

Appendix A. Cargo Projections

This appendix presents projections of cargo activity at O'Hare International Airport for use in estimating future cargo facility requirements. These projections supplement the information obtained from the FAA's 2001 Terminal Area Forecast for other components of aviation activity.

The level of cargo activity at an airport is dependent on the economic characteristics of the community, the level of passenger service offered at the facility, and the associated (air carrier) belly cargo capacity, competition from other modes of transportation, and decisions by cargo carriers regarding use of the facility as a cargo hub/terminal. In addition, decisions and operating practices by the U.S Postal Service can also affect the amount of airmail processed at an airport. To account for these factors, future cargo activity projections were correlated with the activity projections for air carrier and all-cargo operations. Additional consideration was given to factors affecting freight, air cargo, and airmail demand as contained in the FAA Aerospace Forecasts for Fiscal Years 2002 – 2013.

A.1 Approach

The projection of future enplaned cargo at O'Hare utilizes a "top down" approach. This approach evaluates historic relationships between both domestic and international enplaned cargo and the operational demand levels associated with all-cargo and air carrier operators at O'Hare. These relationships form the basis for estimating the average enplaned cargo per all-cargo/air carrier operations that would be expected throughout the planning horizon. This ensures that the projected increase in belly cargo and freight/express correlates to the growth in air carrier and all-cargo aircraft operations, respectively.

Due to the variety of market forces associated with air cargo, international and domestic demand for belly and all-cargo operators are projected separately and segregated as either freight/express or mail. This requires a two-tiered approach. The initial step includes the projection of domestic, international, and total cargo projections only. These projections are developed separately for belly and all-cargo operators. Once established, the projections of both international and domestic enplaned cargo are then segregated as either freight/express or mail.

Table A-1 provides a summary of both the historic enplaned cargo demand levels, and those projected for the Airport through 2022 as a result of this analysis. The following sections describe the methodologies and assumptions that form the basis for these projections.

A.2 International and Domestic Enplaned Cargo

The initial projections of international and domestic enplaned cargo are predicated on the estimated cargo enplaned per operation and the operational demand levels for either air carrier or all-cargo operators. **Tables A-2** and **A-3** summarize these two variables and the resulting cargo projections for belly and all-cargo operators, respectively. Both the historic relationships of aircraft operations and enplaned cargo and those projected through 2022 are presented. At the time of this analysis, 2001 was the most recent year for which a complete historical data sample was available for actual cargo enplanements at the Airport.

Table A-1

Summary of Total Cargo Tonnage Projections^{1/}

Year	Belly Cargo Tonnage		All-Cargo Tonnage		Total All-Cargo Tons	Total Cargo Tonnage
	Domestic	International	Domestic	International		
Historic:						
1990	286,608	152,275	109,115	20,035	129,149	568,033
1991	262,160	167,181	114,424	19,747	134,171	563,512
1992	280,456	172,567	156,469	23,587	180,056	633,079
1993	287,103	178,847	154,520	24,736	179,256	645,206
1994	266,710	203,517	187,192	37,778	224,970	695,197
1995	258,481	214,904	178,515	48,941	227,456	700,841
1996	242,211	204,760	194,671	76,295	270,966	717,937
1997	252,528	222,121	203,498	85,565	289,063	763,732
1998	231,955	209,926	225,236	95,374	320,610	762,492
1999	258,342	229,015	207,274	92,191	299,465	786,822
2000	238,338	229,939	197,327	107,393	304,720	772,996
2001	145,585	196,372	180,596	127,701	308,298	650,254
Projected:^{2/}						
2002	228,823	289,521	219,528	99,108	318,636	836,980
2003	230,246	305,368	224,163	101,200	325,363	860,977
2004	231,527	323,035	228,798	103,293	332,090	886,653
2005	232,838	340,328	233,432	105,385	338,817	911,983
2006	234,124	357,939	238,067	107,477	345,544	937,607
2007	235,386	375,860	242,702	109,570	352,271	963,517
2008	236,613	394,226	247,336	111,662	358,998	989,837
2009	237,870	412,209	251,971	113,754	365,725	1,015,805
2010	239,106	430,460	256,606	115,847	372,453	1,042,018
2011	240,322	448,970	261,241	117,939	379,180	1,068,472
2012	241,519	467,733	265,875	120,031	385,907	1,095,159
2013	243,141	481,013	270,510	122,124	392,634	1,116,788
2014	244,759	494,353	275,145	124,216	399,400	1,138,500
2015	246,279	507,765	279,779	126,308	406,088	1,160,132
2016	247,593	521,265	284,414	128,401	412,815	1,181,673
2017	249,128	534,784	289,049	130,493	419,542	1,203,454
2018	250,659	548,355	293,683	132,586	426,269	1,225,283
2019	252,186	561,976	298,318	134,678	432,996	1,247,158
2020	253,710	575,645	302,953	136,770	439,700	1,269,100
2021	255,230	589,359	307,587	138,863	446,450	1,291,039
2022	256,746	603,118	312,222	140,955	453,177	1,313,041

