	667,030	1,874	2.8
7	Dallas/Ft. Worth	618,060	1,736	2.6
8	Denver	614,820	1,727	2.6
9	New York-Newark	593,940	1,668	2.5
10	Atlanta	576,850	1,620	2.5
11	Philadelphia	520,400	1,462	2.2
12	Washington, D.C.-National	512,130	1,439	2.2
13	Boston	483,500	1,358	2.1
14	Tampa	443,680	1,246	1.9
15	Detroit	431,030	1,211	1.8
16	Ft. Lauderdale	395,030	1,110	1.7
17	Kansas City, MO	379,710	1,067	1.6
18	San Francisco	374,080	1,051	1.6
19	Baltimore	363,950	1,022	1.5
20	St. Louis	347,170	975	1.5
21	San Diego	338,910	952	1.4
22	Ft. Meyers	337,160	947	1.4
23	Seattle	330,100	927	1.4
24	Miami	302,370	849	1.3
25	Houston Intercontinental	296,740	834	1.3
	Top 25 markets	12,919,040	36,289	55.0%
	All other markets	10,576,230	29,709	45.0%
	Total	23,495,270	65,998	100.0%

(a) Includes estimated number of total originating outbound passengers from O'Hare and Midway; excludes connecting passengers.

Source: U.S. Department of Transportation OD1B database, 2008.

- Terminal and ground crew personnel
- Ground handling equipment, including baggage tugs and carts, etc.
- Loading bridges or portable stairways
- Transportation Security Administration (TSA) screening facilities for passengers, baggage, and employees
- Terminal space to accommodate ticket counters, holdrooms, baggage claim and baggage storage facilities, airline office space, other employee facilities, etc.
- Storage for spare parts, materials and supplies, catering equipment, etc.

The start-up cost for such an operation is often prohibitively high, especially if these costs are spread over a relatively few number of flights and passengers. Some of these costs can be reduced or services provided at low cost by the airport, but there are still significant start-up expenses. Furthermore, in the current airline operating environment, with record high fuel costs, airlines are taking extraordinary steps to curtail all but critical airport facility expansion. Although fuel prices may not remain at the current levels, many industry experts believe they will remain at levels significantly higher than even a year ago. This economic factor will increase the scrutiny airlines place on choosing new destinations.

Development Considerations for DuPage

The decision to pursue commercial passenger air service is based on a number of factors that are not always easily quantifiable, but once the decision is made, a general strategy and approach can be applied. Presented below are the key considerations and tasks involved to implement the strategic decision to pursue scheduled commercial passenger air service.

- ***Regulatory Plans.*** An airport that desires commercial air service by an air carrier providing scheduled service with aircraft of 10 to 30 seats; or scheduled or unscheduled air service by an airline operating aircraft with more than 30 seats must apply for and receive an FAA Part 139 Airport Operating Certificate (AOC). This process, administered by the FAA Regional Airports Division Office, also requires conversion of the existing Airport Certification Specifications (ACS) plan into an approved Airport Certification Manual (ACM), and completion of an airport certification inspection and an updated Airport Rescue and Fire Fighting (ARFF) plan. Additional modifications and FAA approvals may be required to the airport's Emergency Plan, Snow and Ice Plan, Marking and Sign Plan, fueling system plans, personnel training and other procedures depending on the existing status of the airport.

- ***Airline Commitments.*** The FAA is unlikely to issue a new Part 139 AOC without an official letter from a commercial airline clearly identifying the airline's commitment to begin air service at the airport. This letter must identify the proposed start date for the new service, the airline schedule including destination markets, arrival and departure times, aircraft equipment type, and other information as requested.

- ***Operational and Facility Plans.*** The start-up of commercial passenger service will add a significant level of complexity to current Airport operations. A comprehensive operations plan should be prepared to address all of the new operations issues related to dealing with

the new TSA/FAA operational requirements and new landside, terminal and airside facility requirements. In addition a comprehensive security and life safety plan and insurance/liability analysis should also be prepared. Primary operational issues for consideration include, but are not limited to the following:

Landside areas:

- Security, lighting, fencing
- Airport roadway access and public/employee parking
- Curb front management (passenger drop-off and pick-up)
- Commercial vehicle access (taxi, limo, courtesy bus)

Terminal building areas:

- Airline passenger processing requirements
- TSA passenger screening requirements
- Increased utility, mechanical, and HVAC loads
- Passenger requirements: restrooms, concessions, lost & found, first aid
- Americans with Disabilities Act (ADA) requirements

Airside areas:

- Airline aircraft movement and parking
- Airfield maintenance and snow removal
- Airport rescue and fire fighting (ARFF)
- Access control, security, fencing, lighting, etc.
- Airline ground handling, fueling, catering, etc.

- ***Legal Plans.*** The operation of commercial passenger service activities at the Airport will present a number of new situations for which the Airport will need to be legally protected. Airlines will expect to operate under some type of agreement or permit and will need to review the terms and conditions before making new service decisions. Most commercial service airports allow airlines to operate at their airport conditionally upon the signing of an airport use and lease agreement or operating permit. The terms of the use agreement and/or operating permit describes the rights and obligations of the airport and the airline tenant and binds both parties to the agreement. A typical agreement includes terms regarding the following:

  - Term of the agreement (month-to-month, annual, 5-year, etc.)
  - Airport fees charged the airline for use of facilities
  - Airline reporting requirements (information provided to airport)
  - Monetary obligations of airline
  - Security deposit provisions
  - Facility use restrictions
  - Restrictions on repairs and improvements to facilities

- Compliance with applicable laws
- Assignment provisions
- Non-discrimination provisions

In addition, standard agreements include sections related to all applicable environmental laws and environmental policies of the airport, indemnification provisions, insurance requirements, default and remedies and other miscellaneous legal issues.

- ***Financial Plans.*** Any airline considering initiation of new service will require data regarding the cost to operate at that airport. Therefore, the financial analysis and planning described below must be conducted prior to any formal airline marketing efforts.

  - *Financial Feasibility.* The decision to pursue commercial passenger service should be based in part on the financial feasibility of recovering the costs to provide and maintain appropriate facilities on an ongoing basis. Most commercial service airports recover a portion of these costs through rates and fees charged to the airlines and other airport tenants. An airport can always decide to move forward with a project that operates at a deficit, but it should be aware of the financial impacts.

  - *Cost Recovery*. FAA regulations require commercial service airports operate on a cost recovery basis and in a fiscally responsible manner, although exceptions are made for smaller airports that can't reasonably be expected to recover their costs. The level of rates and fees charged the airlines varies considerably from airport to airport, but typically include terminal rentals for space used in the terminal building by airline staff and its passengers, and landing fees based on the weight of the aircraft per landing. Aircraft apron use fees and remain overnight (RON) parking fees are also common. The amount of the rental fee is typically calculated to cover all operating and capital expenses associated with providing and maintaining the facilities. In reality, the cost recovery methodology at smaller airports often proves to be prohibitively expensive to the airlines, and therefore, a portion of the cost is covered through operating subsidies provided by the airport or local government.

- ***Infrastructure Investment.*** The initiation of new passenger service may require significant investment in existing airport infrastructure. Depending on the specific capital improvements made, much of the cost for these projects may be eligible for federal funding provided the facilities are available on a common use basis (i.e., not exclusively leased to a particular airline). However, even with federal funding there is typically a significant portion of the expense covered by the airport. At smaller airports, capital improvement projects are often funded with a combination of federal grants, proceeds from general obligation bonds secured by local tax revenues, airport cash reserves, and local government subsidies. The cost of the investment is then often amortized over the expected life of the facilities and an annual repayment expense is charged to the airlines through rentals and fees.

Airline Incentive Programs

Many airports have used incentive programs to help attract commercial air service to their airports and communities. According on FAA requirements, incentive programs must be non-discriminatory in that they must be open and available to any airline that provides the service requested by the airport (i.e., they can not be offered solely to a particular airline). Also, these incentives are different from the FAA's Essential Air Service (EAS) program which provides funds to subsidize commercial air service to small communities with no air service. Given the proximity of O'Hare and Midway, the Authority would not qualify for funding under the EAS program. Common incentive programs are described below:

- ***Revenue Guarantees.*** Airline revenue guarantees are based on the concept that an airport, often with the support of community development funds, will guarantee an airline that it will generate a specific amount of ticket revenue from the airport over a specific period of time. If the airline does not meet the ticket revenue targets the revenue guarantees are paid to make up the difference. These guarantees typically range from tens of thousands to millions of dollars depending on the size of the market served.

- ***Travel Banks.*** Travel banks are typically arranged with the support of local businesses and organizations that deposit a fixed amount of funds into an airline's travel account. The airline then initiates air service and the travel bank contributors draw down the amount in their accounts by scheduling travel on that airline. If the funds are not drawn down for travel, the airline typically keeps the balance of the funds. This incentive approach is often successful as it demonstrates local support for air service and not just a community "wish".

- ***Fee Waver Programs.*** Airport fee waver programs work by airports allowing airlines to operate at their airport free of any terminal rental charges or landing fees. Under the current fuel cost environment, this incentive has lost some of its attractiveness since it covers a decreasing percentage of total airport operating costs. Airport rates and charges typically account for between 4.0% and 7.0% of airline operating costs.

- ***Marketing Support.*** Marketing and advertising support is often offered to supplement existing air service. This takes the form of the airport paying for local advertising expenses and often includes free advertising space in the terminal or on airport property.

Incentive programs have been implemented with mixed results. Many airlines discount the idea because incentives often expire or run out. Other airlines actively seek incentives to reduce general risk and minimize even marginal expenses. It is recommended that investments be made only after thorough research of the local market concludes: (1) how many local businesses will actually support new air service; (2) will a competitive response from airlines at nearby airports overwhelm the effort; or (3) is the airport willing to make the necessary long-term investments to attract and sustain commercial service.