Average Annual Growth Rates:

1990-2001:	-6%	2%	4.7%	18.3%	8.2%	1.2%
2000 - 2014:	0.2%	5.6%	2.4%	1.0%	2.0%	2.8%
2014-2022:	0.6%	2.5%	1.6%	1.6%	1.6%	1.8%

Notes:

^{1/} Totals may not add due to rounding

^{2/} In effort to prevent the demand projections from being distorted by the events of September 11, 2001, 2000 cargo explained levels form the basis for belly/all-cargo explained projections.

Source: Airport Management Records, 2001; Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc.

Table A-2

Enplaned Belly Cargo Tonnage Projections - Operational Trend Methodology

Year	Total Air Carrier Departures			Enplaned Belly Cargo (Tons per Departure)			Total Enplaned Belly Cargo Tons		
	Domestic	International	Total	Domestic	International	Total	Domestic	International	Total
1990	316,808	12,033	328,841	0.9	12.7	1.3	286,608	152,275	438,883
1991	283,769	12,471	296,240	0.9	13.4	1.4	262,160	167,181	429,341
1992	298,371	14,321	312,692	0.9	12.0	1.4	280,456	172,567	453,023
1993	308,385	16,272	324,657	0.9	11.0	1.4	287,103	178,847	465,950
1994	298,991	16,556	315,547	0.9	12.3	1.5	286,710	203,517	470,227
1995	304,078	16,674	320,752	0.9	12.9	1.5	258,481	214,904	473,385
1996	303,659	18,216	321,875	0.8	11.2	1.4	242,211	204,760	446,971
1997	306,484	19,877	326,361	0.8	11.2	1.5	252,528	222,121	474,649
1998	305,373	22,675	328,048	0.8	9.3	1.3	231,955	209,926	441,882
1999	304,717	25,219	329,936	0.8	9.1	1.5	258,342	229,015	487,357
2000	296,144	27,788	323,932	0.8	8.3	1.4	238,338	229,939	468,276
2001	285,879	26,086	311,965	0.5	7.5	1.1	145,585	196,372	341,956
2002	297,003	29,183	326,186	0.8 ^{3/}	9.9 ^{6/}	1.6	228,823	289,521	518,344
2003	298,849	30,781	329,630	0.8 ^{3/}	9.9 ^{6/}	1.6	230,246	305,368	535,614
2004	300,513	32,561	333,074	0.8 ^{3/}	9.9 ^{6/}	1.7	231,527	323,035	554,562
2005	302,214	34,304	336,519	0.8 ^{3/}	9.9 ^{6/}	1.7	232,838	340,328	573,166
2006	303,883	36,080	339,963	0.8 ^{3/}	9.9 ^{6/}	1.7	234,124	357,939	592,063
2007	305,521	37,886	343,407	0.8 ^{3/}	9.9 ^{6/}	1.8	235,386	375,860	611,246
2008	307,114	39,737	346,851	0.8 ^{3/}	9.9 ^{6/}	1.8	236,613	394,226	630,839
2009	308,745	41,550	350,295	0.8 ^{3/}	9.9 ^{6/}	1.9	237,870	412,209	650,079
2010	310,350	43,390	353,739	0.8 ^{3/}	9.9 ^{6/}	1.9	239,106	430,460	669,566
2011	311,928	45,255	357,184	0.8 ^{3/}	9.9 ^{6/}	1.9	240,322	448,970	689,292
2012	313,481	47,147	360,628	0.8 ^{3/}	9.9 ^{6/}	2.0	241,519	467,733	709,252
2013	315,587	48,485	364,072	0.8 ^{3/}	9.9 ^{6/}	2.0	243,141	481,013	724,154
2014	317,687 0.8% ^{1/}	49,830 5.1% ^{3/}	367,517	0.8^{3/}	9.9^{6/}	2.0	244,769	494,353	739,112
2015	319,660	51,182	370,842	0.8 ^{3/}	9.9 ^{6/}	2.0	246,279	507,765	754,045
2016	321,365	52,543	373,908	0.8 ^{3/}	9.9 ^{6/}	2.1	247,593	521,265	768,858
2017	323,358	53,905	377,263	0.8 ^{3/}	9.9 ^{6/}	2.1	249,128	534,784	783,912
2018	325,345	55,273	380,618	0.8 ^{3/}	9.9 ^{6/}	2.1	250,659	548,355	799,014
2019	327,327	56,646	383,973	0.8 ^{3/}	9.9 ^{6/}	2.1	252,186	561,976	814,162
2020	329,305	58,024	387,329	0.8 ^{3/}	9.9 ^{6/}	2.1	253,710	575,645	829,354
2021	331,277	59,406	390,684	0.8 ^{3/}	9.9 ^{6/}	2.2	255,230	589,359	844,589
2022	333,246 0.6% ^{2/}	60,793 2.5% ^{4/}	394,039	0.8^{3/}	9.9^{6/}	2.2	256,746	603,118	859,864