Air Cargo Service

The air cargo industry is organized around a complex distribution chain to move freight from shippers to consignees. Many different types of service providers from local trucking companies, warehouse providers, freight forwarders and consolidators, long-haul trucking companies, railroads, maritime shippers, and passenger and all-cargo airlines contribute to this process. Over the last 30 years, cargo integrators such as FedEx and United Parcel Service (UPS) have grown to dominate the package delivery market by greatly simplifying the shipping process and providing door-to-door services. All air cargo businesses, however, rely on demand for products produced by others to drive demand for their services. The key elements of every cargo market include:

- ***Shippers.*** For shippers (i.e., area businesses), the primary consideration is reliable, timely and cost-effective transportation. Most shippers use freight forwarding agents and integrated all-cargo airlines.
- ***Freight Forwarders.*** Freight forwarders arrange for the transportation of cargo by both air and ground modes, although most are not transportation providers themselves. Freight forwarders rely primarily on the cargo capacity of domestic and international passenger airlines or all-cargo airlines at major gateways such as Chicago, Miami, Dallas/Fort Worth, Houston, Los Angeles, or New York.
- ***Integrated All-Cargo Airlines.*** Between 1990 and 2005, the U.S. air cargo industry doubled in shipment volume. The integrators (DHL, FedEx, and UPS) claimed almost all of the growth in the domestic market, a segment that capitalizes on the integrators' ability to rationalize their control and utilization of multiple transportation modes—primarily aircraft and trucks. The integrators are less dominant in international transport, which is still largely the domain of the freight forwarding community and their airline partners (passenger carriers and all-cargo airlines) with over three-quarters of the international market share.
- ***Other All-cargo Airlines.*** Other all-cargo airlines (e.g., Cargolux SA, Evergreen International, Polar Air Cargo) provide airport-to-airport transportation of cargo, but most do not contract directly with shippers. These carriers do not incorporate trucking activity in their core business.
- ***Passenger Airlines.*** Passenger airlines use the space in the bellies of passenger aircraft to transport air cargo. Passenger airlines generally rely on freight forwarders to arrange for and consolidate cargo shipments.

The air cargo industry is facing increased pricing pressures, and many of the larger companies are looking to strengthen their market position and ability to respond to shipping demands through acquisition and internal restructuring and downsizing. It is likely that this trend will continue and fewer companies (namely the integrated carriers and freight forwarders) will be controlling a larger portion of the future cargo market.

Market Potential

The North American air cargo market is a diverse collection of companies and services, with differing business strategies and market roles. Table 3 provides a summary of the different types of cargo airlines, their respective customer base, and the airport characteristics that enable them to conduct their respective cargo operations.

Table 3
Air Cargo Carrier Types and their Business Characteristics

Air cargo carrier types	Characteristics	Illustrative carriers	Customers	Desired airport characteristics
Belly	Baggage holds of passenger aircraft	Continental, Delta, United	Wholesale, mail, retail	Passenger airport
Mixed	Baggage holds of passenger aircraft and main decks of all-cargo aircraft	Air Canada, Cathay Pacific, Lufthansa, Northwest	Wholesale, mail, retail	Passenger airport
Integrated	Main decks of all-cargo aircraft	DHL, FedEx, UPS	Retail	Airport near population center
All-cargo	Main decks of all-cargo aircraft	Cargolux, Polar Air, Evergreen	Wholesale	Airport near population center

Economic globalization and the associated growth in world trade have produced substantial increases in North American air cargo traffic and tonnage, particularly with the recent growth of high-value technology industries. The continued evolution of business and consumer models emphasizing speed of delivery has led to this growth. The historical growth in air cargo has resulted in expansion of the capacity of the industry, in terms of companies, services, aircraft, and on-airport facilities.

Barriers to Entry

The following summarize the barriers to entry to establishing air cargo service at DuPage.

- ***Cargo Infrastructure.*** A successful cargo or distribution center is highly dependent on existing infrastructure. Cargo companies are essentially transportation providers that seek to locate their businesses where the best transportation facilities exist. This includes not only physical infrastructure such as well developed local roadway systems, convenient highway connectivity, and airports, but also distribution chain infrastructures such as the presence of freight forwarders and consolidators and local trucking and warehouse providers. The Chicago region is well supplied with an existing cargo distribution network. O'Hare is a

major cargo airport and a regional sorting hub for FedEx, while Rockford is the second largest sorting hub in the UPS network. Furthermore, there is an established network of trucking companies, freight forwarders and warehouses in the vicinity of O'Hare. Chicago is also a major railway hub and maritime distribution center.

- ***Critical Mass.*** The development of a cargo distribution center is not only highly dependent on the existence of this physical distribution chain infrastructure, but also on a critical mass of producers and consumers to stimulate cargo activity. Freight forwarders, consolidators, local trucking, and warehouse providers require a critical mass of business to operate profitably and therefore tend to locate near large metropolitan areas where manufacturers (producers) and consumers exist.

- ***Demand for Services.*** In some cases the demand for a product or perhaps a specialized group of products (e.g., auto parts, laptop computers, etc.) can generate demand to justify a distribution center. Without a single high volume shipper, however, the combination of many shippers from different industries is required to generate sufficient demand. In some unique situations, a cargo center may be developed as a central hub operation, such as FedEx in Memphis, or UPS in Louisville. These sites are chosen for a number of reasons, including central geographic locations, moderate weather, highway system access, relatively low labor costs, and airport facilities.

- ***Price Sensitivity.*** An axiom in the cargo business is that "cargo doesn't care". In other words, shippers are unconcerned if a package goes by truck or is flown by air since shippers primarily care about schedule, reliability, and price. Cargo providers operate on an economic model where it is far more economical to consolidate individual packages into large shipments, transport the consolidated shipment to major distribution centers, and then distribute packages locally by truck or air feeder service (small cargo aircraft). Because of these practices, the competition for air cargo service is highly price sensitive where high volume distribution networks can provide cargo capacity or "lift" at lower prices. A freight forwarder with a large volume of tonnage can demand a better price for its shipments. Conversely, a large air cargo airline can provide large volumes of lift and therefore offer that freight forwarder a better price.

Development Considerations for DuPage

The following summarizes the key considerations and tasks involved to implement the strategic decision to pursue air cargo service at DuPage.

- ***Market Analysis.*** A local market analysis is necessary to determine the true volume of local air cargo demand that exists within the Airport's air trade area. This analysis should attempt to identify local shippers, type of products shipped, annual cargo tonnage, primary destinations, and the means by which this demand is serviced (i.e., trucked to an O'Hare-based freight forwarder, shipped via air to a regional airport, transported from airport to final destination by local trucking company, etc.).

- ***Facility Analysis.*** An airport-based cargo or distribution center will require basic site infrastructure that should be evaluated with regard to the following:
  - Capacity of local roadway systems, intersection ratings, ability to accommodate semi-trailer traffic, and requirements for truck routes
  - Landside and airside access to warehouse facilities, capacity of airport access roads, and connectivity to local roadways system
  - Warehouse facilities with office space, truck docks, automobile parking
  - Available specialty facilities: clean-rooms, cold-storage, high-security
  - Transportation Security Administration (TSA) cargo screening facilities
  - Capacity and availability of U.S. Customs facility
  - Aircraft apron space for loading and unloading planes
  - Runway and taxiway capacity and access to cargo site
- ***Legal Analysis.*** A legal analysis, similar to that recommended for passenger service, should also be conducted. Cargo operations have a unique set of characteristics that should be considered. For example, airside loading and unloading of aircraft presents liability issues different from passenger operations. Cargo operations are also likely to generate a significant volume of on-Airport truck traffic.
- ***Financial Analysis.*** A business plan should be developed which identifies the Authority's financial objectives for the project. For example, is the objective to generate discretionary cash flows, provide local economic stimulation (employment, tax revenues), or provide a necessary aviation service (expedited air cargo) under a cost recovery (breakeven) financial model. At a minimum the business plan should identify the cost of developing the necessary facilities and improvements to attract a cargo operator. Once the baseline costs are established the Authority should develop a preliminary funding plan to determine lease rates and fees required to recover costs and meet revenue targets. These lease rates and other fees can then be compared to the local competition to determine preliminary project feasibility. If the preliminary analysis determines that the project is feasible the Authority should consider the various development models available including speculative development of facilities, Authority managed direct lease to an identified tenant, or the master developer approach.

Maintenance, Repair and Overhaul Development

The concept of attracting an MRO service provider is as much a commercial and economic development issue as it is a marketing or business recruitment issue. An MRO operation may provide more or less benefits to the Airport and community than another business venture that is equally well-suited for an on-airport location.

Market Potential

MRO companies provide services, typically maintenance-related, to aircraft owners (corporate or private) or aircraft management companies. The MRO industry was initially established by

airline in-house flight departments that perform work on the aircraft of other airlines during slow periods, but have become increasing specialized as aircraft technology has developed. Today, the MRO industry includes the following six major market segments:

- Commercial airline facilities (largest market)
- Independent maintenance, repair, and overhaul stations
- Fixed based operators (FBOs) offering maintenance, repair, fuel, training, etc.
- Military/government repair facilities
- Flight/aircraft mechanic schools and training facilities

Services provided by MROs can be generally classified as follows:

- Airframe heavy maintenance, major modifications or retrofits
- Engine overhaul
- Regular line maintenance (scheduled and unscheduled)
- Component overhaul (landing gear, avionics, interior refurbishing, etc.)
- Specialty lines of service (e.g., firms that specialize in in-flight entertainment systems placed in the seat backs of commercial passenger aircraft)

MRO service providers tend be located where aircraft traffic patterns indicate high traffic flows. This includes airline hub or focus cities or airports located along major traffic routes. MROs also seek airports where the basic airport facilities already exist, including airfields of appropriate capacity, essential navigation equipment, sufficient local roadway access for employees and suppliers, etc. Perhaps most importantly, MROs seek airports where they can obtain the best financial incentives and most economic terms on airport land and facility leases. Additionally, the availability and relative cost of labor is also an essential consideration, which explains the large amount of servicing for large jet aircraft to MROs in foreign countries.

Key Factors for Entry

As described above the MRO industry includes a wide spectrum of businesses that focus on vastly different market segments. For example, there are businesses operating at the Airport today that that provide MRO services to corporate/business and recreational aircraft operators. Hence, the ability for DuPage to attract a new, large-scale MRO provider would be based on a number of key factors that include:

- ***Proximity to Aerospace Industry.*** A large MRO facility will require parts and material suppliers, specialty aviation services, and standard business vendors. Because of the Airport's proximity to O'Hare and Midway and the established aerospace businesses that serve MROs at these airports, the Airport may be able to leverage this to an advantage. According to Dunn & Bradstreet industry reports, there are over 100 businesses in the aviation service industry within the Chicago region. These businesses employ over 2,200 and generate nearly $150 million in annual sales. This established aerospace industry base would be an important consideration to an MRO developer.

- ***Facility Space.*** An MRO will require either existing facilities or the space to construct its own hangars, office facilities, as well as space for potential expansion. The on-going master plan will provide the Authority with an opportunity to identify suitable sites for a potential MRO development and the opportunity to highlight the Airport' strengths related to this potential market.

- ***Work Force Availability and Training.*** The MRO industry also relies on the availability of highly skilled mechanics with airframe and power plant (A&P) certifications and aviation maintenance technicians that specialize in service specialties. The industry has had a difficult time keeping up with the demand for such service providers, which are typically trained in military programs or aviation flight schools. The cyclical nature of the aviation industry, long-term decline in the size of the military, and competition from other industries has lead to this labor shortage. The Airport could potentially benefit from the availability of existing trained mechanics and technicians in the Chicago region.