Notes:

- ^{1/} 2001-2014 Average Annual Domestic Commercial Operations Growth Rate.
- ^{2/} 2014-2022 Average Annual Domestic Commercial Operations Growth Rate.
- ^{3/} 2001-2014 Average Annual International Commercial Operations Growth Rate.
- ^{4/} 2014-2022 Average Annual International Commercial Operations Growth Rate.
- ^{5/} Represents the average of domestic enplaned Belly Cargo Tons per Departure from 1995 to 2001.
- ^{6/} Represents the average of international enplaned Belly Cargo Tons per Departure from 1995 to 2001.
- ^{7/} Totals may not add due to rounding.

Source: Airport Management Records, 2001; Ricondo & Associates, Inc.
 Prepared by: Ricondo & Associates, Inc.

Table A-3

Enplaned All-Cargo Tonnage Projections - Operational Trend Methodology

Year	Total All Cargo Departures ^{1/}			Enplaned All Cargo Tons per Departure			Total Enplaned All Cargo Tons		
	Domestic ^{2/}	International ^{2/}	Total	Domestic	International	Total	Domestic	International	Total
Historic:									
1990	11,156	3,562	14,718	20	11	18	109,115	20,035	129,149
1991	11,745	3,750	15,495	24	11	17	114,424	19,747	134,171
1992	12,310	3,930	16,240	25	12	22	156,469	23,587	180,056
1993	12,087	3,859	15,946	26	13	22	154,520	24,736	179,256
1994	12,984	4,145	17,129	29	18	26	187,192	37,778	224,970
1995	13,900	4,438	18,338	26	22	25	178,515	48,941	227,456
1996	14,541	4,643	19,184	27	33	28	194,671	76,295	270,966
1997	15,638	4,992	20,630	26	34	28	203,498	85,565	289,063
1998	18,438	5,887	24,325	24	32	26	225,236	95,374	320,610
1999	18,180	5,804	23,984	23	32	25	207,274	92,191	299,465
2000	18,156	5,796	23,952	22	37	25	197,327	107,393	304,720
2001	15,998	5,107	21,105	23	50	29	180,596	127,701	308,298
2002	18,075	5,771	23,846	24.3 ^{3/}	34.3 ^{6/}	27.4	219,528	99,108	318,636
2003	18,457	5,892	24,349	24.3 ^{3/}	34.3 ^{6/}	27.5	224,163	101,200	325,363
2004	18,838	6,014	24,853	24.3 ^{3/}	34.3 ^{6/}	27.7	228,798	103,293	332,090
2005	19,220	6,136	25,356	24.3 ^{3/}	34.3 ^{6/}	27.9	233,432	105,385	338,817
2006	19,601	6,258	25,859	24.3 ^{3/}	34.3 ^{6/}	28.0	238,067	107,477	345,544
2007	19,983	6,380	26,363	24.3 ^{3/}	34.3 ^{6/}	28.2	242,702	109,570	352,271
2008	20,365	6,502	26,866	24.3 ^{3/}	34.3 ^{6/}	28.4	247,336	111,662	358,998
2009	20,746	6,623	27,370	24.3 ^{3/}	34.3 ^{6/}	28.5	251,971	113,754	365,725
2010	21,128	6,745	27,873	24.3 ^{3/}	34.3 ^{6/}	28.7	256,606	115,847	372,453
2011	21,509	6,867	28,377	24.3 ^{3/}	34.3 ^{6/}	28.8	261,241	117,939	379,180
2012	21,891	6,989	28,880	24.3 ^{3/}	34.3 ^{6/}	29.0	265,875	120,031	385,907
2013	22,273	7,111	29,383	24.3 ^{3/}	34.3 ^{6/}	29.2	270,510	122,124	392,634
2014	22,654	7,233	29,887	24.3 ^{3/}	34.3 ^{6/}	29.3	275,145	124,216	399,361
2015	23,036	7,354	30,390	24.3 ^{3/}	34.3 ^{6/}	29.5	279,779	126,308	406,088
2016	23,417	7,476	30,894	24.3 ^{3/}	34.3 ^{6/}	29.7	284,414	128,401	412,815
2017	23,799	7,598	31,397	24.3 ^{3/}	34.3 ^{6/}	29.8	289,049	130,493	419,542
2018	24,181	7,720	31,901	24.3 ^{3/}	34.3 ^{6/}	30.0	293,683	132,586	426,269
2019	24,562	7,842	32,404	24.3 ^{3/}	34.3 ^{6/}	30.1	298,318	134,678	432,996
2020	24,944	7,964	32,907	24.3 ^{3/}	34.3 ^{6/}	30.3	302,953	136,770	439,723
2021	25,325	8,085	33,411	24.3 ^{3/}	34.3 ^{6/}	30.5	307,587	138,863	446,450
2022	25,707	8,207	33,914	24.3 ^{3/}	34.3 ^{6/}	30.6	312,222	140,955	453,177

Notes:
^{1/} All cargo departure values are estimated to be 50 percent of all cargo operations.
^{2/} Based on historic (1990-2001) average split of All Cargo tonnage.
^{3/} 2002-2014 Average Annual All Cargo Total Operations Growth Rate
^{4/} 2014-2022 Average Annual All Cargo Total Operations Growth Rate
^{5/} Represents the average of domestic enplaned All Cargo Tons per Departure from 1995 to 2001.
^{6/} Represents the average of international enplaned All Cargo Tons per Departure from 1995 to 2001.
^{7/} Totals may not add due to rounding

Source: Airport Management Records, 2001; Ricondo & Associates, Inc.
 Prepared by: Ricondo & Associates, Inc.

As shown on Table A-2, the ratio of enplaned belly cargo per air carrier operation at the Airport has fluctuated since 1990. During 2001, this ratio reached its lowest level of 0.9 tons per operation. It has been concluded that this reduction was a direct result of restrictions placed on belly cargo following the terrorist attacks that occurred on September 11, 2001. It is anticipated, however, that belly cargo levels will recover as the security procedures related to the processing of belly cargo are enhanced and the US and World economies recover. Therefore, in lieu of extrapolating this downward trend for future cargo projections, the average ratio experienced at the Airport between 1995 and 2001 was utilized for projecting belly cargo enplanement levels throughout the planning horizon. These ratios were selected to better represent the lower enplaned cargo levels experienced since 1995. During that period, the average domestic and international enplaned belly cargo per air carrier operation was 0.8 and 9.9 tons, respectively. On that basis, domestic and international annual belly cargo enplanements would reach 244,759 and 494,353 tons, respectively, at 2014; the latest projection year included the Terminal Area Forecast (TAF). As air carrier demand is projected to increase further beyond the TAF, the annual enplaned belly cargo levels are projected to reach 256,746 and 603,118 tons for domestic and international markets, respectively.

Combined, the total annual belly cargo enplaned at the Airport is projected to increase from the current (2001) level of 341,956 to 739,112 tons at 2014. At 2022, annual belly cargo enplanements would reach 859,864 tons. Throughout the planning horizon, the overall average of enplaned cargo tonnage per departure would steadily increase from 1.6 tons during 2002 to 2.2 tons at 2022. This escalation is attributed the increased share of enplaned belly cargo accommodated on international carriers, which are expected to continue their higher level of cargo volume per operation.