- ***Existing Air Service***. An obstacle to attracting a commercial aircraft MRO provider is the fact that most major airlines maintain an MRO at their primary airport stations so aircraft can be flowed through the MRO facility during normal scheduled operations. The establishment of an MRO facility at an off-route airport presents logistical issues and an additional fuel and pilot expense for airlines.

- ***Capital Costs.*** Because the start-up of a new MRO facility often requires a large capital investment, these facilities are not built on speculation, but rather to service an existing customer or new customers under contract. The number of new MRO facilities are therefore limited and driven by a quantified demand. Some types of this demand may not be suitable for DuPage. For example, a wide-body facility (Boeing 767, 777, 747) would require significant airfield infrastructure development.

Development Considerations for DuPage

The following outlines the tasks involved to implement the strategic decision to pursue an MRO service provider at DuPage.

- ***General Industry Demand.*** The Authority would first need to establish the local need for an MRO provider. The process of investigating market demand would likely require the hiring of a consultant that specializes in the development of MRO facilities to determine the true potential for attracting an MRO. There are a number of new aircraft under development that will be flying in three to five years. This includes new passenger regional jets including Bombardier's C-Series 100 to 130 seat aircraft and the Mitsubishi Regional Jet. There are also a wide range of corporate/business aircraft, and very light jets (VLJs) by a number of manufacturers including Eclipse Aviation, Honda Aircraft, and Embraer. Recently, Eclipse Aviation, the market leader in VLJ sales, has had some serious financial and production difficulties. It announced the layoff of approximately one-third of its staff and its founder and CEO was replaced. These recent events serve as a reminder that the future of the VLJ market is still highly uncertain.

The Airport's primary market today is corporate and business general aviation and its most promising MRO opportunities may be with a firm such as Midcoast, which specializes in a full range of aircraft services for business jets such as Challenger, Global Express, Falcon, Hawker and Gulfstream aircraft. In addition, there may be other opportunities given the Authority's willingness to invest in the project and the other local characteristics described below.

- ***Economic Development and Financial Incentives.*** Given demand for economic development, some airports are cooperating with local development agencies to offer financial incentives to lure MRO operators with the hopes of attracting moderate to high paying employment. These incentives often take the form of capital development grants, low cost financing (special facility bonds), tax incentives, employee training programs (cooperation with local colleges and technical schools), and others. To be a serious contender for a new MRO development, the Authority would likely need to offer a significant financial incentive package. The following are recent industry examples:

  - *Laurentian Aerospace, Plattsburgh, New York* – Laurentian Aerospace recently opened a MRO facility to service widebody aircraft in Plattsburgh, New York. The company received approximately $7.6 million in incentives from three different state agencies to build a $64 million facility. The operation is expected to employ approximately 800 and create an additional 800 jobs from local vendors and suppliers.

  - *NetJets Inc., Columbus, Ohio* – NetJets Inc., an industry leader in private jet aviation, charter aircraft management, and fractional ownership recently announced the development of a flight training facility in Columbus, Ohio. This $200 million project will be supported with a $67.6 million incentive package provided by The State of Ohio, City of Columbus, Franklin County, and the Columbus Regional Airport Authority. The incentives are in the form of workforce development assistance, job credits, tax abatements and other direct assistance. An additional $30 million (above the $67.6 million) was also provided by local agencies for site improvements. When completed the project is expected to produce an additional 800 high-wage positions.

  - *Eclipse Aviation Corporation, Gainesville, Florida* – An example from a new and rapidly evolving sector of business aviation is provided by the aircraft manufacturer Eclipse Aviation Corporation (Eclipse). Eclipse recently built an aircraft service center for its new Eclipse 500 very light jet (VLJ) aircraft in Gainesville, Florida. This 61,200 square foot facility has the hangar capacity to store up to 12 Eclipse 500 aircraft at a time. The cost of this project was estimated at $11.2 million of which approximately 50% was funded by the Florida Department of Transportation Aviation Work Program. Eclipse also built a similar, but smaller, facility in Albany, New York that cost approximately $8.0 million. This project was funded by a combination of a $1.5 million state grant and a $6.5 million contribution from the Albany County Airport Authority. Eclipse in turn will pay rental fees for use of the facility.

- ***Legal Analysis.*** An MRO development will likely require the location of a large facility within Airport boundaries that would operate under the terms of a ground lease, an operating agreement, and other potential legal requirements. The existence of an MRO may present additional insurance, liability and environmental issues. This facility will likely be involved in the storage and disposal of industrial fuels, lubricants, and solvents, and create additional noise and increase traffic on local roadways. An MRO project can generate both support and opposition from the community. It would be advised to conduct a thorough legal review of these issues as part of an overall strategic planning effort before pursuing an MRO development.

- ***Financial Analysis.*** A detailed financial feasibility plan should be developed to identify the true and total costs of an MRO development. An MRO development may not be the most appropriate business for the Airport since the required financial incentives package, loss of potential revenue from discounted airport fees, and opportunity cost of investing in MRO facilities as opposed to another suitable business may be substantial. On the other hand, consideration should also be made for benefits such as increased local employment, tax revenues, and other intangible benefits. A final decision should be made by weighing the importance of each factor, buts it is critical to understand the true financial impacts separate from potential community benefits.

CONCLUSIONS

Based on the above, the pursuit of any of the three new aviation markets – passenger service, air cargo service, and MRO operator – is a serious undertaking that would likely require substantial investments in time, effort, and capital on behalf of the Authority. In the current market environment for passenger and air cargo service, coupled with existing and expected near-term economic conditions, it is unlikely the Authority would be successful in securing meaningful and sustained levels of scheduled commercial passenger or regularly scheduled air cargo service.

On the other hand, the Airport's obvious commercial strength is servicing the high-end corporate and business general aviation markets. Hence, a natural extension of this line of business is the development of a general aviation aircraft MRO service provider. As discussed above, this type of business often provides high-visibility and potential local economic development, but often generates only modest financial returns to the airport. MROs are also highly dependent on economic and financial subsidies provided by the airport and state and local governments. Establishing state and local funding commitments for this type of development is likely to require a coordinated local effort. Reaching a decision to pursue an MRO development should not be done without careful consideration of the market potential, barriers to entry, and capital investment requirements. A potential MRO development should also be compared to other potential capital projects and commercial development which may require significantly less local investment and provide greater financial returns and enhanced Airport prestige.

Appendix B

WHITE PAPER

RUNWAY 28 INSTRUMENT APPROACH PROCEDURE ASSESSMENT

DUPAGE AIRPORT

RUNWAY 28 INSTRUMENT APPROACH PROCEDURE ASSESSMENT

Prepared for:

DuPage Airport Authority

and

Jacobs Consultancy

Prepared by:

April 2009

1. PURPOSE

As part of the Airport Master Plan Update, Reynolds, Smith and Hills, Inc. (RS&H) assessed the feasibility of implementing an instrument approach procedure (IAP) to Runway 28 at DuPage Airport. Runway 28 currently does not have an approach procedure. An approach procedure to Runway 28 would increase the accessibility to the Airport in reduced visibility conditions and high wind conditions. Increased usability would in turn benefit the airport and community based on increased usefulness of the Airport.

2. EXISTING CONDITIONS

The collection of existing conditions establishes the baseline information needed to assess the feasibility of an instrument approach procedure to Runway 28. Information collected includes runway and associated instrument approach procedures identification, the wind conditions at the Airport, and potential regional limitations to a new procedure.

2.1 Runways and Instrument Procedures

DuPage Airport has four runways. Runway 2L/20R is the primary runway, and is 7,571 feet long. This runway has a Category I Instrument Landing System (ILS) precision approach to the Runway 2L end. A precision approach provides both vertical and horizontal guidance information to the pilot of the approaching aircraft. Runway 20R has an Area Navigation / Global Positioning Satellite (RNAV/GPS) non-precision instrument approach. A non-precision approach provides only horizontal guidance information to the pilot of the approaching aircraft.

Runway 10/28 is 4,750 feet long. Runway 10 has a Category I Instrument Landing System (ILS) precision approach. Runway 28 has only a visual approach.

Runway 2R/20L is 5,101 feet long, and Runway 15/33 is 3,399 feet long. All four of these runway ends have only visual approaches.

2.2 Wind Coverage

During the takeoff and landing phases of flight, aircraft performance is enhanced when operating into the prevailing wind. Wind coverage is the comparison of runway orientation to the prevailing winds at the airport. The more the runways are aligned with the prevailing winds, the higher the wind coverage. Wind coverage is evaluated based on general groupings of aircraft size and performance. Larger, high-performance aircraft are generally able to operate with a greater cross-wind component (i.e., wind not aligned with the runway) than smaller aircraft.

The wind coverage is evaluated for multiple runway usage combinations and weather conditions. It is important to understand the wind coverage for these varying conditions as the different aircraft types have unique runway length requirements potentially limiting their ability to use individual runways, and the Airport's runways have differing instrumentation and accessibility in varying weather conditions. Weather conditions evaluated include:

- Visual Flight Rules (VFR) having cloud ceiling greater than or equal to 3,000 feet above ground level and forward visibility greater than or equal to 1 mile.
- Instrument Flight Rules (IFR) having cloud ceiling less than 3,000 feet above ground level and forward visibility less than 1 mile.

- All weather

Table 3-1 presents the wind coverage for the individual runways and runway combinations, and for the varying weather conditions.

Table 3-1
Wind Coverage

	Weather Condition / Crosswind Component								
	All Weather			VFR			IFR		
	10.5 kt	13 kt	16 kt	10.5 kt	13 kt	16 kt	10.5 kt	13 kt	16 kt
Runways									
All Runways	99.26%	99.80%	99.96%	99.29%	99.82%	99.96%	98.83%	99.59%	99.91%
Runways 2/20	88.28%	93.46%	97.77%	88.17%	93.37%	97.74%	88.54%	93.92%	97.99%
Runway 15/33	84.37%	91.03%	97.04%	84.50%	91.17%	97.14%	81.99%	89.07%	95.87%
Runway 10/28	86.11%	92.20%	97.67%	86.19%	92.26%	97.69%	84.47%	91.18%	97.35%
Runways 2/20 and 10/28	98.33%	99.59%	99.94%	98.36%	99.61%	99.94%	97.89%	99.34%	99.88%
Runways 2/20 and 15/33	93.41%	97.10%	99.01%	93.45%	97.13%	99.04%	92.48%	96.62%	98.77%
By Runway End:									
Runway 2	45.71%	48.55%	50.87%	45.05%	47.88%	50.22%	51.40%	54.64%	56.87%
Runway 20	51.94%	54.27%	56.26%	52.43%	54.80%	56.82%	45.21%	47.35%	49.18%
Runway 10	44.28%	46.68%	48.95%	43.24%	45.51%	47.67%	51.89%	55.65%	59.13%
Runway 28	51.19%	54.87%	58.08%	52.26%	56.05%	59.33%	45.21%	47.35%	49.18%

The wind coverage for the combined three runways exceeds 99% in all weather conditions and crosswind components. In other words, the wind alignment with the runways and aircraft, and the associated wind speeds are within acceptable levels to the aircraft using the Airport greater than 99 percent of the year. The FAA recommended minimum wind coverage is 95%, so additional runways are not needed.

The wind coverage for Runway 10/28 combined with Runways 2R/20L and 2L/20R is greater than 97 percent for all weather and crosswind component combinations. The wind coverage for Runway 15/33 combined with Runways 2R/20L and 2L/20R is less than 93.5 percent considering the 10.5 knot crosswind component, which is typically associated with small, single-engine aircraft that are the predominant users of the Airport. These runway combinations and associated wind coverages are considered in subsequent runway requirement analyses.

It should be noted that runway length and width limit most corporate jets to Runways 2L/20R and 2R/20L. For these aircraft types, the wind coverage is approximately 93.5%, less than the FAA recommended coverage. Based on current activity levels, approximately 960 annual aircraft operations are precluded from the airport based on wind coverage. That number will grow to approximately 2,200 annual operations by the end of the planning period. Facility improvements are needed to increase the wind coverage for these aircraft.

2.3 Instrument Approach Procedure Limitations

There are several factors that limit the use of existing instrument approach procedures. These limitations can be described in terms of meteorological limitations and airspace limitations.

2.3.1 Meteorological Limitations

The primary instrument approach to the Airport is the Runway 2L ILS. This approach is accessible when the winds are calm or generally out of the north. In instrument meteorological conditions, when the winds do not allow the use Runway 2L, approaches are available to Runway 10 or Runway 20R. The winds at the Airport are predominantly out of the west and south which frequently precludes the use of the Runway 10 IAP. In addition, Runway 10/28 has a relatively short runway length precluding its use by many mid-size and large corporate aircraft.

When the winds preclude the use of the Runway 10 ILS or the Runway 2L ILS, there are three options available to the pilot of the arriving aircraft. The pilot can use the Runway 20R RNAV/GPS approach. However, this non-precision instrument approach procedure does not have visibility and cloud ceiling minimums as low as the ILS procedures, limiting access. The second option involves the pilot flying either the approach to Runway 10 or to Runway 2L, then circling in visual conditions to Runway 20 or Runway 28. This procedure limits accessibility based on the required higher cloud ceiling elevation needed to visually maneuver the aircraft to another runway end. If the pilot cannot use either of these options, then the pilot must divert to another airport.

2.3.2 Airspace Limitations

The approaches to Runway 10 and Runway 2L are not limited by airspace constraints. Runway 20R is equipped with an RNAV/GPS approach. This approach passes under the approach and departure paths to O'Hare's three east-west runways, and future six east-west runways. At the present time, availability of the approach procedure is inconsistent as the approach is authorized at the discretion of the Chicago Terminal Radar Approach Control (TRACON) based on activity at O'Hare. The Runway 20R approach procedure is designed to segregate O'Hare activity from the DuPage approach. If at any point there is controller concern regarding separation of aircraft, O'Hare activity will take precedent. There are two primary factors that currently limit the DuPage Runway 20R procedure:

- The RW 20R approach is a relatively new procedure. Air traffic controllers are still becoming familiar with the procedure and coordination of O'Hare and DuPage traffic. Over time, the procedure will likely be available more frequently. However, as new runways are opened at O'Hare, the familiarization and coordination process will repeat.
- Specific aircraft departing O'Hare, particularly Heavy aircraft, do not always climb at an anticipated rate. The resulting lower flight path restricts usability the Runway 20R approach.

In general, availability of this approach will be greatest during off-peak hours when O'Hare activity is at lower levels.

3. RW 28 APPROACH FEASIBILITY

Accessibility to the airport would be greatly enhanced with an instrument approach from the east to Runway 28. While the airport has instrument approaches from the south, west and north, predominant winds are from the south and west, supporting approaches from the east and north. The approach from the north to Runway 20R has limited accessibility due to required coordination with, and segregation from, O'Hare traffic.

Establishment of a new approach procedure to Runway 28 faces several challenges. From an airfield perspective, property acquisition will be needed on the east side of the airport for obstruction removal. Implementation of a procedure would likely require completion of an

environmental assessment based on the increased flight activity over areas east of the airport. Addition of an approach light system with a Runway 28 IAP would allow lower visibility/cloud ceiling, increasing frequency of Airport accessibility.

An IAP to Runway 28 has historically been limited by O'Hare Runway 4R approaches / Runway 22L departures. The 4R arrivals are more limiting based on the lower flight paths of the aircraft. The O'Hare Modernization Program Environmental Impact Statement indicates that when the O'Hare program is complete the use of Runway 4R for arrivals will effectively be eliminated. The use of Runway 22L for departures will remain in use approximately 70 percent of the year.

This assessment assumes the aircraft using a Runway 28 IAP would initially approach from the south or east enroute to the final approach path. There are several feasible options for an approach to Runway 28. The first is a straight-in approach with the initial approach fix located approximately 5 to 6 nm from the runway. The second approach procedure option has the approach path offset approximately 3 degree south of the extended Runway 28 centerline. This approach allows arriving aircraft to cross the O'Hare Runway 4R arrival path or Runway 22L departure path farther from the O'Hare runway providing greater separation between aircraft. With this option the initial approach fix would be located approximately 5 to 7 miles from the Runway 28 end. The third potential option would involve an initial approach path paralleling the O'Hare Runway 4R approach, then turning to the final approach to Runway 28.

Airspace protection for Midway Airport will also have an impact on a proposed approach to Runway 28. The climb of aircraft departing westbound from Midway is limited to keep those aircraft below the O'Hare Runway 4R/22L flight path. Aircraft using an IAP to Runway 28 would need to be kept below the Midway and O'Hare aircraft, or would need to be sequenced with, and through the Midway operations.

4. SUMMARY

An instrument approach to Runway 28 would significantly increase accessibility to the Airport, considering the predominant winds are out of the west and south. The on-going implementation of the O'Hare Modernization Program and changed use of the runways at O'Hare increases the feasibility of establishing an instrument approach procedure to Runway 28 at DuPage Airport.

Appendix C

WHITE PAPER
RUNWAY 10-28 INCREASED LANDING DISTANCE EVALUATION

DUPAGE AIRPORT

RUNWAY 28 INCREASED LANDING DISTANCE EVALUATION

Prepared for:

DuPage Airport Authority

and

Jacobs Consultancy

Prepared by:

April 2009

1. PURPOSE

DuPage Airport experiences periods when wind coverage on primary Runways 2/20 is not sufficient for many of the jet aircraft landing at the airport. An option that allows these aircraft to continue to access the airport is to use Runway 10/28. However, the relatively short length of Runway 10/28 precludes use by many of these aircraft. This assessment discusses alternatives to provide additional runway length, focusing on available landing length.

This study investigates the application of declared distances to achieve the goal landing distance available (LDA) of 5,000 feet. LDA is a component of declared distances, a method by which the airport owner declares distances available and suitable for satisfying the airplane's take-off run, take-off distance, accelerate-stop distance, and landing distance aircraft operational requirements. Declared distances are used primarily in cases of constrained airports where it is impractical to provide the clear runway safety area (RSA), object free area (OFA), and runway protection zone (RPZ).

The Alternatives chapter of the Airport master plan addresses the extension of the Runway 10 end, providing increased landing distance for aircraft arriving on Runway 28. For the Runway 10 end, the plan recommends a 250-foot runway extension plus associated access taxiway development. The Runway 10 landing threshold will remain in its existing location.

2. PREVIOUS STUDIES

Previous studies conducted for the DuPage Airport Authority considered extension and/or reorientation of the runway to provide additional runway length. These previous alternatives included relocation of the runway ends and landing thresholds. The studies identified significant cost associates with these actions, tied largely to the relocation of the landing thresholds and the associated property acquisition needed to have clear RSAs, OFAs, RPZs, and to clear obstructions from the approaches.

3. ALTERNATIVES

Alternatives are developed for the extension of the Runway 28 end to provide at least 5,000 feet of LDA for aircraft landing on Runway 10. Despite having identified a required length increase of 250 feet, multiple alternatives are needed to address airfield configuration and operational requirements. The following figures and associated descriptions present the alternatives.

3.1 Alternative 1

Alternative 1 extends Runway 28 by 250 feet providing a Runway 10 landing distance available of 5,000 feet. A sketch of this alternative is depicted on Figure 1. The Runway 28 landing threshold remains in its current location to protect obstruction clearance for the approach procedure. The additional 250 feet of length also provides additional take-off runway length for aircraft departing on Runway 28.

With the runway extension, the RSA and OFA are also extended. This will require the relocation of the Localizer Antenna (associated with the Runway 10 instrument landing system (ILS)) and the Airport perimeter fence. To accommodate these relocations, property will need to be acquired east of Powis Road, and the road will need to be relocated.

The new runway end location, and the resulting pavement configuration, results in an increased potential for aircraft incursion at the intersection of RW 15/33 and new RW 28 access taxiway. The configuration is not consistent with airfield geometry standards identified in FAA Engineering Brief No. 75: *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design*.

Figure 1
Runway 28 Extension Alternative 1

3.2 Alternative 2

Alternative 2 extends Runway 28 by 850 feet. However, the Runway 10 landing distance available is limited to 5,000 feet. The 850-foot extension is needed to improve the intersecting pavement geometry and reduce incursion potential identified with Alternative 1. However, this alternative introduces new incursion potential associated with the configuration of extended Runway 28, and its intersections with, and proximity to, Runway 33 and Taxiway B. A sketch of this alternative is depicted on Figure 2. The Runway 28 landing threshold remains in its current location to protect obstruction clearance for the approach procedure. The additional 850 feet of length provides additional take-off runway length for aircraft departing on Runway 28.

With the runway extension, the RSA and OFA are also extended. This will require the relocation of the Localizer Antenna (associated with the Runway 10 ILS) and the Airport perimeter fence. To accommodate these relocations, property will need to be acquired east of Powis Road, and the road will need to be relocated. In addition, this concept incorporates a blast fence to protect vehicles on Powis road from the blast of aircraft departing on Runway 28.

Alternative 2 shows a configuration requiring relocation of the airport rescue and fire fighting (ARFF) facility. However, the taxiway can be reconfigured to avoid the ARFF.