Similar to the projection of enplaned belly cargo, the historical relation between enplaned cargo and aircraft operations since 1995 form the basis for projecting future all-cargo activity. As shown on Table A-3, cargo enplaned per all-cargo operation has steadily increased from 17.5 to 25.4 tons between 1990 and 2000. During 2001, a significant increase was noted, as this ratio increased to 29.2 tons per all-cargo operation. This increase was attributed to increase in international cargo per operation. This increase was also related to the terrorist attacks. As manufacturer's and wholesale distributor's supply chains were disrupted following the terrorist attacks, the demand for all-cargo operators increased as inventory supplies were diminished. In addition, all-cargo operators experienced an increase in market share as cargo restrictions were imposed on air carriers following the terrorist attacks. Therefore, the increase in all-cargo demand that was experienced during 2001 is not expected to continue, and the more moderate growth that occurred prior to 2001 is anticipated to resume throughout the planning horizon.

Based on the average growth rates experienced between 1995 and 2001 at the Airport, the average enplaned tons per all-cargo operation for domestic and international markets were 24.3 and 34.3 tons, respectively. On that basis, domestic and international enplaned cargo levels are projected to reach 275,145 and 124,216 tons, respectively at 2014 for all-cargo carriers. At 2022, these demand levels are projected to increase to 312,222 and 140,955 tons, respectively. These demand levels would result in a total enplaned cargo volume of 399,361 and 453,177 tons at 2014 and 2022, respectively, for all-cargo operators. Also similar to the projection of enplaned belly cargo, the overall average of enplaned cargo tonnage per departure would steadily increase from 27.4 tons during 2002 to 30.6 tons at 2022. This escalation is also attributed the increased share of enplaned cargo accommodated on international all-cargo carriers, which are expected to continue their higher level of cargo volume per operation.

A.3 Enplaned Freight and Express Cargo Enplanements

With the both the domestic and international belly cargo and all-cargo projections established, the composition of freight/express and mail enplanements can be established. For this purpose, it was assumed that the share (percent) of freight/express and mail that occurred during 2000 would remain constant throughout the planning horizon. These shares represent the most recent distribution of enplaned cargo levels that have not been affected by the terrorist attacks on September 11, 2001. **Table A-4** summarizes these shares for both the domestic and international freight/express and mail transported in belly and all-cargo.

Table A-4
2000 Share of Freight/Express and Mail Cargo Tonnage

	Belly Cargo					
	Domestic			International		
	Freight & Express	Mail	Total	Freight & Express	Mail	Total
Cargo Tonnage (Tons):	143,347	94,991	238,338	206,837	23,102	229,939
Share (Percent):	60.1%	39.9%	100%	90.0%	10.0%	100%
	All-Cargo					
	Domestic			International		
	Freight & Express	Mail	Total	Freight & Express	Mail	Total
Cargo Tonnage (Tons):	190,030	7,297	197,327	106,908	485	107,393
Share (Percent):	96.3%	3.7%	100%	99.5%	0.5%	100%

Sources: Airport Management Records, 2001; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Tables A-5 and **A-6** summarize both the 1990-through-2001 historic, and the annual cargo projections for belly and all-cargo operators, respectively, through 2022. The average annual growth rate associated with each is also provided.

As shown on Table A-5, total belly cargo demand levels decreased from 468,276 tons during 2000 to 341,956 tons in 2001, a net decrease of 27 percent. This decrease is primarily attributed to the terrorist attacks of September 11, which contributed to significant reduction in air carrier operations throughout the remainder of the year. Other factors include the weakening U.S. and world economy, and new changes in mail transportation policies adopted by the United States Postal Service. This trend, however, is not anticipated to have a long-term affect on belly cargo at O'Hare.

Although recovery of the enplaned cargo demand levels is expected to be slow through 2002, the FAA Aerospace Forecast for 2002 through 2013 predicts that cargo revenue ton-miles will continue to grow through 2013. On that basis, domestic enplaned belly cargo at O'Hare is expected to reach 342,490 tons, including 205,990 and 136,500 tons of freight/express and mail, respectively. Considering the same share of freight/express and mail, the annual enplaned domestic belly cargo levels are expected to reach 368,340 and 347,390 tons at 2022, respectively. Similarly, growth in the