3.3 Alternative 3

Alternative 3 is a derivative of Alternative 1, with Runway 28 extended 300 feet providing a Runway 10 landing distance available of 5,050 feet. Figure 3 depicts a sketch of this alternative. The Runway 28 landing threshold remains in its current location protecting obstruction clearance for the approach procedure. The additional runway length provides additional take-off runway length for aircraft departing on Runway 28.

With the runway extension, the RSA and OFA are also extended. This will require the relocation of the Localizer Antenna (associated with the Runway 10 ILS) and the Airport perimeter fence. Property acquisition will be needed east of Powis Road to accommodate these relocations, and road relocation will be required.

In this alternative, Runway 33 is shortened with its end coincident with Taxiway E. Shortening this runway eliminates the potential for aircraft incursion as defined in Alternative 1. However, this alternative produces insufficient taxiway space for an aircraft departing on Runway 28 to hold north of the new Runway 28 end while remaining clear of the approach area to Runway 33.

Figure 2
Runway 28 Extension Alternative 2

Figure 3
Runway 28 Extension Alternative 3

3.4 Alternative 4

Alternative 4, a modification to Alternative 3, includes Runway 28 extended by 700 feet. Figure 4 depicts a sketch of this alternative. The Runway 10 landing distance available is increased by 250 feet to 5,000 feet. The additional runway length allows aircraft taxiing to the new Runway 28 end to remain clear of the Runway 33 approach protection surfaces. The Runway 28 landing threshold remains in its current location protecting obstruction clearance for the approach procedure. The extension provides additional take-off runway length for Runway 28 departures.

With the runway extension, the RSA and OFA are also extended. This will require the relocation of the Localizer Antenna (associated with the Runway 10 ILS) and the Airport perimeter fence. To accommodate these relocations, property will need to be acquired east of Powis Road, and the road will need to be relocated. In addition, this concept incorporates a blast fence to protect vehicles on Powis road from the blast of aircraft departing on Runway 28. The alternative depicted in the sketch shows a configuration requiring relocation of the airport rescue and fire fighting (ARFF) facility. However, the taxiway can be reconfigured to avoid the ARFF.

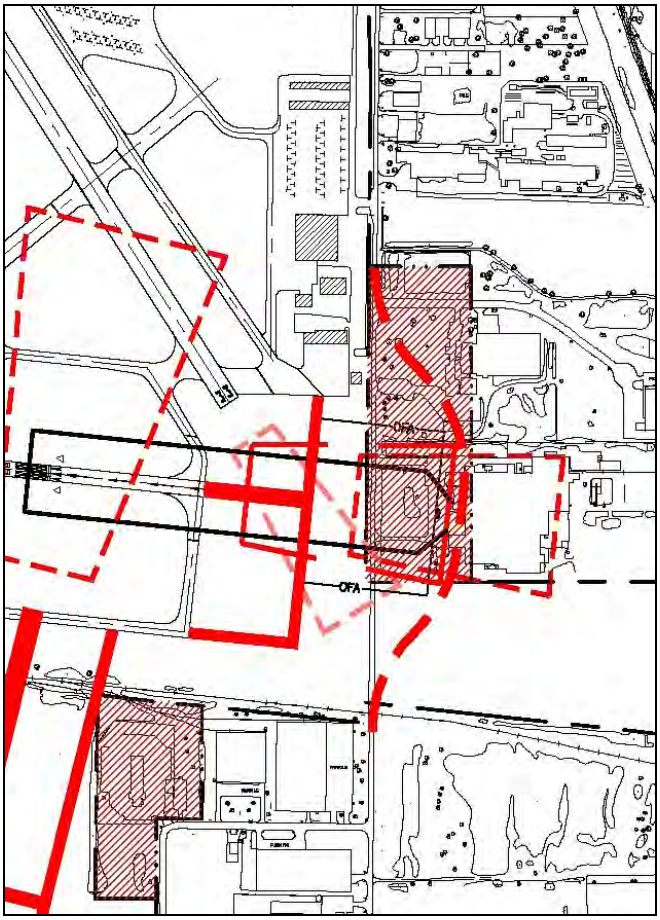
Figure 4
Runway 28 Extension Alternative 4

3.5 Alternative 5

Alternative 5 improves Alternative 4 by refining the required Runway 28 extension necessary to protect operations on Runway 33. Figure 5 depicts a sketch of this alternative. In Alternative 5, Runway 28 is extended 530 feet. The Runway 10 landing distance available is increased by 250 feet to 5,000 feet. The additional runway length allows aircraft taxiing to the new Runway 28 end to remain clear of the Runway 33 approach protection surfaces. The Runway 28 landing threshold remains in its current location protecting obstruction clearance for the approach procedure. The extension provides additional take-off runway length for Runway 28 departures.

With the runway extension, the RSA and OFA are also extended. This will require the relocation of the Localizer Antenna (associated with the Runway 10 ILS) and the Airport perimeter fence. To accommodate these relocations, property will need to be acquired east of Powis Road, and the road will need to be relocated. In addition, this concept incorporates a blast fence to protect vehicles on Powis road from the blast of aircraft departing on Runway 28.

Figure 5
Runway 28 Extension Alternative 5



4. SUMMARY

An extension to Runway 28 will require relocations of the Localizer Antenna (associated with the Runway 10 ILS) and the Airport perimeter fence, property acquisition east of Powis Road, and relocation of Powis Road. Several alternatives will also require construction of a blast fence along Powis Road and/or relocation of the ARFF facility. Selection of a preferred alternative is dependent on the preference to either shorten Runway 33 or provide a supplemental extension to Runway 28 to avoid atypical pavement configurations and increased runway incursion potential.

Appendix D

MEMORANDUM

PROPOSED WIDENING OF RUNWAY 2L-20R

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June 16, 2009

MEMORANDUM

To: Mr. Benjamin Mello, Community Planner, Federal Aviation Administration
Mr. Rich Pur, Program Manager, Federal Aviation Administration
Ms. Amy Hanson, Environmental Protection Specialist, Federal Aviation Administration

From: Robert Hoxie, Jacobs Consultancy

Subject: DuPage Airport Master Plan – Proposed Widening of Runway 2L-20R

INTRODUCTION

This memorandum summarizes the potential benefits of widening Runway 2L-20R at DuPage Airport (the Airport) with regard to the Airport's ability to accommodate aircraft operations during periods of strong east-west winds. Runway 2L-20R is currently 7,571 feet long by 100 feet wide. Recent and ongoing planning efforts have proposed to widen the Runway to a width of 150 feet while simultaneously strengthening the pavement to better accommodate larger and heavier aircraft in the forecast fleet mix. While there are several justifications to support widening Runway 2L-20R, this memorandum focuses on the operational benefits that the widening project would provide during periods of strong east-west winds at the Airport.

The Airport's designated crosswind runway, Runway 10-28, is 4,751 feet long by 75 feet wide and oriented east-west generally perpendicular to Runway 2L-20R. Although Runway 10-28 can accommodate Airplane Design Group (ADG)* II aircraft, the runway is too short and too narrow to accommodate ADG III aircraft. Hence, during periods of strong east-west winds, many ADG III aircraft are unable to operate at the Airport within Federal Aviation Administration (FAA) guidelines for allowable crosswinds because (1) Runway 10-28, which would be preferred for the winds, does not provide sufficient length and/or width; and (2) the allowable crosswind for Runway 2L-20R exceeds FAA allowances.

Based on studies conducted by the Airport Authority in 2006, upgrading Runway 10-28 to accommodate ADG III aircraft would require substantial land acquisition and a

*Airplane Design Group (ADG) is a categorization of aircraft according to their wingspans and tail heights. Aircraft in ADG I have wingspans up to 49 feet and tail heights up to 20 feet. Aircraft in ADG II have wingspans between 49 and 79 and tail heights between 20 and 30. Aircraft in ADG III have wingspans between 79 and 118 and tail heights between 30 and 45.

- The existing 100-foot width of Runway 2L-20R does not meet the required width for ADG III aircraft with certified takeoff weights of 150,000 pounds or greater. As described in the forecast section, the "Heavy +" group of business jets includes both the BBJ, which has a heavier takeoff weight than 150,000 pounds, and the Global Express and G550, which do not. Consequently, the BBJ requires a 150-foot wide runway while the Global Express requires only a 100-foot wide runway. Thus, among the "Heavy +" operations, it was assumed that half would be BBJ and half would be Global Express and G550 aircraft. As a result, the maximum crosswind component for the Global Express is 16 knots—the standard for ADG III aircraft—but only 13 knots for the BBJ due to the sub-standard width of the runway.

- Within the "Medium" category of business jets, it is assumed that half of the operations consist of aircraft that require the length or width of Runway 2L-20R. The other half consists of aircraft for which either Runway 2L-20R or Runway 10-28 is suitable.

- The wind and weather data used in the analysis represents all-weather observations from the Automated Surface Observing System (ASOS), located at the Airport, from the period beginning January 1998 and ending December 2007, as provided by the National Climatic Data Center.

CONCLUSIONS

Table 2 summarizes the wind coverage and affected operations among the four categories of business jets for both the existing condition as well as the proposed condition, which assumes Runway 2L-20R is widened to 150 feet. As shown, there are presently 462 annual operations unable to operate at the Airport because of the physical deficiencies of Runway 10-28 during strong east-west winds. This number is projected to increase to 807 in 2017 and 1,085 in 2027. The "Heavy" and "Medium" categories of business jets are most significantly affected, accounting for more than 95% of total affected operations.

The proposed runway widening project increases the allowable crosswind component for many subcategories of business jets using Runway 2L-20R and therefore keeps the Airport accessible for a greater percentage of time. If this improvement were in place in 2007, only 159 operations would have been unable to operate, a reduction of 303 operations. This project would reduce affected operations by 526 in 2017 and 707 in 2027.

major roadway relocation at estimated costs between $25 and $60 million. Based on cost and implementation factors, widening Runway 2L-20R is a more feasible option for enhancing wind coverage and therefore reducing the number of aircraft operations affected by high crosswind conditions.

FORECAST AVIATION ACTIVITY AND FLEET MIX

Aviation demand forecasts were prepared for the Airport's Master Plan for the 20-year planning horizon (2007–2027)*. The forecasts were prepared using the December 2007 version of the FAA's Terminal Area Forecast, which is based on data reported in the FAA's Air Traffic Activity Data System. An estimate of existing and future fleet mix was also prepared using instrument operations data from the FAA's Enhanced Traffic Management System, interviews with tenants operating at the Airport, FAA Airport Traffic Control Tower staff, and professional experience and judgment.

Fleet mix forecasts were developed for three distinct aircraft categories: business jets, turboprop aircraft, and piston aircraft. Within the business jet category, aircraft were segregated into four sub-categories:

- **Heavy + –** Includes aircraft with maximum takeoff weights in excess of 80,000 pounds and in ADG III, such as the Boeing Business Jet (BBJ), Bombardier Global Express, and Gulfstream G550
- **Heavy –** Consists of aircraft in the Gulfstream family, the Falcon 900, and other similarly-sized ADG II aircraft
- **Medium –** Consists of the Cessna Citation II and III, the Falcon 20 and 50, and other similarly-sized aircraft split between ADGs I and II
- **Light –** Consists of emerging aircraft, known as "very light jets," in ADG I

Forecast aircraft operations and fleet mix for the Airport are presented in Table 1. Total operations are expected to increase from approximately 104,000 in 2007 to 158,000 in 2027 at an annual compound rate of 2.1%. Overall, strong growth is expected in the jet and turboprop categories while the piston categories are expected to modestly decrease. In 2027, business jet activity is projected to account for approximately 25% of total aircraft operations at the Airport, up from 16% in 2007. Within the business jet category, "Heavy +" aircraft operations are projected to grow more rapidly than other categories on a percentage basis from 0.1% to 0.6% of total aircraft activity.

*Forecasts were approved by the FAA in October 2008.

Table 1

FORECAST AIRCRAFT OPERATIONS AND FLEET MIX

	Total aircraft operations				
	Historical	Forecast		CAGR	
	2007	2017	2027	2007-2017	2007-2027
Business jet					
Heavy +	140	704	956	17.5 %	10.1 %
Heavy	3,096	5,956	8,062	6.8	4.9
Medium	7,723	11,819	15,794	4.3	3.6
Light	6,220	10,293	14,118	5.2	4.2
Helicopter	1,935	2,471	2,914	2.5	2.1
Multi-engine piston	7,929	6,330	5,220	(2.2)	(2.1)
Multi-engine turboprop	5,511	12,256	17,168	8.3	5.8
Single-engine piston	62,663	57,466	53,841	(0.9)	(0.8)
Single-engine turboprop	9,137	26,388	39,669	11.2	7.6
Total	104,354	133,683	157,742	2.5%	2.1 %

	Percent of total operations		
	Historical	Forecast	
	2007	2017	2027
Business jet			
Heavy +	0.1 %	0.5 %	0.6 %
Heavy	3.0	4.5	5.1
Medium	7.4	8.8	10.0
Light	6.0	7.7	9.0
Helicopter	1.9	1.8	1.8
Multi-engine piston	7.6	4.7	3.3
Multi-engine turboprop	5.3	9.2	10.9
Single-engine piston	60.0	43.0	34.1
Single-engine turboprop	8.8	19.7	25.1
Total	100.0 %	100.0 %	100.0 %

CAGR = Compound annual growth rate

Note: Percent totals may not add due to rounding.

Sources: Historical/estimated – Developed from data from the FAA's Enhanced Traffic Management System (provided by Flightaware), adjusted by Jacobs Consultancy, and estimates of VFR fleet mix, July 2008.
Forecast – Jacobs Consultancy, July 2008 (approved by the FAA in October 2008).

FAA AIRPORT DESIGN CONSIDERATIONS

FAA Advisory Circular 150/5300-13, *Airport Design*, provides recommended crosswind components for aircraft based on Airport Reference Code (ARC)* classification. The FAA states that wind coverage shall be computed based on the ARC classification, where 10.5 knots is the maximum crosswind for ARC A-I and B-I, 13 knots for A-II and B-II, and 16 knots for A-III, B-III, and C-I through D-III. However, the FAA has historically accepted that wider runways can better accommodate operations in high crosswind conditions. Such a relationship is supported in Appendix 1, Paragraph 3, of *Airport Design*:

> *"At locations where provision of a crosswind runway is impractical due to severe terrain constraints, consideration may be given to increasing operational tolerance to crosswinds by upgrading the airport layout to the next higher Airport Reference Code."*

In this context, widening Runway 2L-20R to a width of 150 feet would constitute an upgrade to its ARC and enable it to provide additional crosswind capability for aircraft operations. This interpretation of FAA guidance to establish a relationship between crosswind capability and runway width has been used in the past for planning assignments at a variety of airports.**

WIND ANALYSIS

A wind analysis was conducted in the ongoing Master Plan to quantify the number of operations that cannot operate at the Airport during periods of strong east-west winds, but could be accommodated if Runway 2L-20R were widened to 150 feet. These operations are unable to use Runway 2L-20R due to high crosswinds and can not use Runway 10-28 because they require a longer/wider runway. The wind analysis was conducted in accordance with FAA guidelines, the Master Plan aviation demand forecasts, and the following assumptions:

- An upgrade to the ARC of Runway 2R-20L allows the maximum crosswind to be increased by one ADG—i.e. an aircraft with ADG II, for which the maximum crosswind component is 13 knots, is now able to tolerate crosswinds up to 16 knots.

---

*The Airport Reference Code consists of an Aircraft Approach Category and an Airplane Design Group (e.g. C-III).

**Examples include Nevada Airport (Nevada, Missouri), George Harlow Field (Marshfield, Massachusetts), Oconee County Regional Airport (Clemson, South Carolina), McGregor Executive Airport (Waco, Texas), and Currituck County Airport (Currituck, North Carolina)

* * * * *

If you have any questions or comments regarding the content of this memorandum, please call me at 312.612.6022 or send me an e-mail at robert.hoxie@jacobs-consultancy.com.

cc Mr. Terry Schaddel, Illinois Department of Transportation
Mr. David Bird, DuPage Airport Authority
Mr. Mark Doles, DuPage Airport Authority
Eric Bernhardt, Jacobs Consultancy
Neal Westlund, Reynolds, Smith and Hills
Brian Welker, Crawford, Murphy, and Tilly

Table 2

QUANTIFICATION OF AFFECTED AIRCRAFT OPERATIONS

DuPage Master Plan

Aircraft type *(a)*	ADG *(b)*	Allowable crosswind component *(c)*	Wind coverage *(d)*	Percent of time out of coverage	Existing and forecast annual operations			Operations out of wind coverage		
					2007	2017	2027	2007	2017	2027
Existing conditions										
Heavy + (50%)	III	16	97.8%	2.2%	70	352	478	2	8	11
Heavy + (50%)	III	13	93.5	6.5	70	352	478	5	23	31
Heavy	II	13	93.5	6.5	3,096	5,956	8,062	202	390	527
Medium (50%)	II	13	93.5	6.5	3,861	5,909	7,897	253	386	516
Medium (50%)	I	10.5	88.3	0.0 *(e)*	3,861	5,909	7,897	0	0	0
Light	I	10.5	88.3	0.0 *(e)*	6,220	10,293	14,118	0	0	0
Total					**17,178**	**28,771**	**38,930**	**462**	**807**	**1,085**
Widen Runway 2L-20R to 150 feet										
Heavy + (50%)	III	16	97.8%	2.2%	70	352	478	2	8	11
Heavy + (50%)	III	16	97.8	2.2	70	352	478	2	8	11
Heavy	II	16	97.8	2.2	3,096	5,956	8,062	69	133	180
Medium (50%)	II	16	97.8	2.2	3,861	5,909	7,897	86	132	176
Medium (50%)	I	10.5	88.3	0.0 *(e)*	3,861	5,909	7,897	0	0	0
Light	I	10.5	88.3	0.0 *(e)*	6,220	10,293	14,118	0	0	0
Total					**17,178**	**28,771**	**38,930**	**159**	**281**	**378**

Notes:

(a) All are sub-categories of business jet activity. The "Heavy +" category is split evenly between the Boeing BBJ and the Bombardier Global Express. The "Medium" category is split evenly between jets which must exclusively use Runway 2L-20R versus those that can use both Runway 2L-20R and Runway 10-28.

(b) Airplane design group.

(c) Wind magnitude expressed in knots.

(d) Wind coverage provided by Runway 2L-20R during all-weather conditions.

(e) Aircraft able to use both Runway 2L-20R as well as Runway 10-28 meet wind coverage criteria and therefore will be out of coverage 0.0% of the time.

Sources: Wind analysis – Reynolds, Smith and Hills, May 2009, based on wind and weather data from the National Climatic Data Center for January 1998 - December 2007.
Forecast annual operations – Jacobs Consultancy, July 2008.

Appendix E

NON-AVIATION DEVELOPMENT

Appendix E

NON-AVIATION DEVELOPMENT PLAN

A key finding of the DuPage Airport Master Plan is that existing property owned by the DuPage Airport Authority (the Authority) is sufficient to accommodate aviation facilities for the 20-year planning period and beyond. As such, one objective of the Master Plan is to explore opportunities for non-aviation development on lands which will not be needed for future Airport or aviation-related operations.

In addition to identifying areas that may be available for non-aviation development, the Master Plan Team was tasked with the following:

1) Identify issues associated with non-aviation development of Airport property, including federal regulatory requirements for non-aviation uses, and
2) Establish a plan to best capitalize upon commercial development opportunities

The following sections identify and summarize: (1) on-Airport areas suitable for commercial or other non-aviation development; (2) DuPage-specific issues and requirements associated with such development; and (3) the key components of an Airport Commercial Land Use Plan that may be developed for the Authority and used to obtain the required approvals for non-aviation development from the Federal Aviation Administration (FAA).

AREAS IDENTIFIED FOR NON-AVIATION DEVELOPMENT

As presented on Figure E-1, the future on-Airport land use plan described in Chapter 6 identifies the following locations for non-aviation development (referred to henceforth as Development Areas):

- **Northeast Quadrant**. Assuming the decommissioning of Runway 15-33, approximately 70 acres in the northeast quadrant are reserved for commercial or other non-aviation development. Available land would be divided into the following two parcels:
  - 25-acre parcel west of Runway 2L-20R including the Pheasant Run Golf Course driving range which is situated on property currently leased from the Authority
  - 45-acre parcel in the northeast corner of the Airport adjacent to the intersection of Powis Road and North Avenue

  The ultimate development of these parcels may include commercial office space and/or retail facilities, depending on market demand.
- **North Side**. The Authority owns approximately 120 acres on the north side of North Avenue. Approximately 20 acres on this site with roadway frontage could be made available for non-aviation development.

North Avenue (Route 64)
Powis Road
Harvester Road
Fermi National Accelerator Laboratory
North Side (20 acres)
Northeast Quadrant (45 acres)
Kress Road
Runway 2R-20L
Runway 2L-20R
Runway 10-28
Northeast Quadrant (25 acres)
Pheasant Run Golf Course
Flight Center Area
Prairie Landing Golf Course
Roosevelt Road (Route 38)
DuPage National Technology Park (550 acres)
Fabian Parkway
Tower Road
North Aviation Avenue
International Drive
West Side (35 acres)
Kautz Road
Charlestowne Mall

LEGEND

- Airport property line
- Runway protection zone
- Pavement to be removed
- Structures to be removed

GENERALIZED LAND USES

- Airfield
- Aviation support
- Corporate aviation
- General aviation
- MRO operations
- Non-aviation
- Recreation
- Reserved for future development
- Undevelopable

N

0' 800' 1,600' 3,200'

Figure E-1
FUTURE ON-AIRPORT LAND USE PLAN
DuPage Airport Master Plan
September 2009

JACOBS CONSULTANCY

- **West Side**. Approximately 35 acres on the west side of the Airport are reserved for non-aviation use. This area is best suited office development given the existing office building on this site and location near the entrance to the DuPage Flight Center along Kautz Road.

The Authority has ongoing non-aviation commercial development initiatives related to the Prairie Landing Golf Course and DuPage National Technology Park at the Airport. In addition to these commercial areas, the Development Areas delineated above provide an additional 125 acres of on-Airport land for potential future non-aviation development. All acreage contained in the Development Areas is subject to FAA approval for non-aviation or commercial development. Certain parcels in the northeast quadrant that are currently utilized for Airport-related facilities will require the closure of Runway 15-33 and relocation of general aviation facilities prior to commercial development activities.

NON-AVIATION DEVELOPMENT ISSUES AND REQUIREMENTS

As a condition of receiving federal funds or acquiring federal surplus property airports accept a set of Grant Assurances that restrict development of airport owned land and the use of the revenue from that land. Further restrictions are placed on land development through the airport master plan process and federal airport revenue diversion regulations. These restrictions do not prohibit commercial development of airport land for uses compatible with airport operations; however, they do put limitations on some aspects of development.

The initial step in the preparation of a Commercial Land Use Plan is to undertake due diligence with respect to FAA requirements for commercial or non-aviation development of Airport property. With respect to DuPage, these investigations focused on the following:

1) Review of FAA approval requirements
2) Impact of property acquired under the Surplus Property Act
3) Review of the runway decommission process
4) Relocation of tenant areas

The information obtained as a result of these due diligence items can assist the Authority in determining the business strategy related to non-aviation development of Airport land, including the possible development of a Commercial Land Use Plan for the Development Areas.

FAA Approval Requirements

The FAA permits (with specific FAA approval) non-aviation commercial development of airport property for uses compatible with airport operations. In addition to the provisions relating to the development of airport owned land and the use of the revenue from that land that are driven by the Grant Assurances, the FAA's approval of non-aviation development is based on certain federal requirements, including the following:

1. *Section 511 (a) (14) of the Airport Airway Improvement Act (AAIA) (as amended by Section 4 of Public Law 101-236)* - which states the airport may retain land purchased with

federal funding if it is needed for aeronautical purposes, serves as noise buffer land, or prevents the introduction of non-compatible land uses; and may develop such land if revenue from any use (whether interim or long-term) of such land contributes to the financial self-sufficiency of the airport;

And,

2. *FAA Order 5190.6A (Compliance Requirements), Section 5* - provides that aeronautical property may be used for a compatible non-aviation purpose while at the same time serving the primary purpose for which it was acquired, such as the concurrent use of runway clear zone land for low growing crops. The primary purpose is served and the concurrent use should generate fair market revenue to be used for airport purposes. Concurrent uses has been extended by the FAA to the non-aviation commercial development of land designated on the Airport Layout Plan (ALP) as "future airport development" land. The approved ALP thus becomes an important instrument for DuPage for not only the subsequent development of airport facilities, but also for the commercial development of Airport property.

The Authority must demonstrate that although the Development Areas are not needed for direct aviation uses during the planning period, such areas are retained as future airport development land and are suitable for concurrent commercial development. In order to determine that all property at the airport is being used as intended by the applicable law, it is necessary for the Airport to have inventory accountability. The FAA has indicated that the most effective means for maintaining a current inventory is the land use plan, indicating the current use approved for each identifiable area including that land which FAA has approved for revenue production. The land use plan may be incorporated on the ALP or developed as a separate document, such as a Commercial Land Use Plan.

Property Subject to Surplus Property Act

The majority of land comprising the DuPage Airport Development Areas were purchased by the Authority in the early 1980's, when the Authority, FAA, and Illinois Department of Transportation Division of Aeronautics (IDOA) initiated an extensive development plan to position the Airport to better serve the emerging demand for business aviation in the West Chicago region.

However, large portions of the Development Areas—primarily in the northeast quadrant—were acquired on December 11, 1947 by DuPage County (predecessor Airport sponsor to the Authority) from the federal government pursuant to a Quit Claim Deed. As is true for many communities where military bases were located during World War II, DuPage County was the recipient of a federal government property transfer pursuant to the Surplus Property Act of 1944 (as amended by P.L. 80-289). This property, bounded by North Avenue to the north and Runway 10-28 to the south, comprises the original Airport boundary. The Quit Claim Deed that transferred the property from the federal government to DuPage County "runs with the

land" and includes language restricting uses to industrial activities, thereby potentially prohibiting the Authority from developing commercial or other non-aviation uses in those areas.

Pursuant to FAA Order 5190.6A, Section 2, Paragraph 7-7, *Release from Specific Conditions* (the "Order"), the Airport can initiate a process with the FAA to eliminate the restrictions related to industrial use (as well as any other restrictions contained in the Quit Claim Deed which may have been repealed or modified by laws enacted subsequent to the Surplus Property Act) for the affected real property and facilities. Since the Authority does not intend to sell Airport property affected by the Quit Claim Deed, it will not be required to initiate the process with the FAA for a total release of the property, but may instead request a correction to the Quit Claim Deed under the specific provisions in the Order pertaining to land use releases. Prior to granting a correction to the Quit Claim Deed, the FAA will review and approve the intended use of the subject property and require that all necessary environmental approvals be in place. Since the affected property is in close proximity to Airport operations areas (e.g., the airfield) the FAA will not issue a land use release for the property unless the intended development is well defined in a Commercial Land Use Plan.

Based on the above, the FAA indicated that the Authority would need to accomplish the following steps to obtain FAA and IDOA* approval for a land use release for properties under the Quit Claim Deed:

1) **Request for Land Release from IDOA**. A submittal to IDOA must conform to FAA Policy and Procedures Memorandum 5190.6, *Guidance for Leases Use Agreements and Land Releases*. A legal description and appropriate drawings of the parcels requesting the land use release are required with the submittal.

2) **Request for Land Release from Department of Defense**. A submittal would next be provided to the Department of Defense for release of the requirement that subject properties be used for aviation purposes. If it is determined that the affected land is subject to the National Emergency Use Provision, the Authority should also request a release of that provision to ensure the property can not be seized in times of national emergency.

3) **Public Comment Period**. The submittal would then go through the Federal Register Process with a 30-day public comment period. Any public comments would be taken into consideration and addressed as required.

4) **Approval Determination**. Final approval for the land release can be granted based on the FAA's approval of the Commercial Land Use Plan and completion of the above submittals is evidenced by an approval letter from the manager of the FAA's Airports District Office.

* Since Illinois participates in the State Block Grant Program, IDOA has an important role in the administration of Airport Improvement Program grants and other FAA-related functions; IDOA and FAA coordinate closely on land use releases.

Decommissioning Runway 15-33

As shown in Figure E-1, certain parcels in the northeast quadrant of the Airport are currently constrained for commercial development purposes since such development is contingent on the closure of Runway 15-33 and relocation of general aviation facilities.

While the parcels affected by the location of the existing runway and current facilities may represent the parcels within the Development Areas with the highest demand for non-aviation uses, the current conditions must be addressed in the submittals for land restriction release under the Order described above. Therefore, the process to receive FAA approval to decommission Runway 15-33 (including all environmental approvals) would precede or coincide with the process for the land release, and therefore affect the timing of the submission and approval of the required Commercial Land Use Plan.

Runway 15-33 will need to be decommissioned (or at least approved for decommissioning) prior to or in conjunction with the request for the release of the specific conditions pertaining to the surplus property contained in the Quit Claim Deed that affect the property located in the northeast quadrant. Therefore, the timing for initiation of commercial development activity in the northeast quadrant will be dependent upon the FAA approval for the decommissioning of the runway in addition to the approval for the release of specific conditions. It may be possible to identify certain parcels within the northeast quadrant that are not affected by the active runway, and therefore could be made available for non-aviation development prior to the actual decommissioning of the runway. The Authority could request that FAA grant a partial release from specific conditions for this advance development activity and reflect the phasing for such development in the Commercial Land Use Plan. As an alternative, property in the northeast quadrant affected by the runway could be eliminated from inclusion in the Development Areas.

Tenant Leases and Relocation

In addition to the closure of Runway 15-33, another consideration affecting the timing for commercial development activity in the northeast quadrant is the relocation of the existing tenants in the area. As based aircraft facilities reach the end of their useful lives and are replaced in alternate locations, additional parcels in the northeast quadrant can be made available for non-aviation commercial uses. Should replication of general aviation facilities elsewhere on the Airport take longer than planned, a phased relocation program can be a component of the Commercial Land Use Plan.

In the development of the Commercial Land Use Plan, all leases in the Development Areas would be identified together with the revenues and costs associated with the retention of the leases versus the costs and potential revenues for commercial development of such areas. The strategy for phasing of the relocation will take into consideration the cost for relocation. The actual timing for the relocation of tenants would be reflected in the "phasing schedule" the Commercial Land Use Plan presented to the FAA for approval.

COMMERCIAL LAND USE PLAN

As stated above, FAA approval for non-aviation development of all parcels located in the Development Areas (whether or not subject to the Surplus Property Act, decommissioning of Runway 15-33, or relocation of current tenants) will be subject to the Authority's ability to demonstrate compliance with all applicable federal requirements, including Grant Assurances. For the parcels within the Development Area included in the land transferred under the Quit Claim Deed and therefore subject to the Order, a FAA approved Commercial Land Use Plan will be required to release the parcels from the restrictions contained in the Quit Claim Deed.

The remaining parcels within the Development Areas may also be included in the Commercial Land Use Plan for FAA approval. Due to the timing associated with the decommissioning of Runway 15-33 and the relocation of existing tenants, it is recommended that the unencumbered parcels be presented as Phase 1 in the phasing schedule of the Commercial Land Use Plan. In this alternative, these parcels can be reflected as future airport development land on the ALP and presented to the FAA for approval of non-aviation uses on a case by case basis as the Authority enters into negotiations for specific parcel development of commercial or other non-aviation uses.

As shown on Figure E-2, a Commercial Land Use Plan typically has both a physical land planning element and business planning element, and serves as a framework for the long-term development of the commercial areas within Airport property.

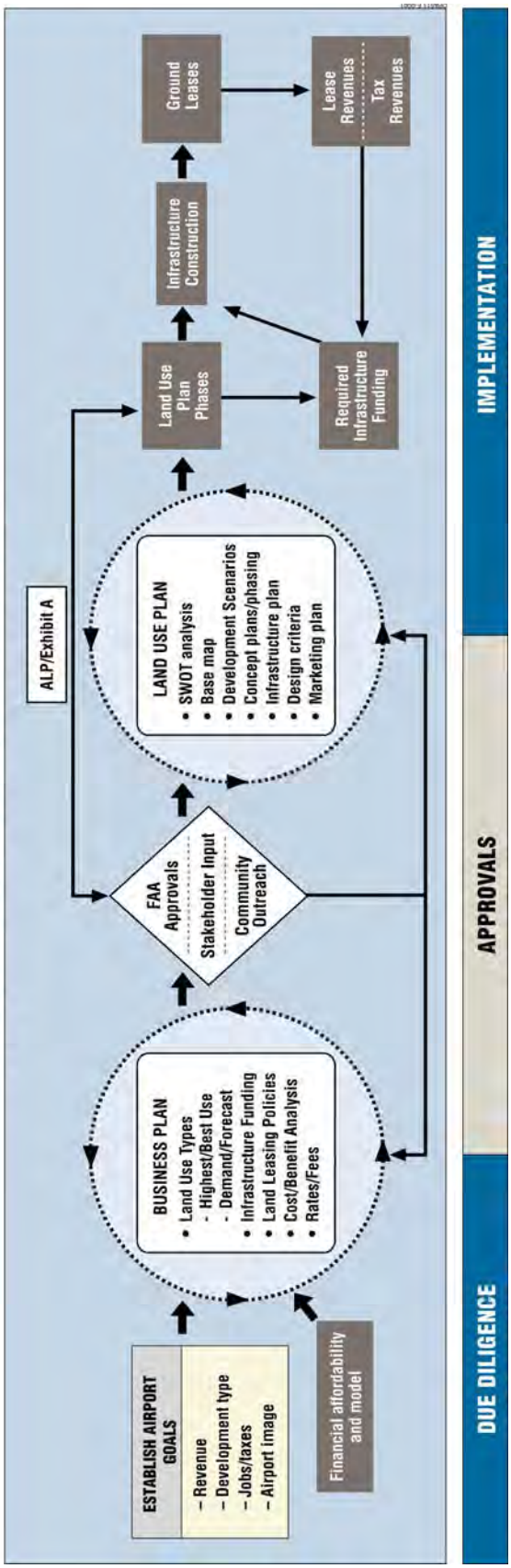
A Commercial Land Use Plan is based on a market driven analysis that determines the highest and best use of the parcels in the Development Areas. The main objective of a Commercial Land Use Plan is to create an optimal mix of compatible land uses and determine necessary infrastructure requirements for Airport property identified for non-aviation development. The Commercial Land Use Plan defines criteria such as visibility, road access, appropriate adjacent land uses, and terrain and is intended to guide marketing of the Airport property designated for commercial uses. Once approved by the FAA, the Authority has the ability to develop properties for uses consistent with the Commercial Land Use Plan without the requirement of obtaining FAA approval for individual leases.

Plan Components

Each Commercial Land Use Plan is tailored to the specific goals and objectives of an individual airport. Major components include the following:

- **Data Collection and SWOT Analysis**. Initial data collection includes site visits, Airport lease reviews, identification of existing tenants or facilities in the proposed Development Area, and a review of financial information and regional economic data. A SWOT analysis is typically performed to identify: strengths and weaknesses of the commercial development areas and/or the Airport organization (from an "internal" perspective); and opportunities and threats that exist to the area to be developed and/or the Airport organization (from an "external" perspective). Such considerations provide a basis to match resources and capabilities to the competitive environment.

Figure E-2


DPA COMMERCIAL DEVELOPMENT PROGRAM
ESTABLISH AIRPORT GOALS
– Revenue
– Development type
– Jobs/taxes
– Airport image
Financial affordability and model
BUSINESS PLAN
• Land Use Types
- Highest/Best Use
- Demand/Forecast
• Infrastructure Funding
• Land Leasing Policies
• Cost/Benefit Analysis
• Rates/Fees
FAA Approvals
Stakeholder Input
Community Outreach
LAND USE PLAN
• SWOT analysis
• Base map
• Development Scenarios
• Concept plans/phasing
• Infrastructure plan
• Design criteria
• Marketing plan
ALP/Exhibit A
Land Use Plan Phases
Required Infrastructure Funding
Infrastructure Construction
Ground Leases
Lease Revenues
Tax Revenues
DUE DILIGENCE
APPROVALS
IMPLEMENTATION

- **Land Use Classifications**. As a business element of a Commercial Land Use Plan, the FAA requires that the Development Area parcels be identified by specific land use classifications according to approved uses for airport development land. Typically, land use classifications include the following:
  - **Direct Aviation** – includes taxiways, taxilanes, aprons, access infrastructure, and other facilities for aviation operations, aircraft maintenance, aircraft manufacturing and other facilities requiring airfield access.
  - **Direct Aviation Support** – May not require direct access to the airfield and can be designated as either aviation or concurrent commercial use, which includes facilities for companies providing logistics, materials, cargo, warehousing and/or distribution operations, and other ancillary support for direct aviation uses.
  - **Indirect Aviation** – Commercial uses including offices, industrial facilities, retail, and similar facilities which do not require direct access to aviation facilities.
  - **Non-aviation** – Non-aviation uses are concurrent commercial use, including offices, industrial facilities, retail, and similar facilities which do not require airfield access and are on properties not currently needed for direct aviation development.
- **Base Map**. An overall graphic base map is developed to identify unique physical characteristics, environmental conditions (topography, vegetation, utility locations, noise contours, wetlands, off airport land uses, etc.) and infrastructure requirements of the site. The base map would include Master Plan considerations and existing and required amenities such as roads, utilities, and drainage infrastructure.
- **Commercial Development Market Analysis**. Development of Airport property for commercial or other non-aviation use is dependent upon local market demand for such developments. A market demand/absorption analysis can be performed to project the demand for space and the supportable new space for industrial, flex, office, and retail on an annual basis; and then subdivided into the pre-determined phases for development set forth in the Commercial Land Use Plan. This analysis is based on forecasted space demand for the total market, and the market capture rate is defined as the percentage of the new supply being built in the market that could be "captured" and built on vacant airport land. Once a development area(s) is identified, a real estate feasibility analysis is typically conducted to address a specific or wide-range of industries to target so that the highest and best use for the area considering the range of potential uses allowed by FAA.
- **Infrastructure Cost Estimates and Funding Strategy**. Order-of-magnitude cost estimates are prepared for the purpose of establishing a probable cost of development for the major infrastructure improvements recommended by the Commercial Land Use Plan. Engineering and architectural designs are later prepared to determine specific scopes and development costs. Infrastructure costs include utilities (water and sewer), roadway improvements, and landscape improvements.

- **Cost-Benefit Analysis**. Establishing the infrastructure funding strategy for the Commercial Land Use Plan requires not only the identification of funding sources for infrastructure (and related Airport costs related to the ground leases) but also the determination of the cost-benefit/return on investment for the direct costs incurred by the Airport operator relative to the ground rentals and other fees received by the Authority. A cost-benefit analysis is conducted to identify the payback that can be expected from developing the preferred development scenario. The analysis compares the potential revenue derived from development of the property to the cost of providing the infrastructure necessary to develop the property. Typically, the cost-benefit analysis is developed assuming multiple market demand scenarios (i.e., low, high, and average).

- **Land Leasing Policies**. Leasing policies outline priorities for commercial development uses and can reflect uses not allowed on Airport property. Of particular importance are the rates and charges methodology and the building standards for commercial tenants, since FAA requires that the "rents" (for land and/or improvements) attributed to the specific land uses reflect, at a minimum, costs associated with operations, maintenance, capital outlays, debt service, reserves, and amortization incurred for the site. For non-aviation uses, FAA Grant Assurances stipulate that the Airport must charge fair market value for Airport land and facilities. Therefore, unless an Airport has enabling legislation or requirements in bond indentures or other contracts requiring rental rates based on a fully allocated cost methodology or other formula, fair market value appraisals used for establishing market rents for non-aviation or commercial uses of Airport land.

- **Ancillary Documentation**. Protocols and procedures for implementation of the Commercial Land Use Plan may also be identified in addition to physical components. Marketing materials can be prepared for development opportunities on Airport property, and procurement documentation (Requests for Proposals, Requests for Qualifications, etc.) may be necessary for certain types of preferred development categories. Building development standards may be developed to outline the process for developing tenant facilities at the Airport and to provide the parameters governing the design, construction, and modification of newly developed facilities.

Commercial Land Use Plan Implementation

Based on the anticipated demand for commercial development at DuPage, and to support the generation of revenues to ensure the Airport remains financially self-sustaining, one objective of the Master Plan is to explore opportunities for non-aviation development on lands which will not be needed for future Airport or aviation-related operations.

As discussed earlier, non-aviation/commercial development in the Development Areas is subject to FAA approval. The creation of a Commercial Land Use Plan is recommended to obtain FAA required approvals for the entire Development Areas and should be created, reviewed, and used by all entities responsible for the development, operation, management, and marketing of Airport property. The Commercial Land Use Plan would include all of the major components described herein which are included to (1) meet FAA requirements; (2) provide the

required information to the Authority Board to support business decisions for non-aviation development of Airport property; and (3) provide the required information needed by potential third-party developers for the non-aviation commercial development of the Development Areas.

Since certain parcels in the northeast quadrant are currently utilized for Airport-related facilities and will require the decommissioning of Runway 15-33 and relocation of facilities prior to redevelopment activities, the Commercial Land Use Plan could reflect a phased approach, incorporating the development of the other parcels in the Development Areas that could potentially occur in advance of those in the northeast quadrant. The advantages of a phased approach are as follows:

1) Leasing the areas not included in the northeast quadrant affected by Runway 15-33, beginning with more developed areas first would minimize the Authority's investment in infrastructure and capital expenditures

2) Given the time required for the decommissioning of Runway 15-33 and the relocation effort for the existing tenants, a phased strategy permits a delay in demolition costs, utilities development, and other capital expenditure until regional demand increases.

3) Provides for a track record of absorption for the Development Areas that gives greater confidence to any investment decisions for the northeast quadrant area that would be "triggered" when certain occupancy levels are reached.

Since even a phased approach to commercial development of Airport property is primarily driven by either the demand created by the tenants and users of the Airport, or by the commercial market demand in the community surrounding the Airport, to be of most value a Commercial Land Use Plan should be reviewed and updated on a regular basis.

Appendix F

AIRPORT LAYOUT PLAN

Appendix F

AIRPORT LAYOUT PLAN

[AIRPORT LAYOUT PLAN TO BE PROVIDED WHEN COMPLETE]