Table A-5**Summary of Enplaned Belly Cargo Tonnage Projections^{1/}**

Year	Domestic			International			Total Belly Cargo Tons
	Freight & Express	Mail	Total	Freight & Express	Mail	Total	
Historic:							
1990	154,650	131,959	286,608	144,310	7,965	152,275	438,883
1991	146,410	115,750	262,160	158,586	8,595	167,181	429,341
1992	148,485	131,971	280,456	164,470	8,097	172,567	453,023
1993	145,743	141,360	287,103	171,120	7,727	178,847	465,950
1994	139,535	127,175	266,710	195,233	8,284	203,517	470,227
1995	133,709	124,772	258,481	206,428	8,476	214,904	473,385
1996	115,603	126,608	242,211	194,862	9,898	204,760	446,971
1997	129,483	123,045	252,528	210,495	11,626	222,121	474,649
1998	124,967	106,988	231,955	197,622	12,305	209,926	441,882
1999	153,997	104,345	258,342	216,021	12,994	229,015	487,357
2000	143,347	94,991	238,338	206,837	23,102	229,939	468,276
2001	72,885	72,700	145,585	182,680	13,692	196,372	341,956
Projected:^{2/}							
2002	137,624 ^{3/}	91,199 ^{3/}	228,823	260,432 ^{3/}	29,088 ^{3/}	289,521	518,344
2003	138,480 ^{3/}	91,766 ^{3/}	230,246	274,688 ^{3/}	30,681 ^{3/}	305,368	535,614
2004	139,251 ^{3/}	92,276 ^{3/}	231,527	290,579 ^{3/}	32,456 ^{3/}	323,035	554,562
2005	140,039 ^{3/}	92,799 ^{3/}	232,838	306,135 ^{3/}	34,193 ^{3/}	340,328	573,166
2006	140,813 ^{3/}	93,311 ^{3/}	234,124	321,977 ^{3/}	35,962 ^{3/}	357,939	592,063
2007	141,572 ^{3/}	93,814 ^{3/}	235,386	338,097 ^{3/}	37,763 ^{3/}	375,860	611,246
2008	142,310 ^{3/}	94,303 ^{3/}	236,613	354,618 ^{3/}	39,608 ^{3/}	394,226	630,839
2009	143,066 ^{3/}	94,804 ^{3/}	237,870	370,794 ^{3/}	41,415 ^{3/}	412,209	650,079
2010	143,809 ^{3/}	95,297 ^{3/}	239,106	387,211 ^{3/}	43,249 ^{3/}	430,460	669,566
2011	144,541 ^{3/}	95,782 ^{3/}	240,322	403,862 ^{3/}	45,108 ^{3/}	448,970	689,292
2012	145,260 ^{3/}	96,259 ^{3/}	241,519	420,740 ^{3/}	46,994 ^{3/}	467,733	709,252
2013	146,236 ^{3/}	96,905 ^{3/}	243,141	432,685 ^{3/}	48,328 ^{3/}	481,013	724,154
2014	147,210^{3/}	97,550^{3/}	244,759	444,680^{3/}	49,670^{3/}	494,353	739,100
2015	148,123 ^{3/}	98,156 ^{3/}	246,279	456,750 ^{3/}	51,016 ^{3/}	507,765	754,045
2016	148,913 ^{3/}	98,679 ^{3/}	247,593	468,893 ^{3/}	52,372 ^{3/}	521,265	768,858
2017	149,837 ^{3/}	99,291 ^{3/}	249,128	481,054 ^{3/}	53,730 ^{3/}	534,784	783,912
2018	150,757 ^{3/}	99,902 ^{3/}	250,659	493,262 ^{3/}	55,094 ^{3/}	548,355	799,014
2019	151,676 ^{3/}	100,510 ^{3/}	252,186	505,514 ^{3/}	56,462 ^{3/}	561,976	814,162
2020	152,590 ^{3/}	101,120 ^{3/}	253,710	517,810 ^{3/}	57,840 ^{3/}	575,645	829,400
2021	153,506 ^{3/}	101,723 ^{3/}	255,230	530,146 ^{3/}	59,213 ^{3/}	589,359	844,589
2022	154,419^{3/}	102,328^{3/}	256,746	542,522^{3/}	60,596^{3/}	603,118	859,864
Average Annual Growth Rates:							
1990-2001:	-7%	-5%	-6%	2%	5%	2%	-2%
2000 - 2014:	0.2%	0.2%	0.2%	5.6%	5.6%	5.6%	3.3%
2014-2022:	0.6%	0.6%	0.6%	2.5%	2.5%	2.5%	1.9%

Notes:

^{1/} Totals may not add due to rounding^{2/} In effort to prevent the demand projections from being distorted by the events of September 11, 2001, 2000 cargo enplaned levels form the basis of belly cargo enplaned projections.^{3/} The projected share for domestic and international freight & express and mail was based on the 2000 share to represent the recent levels of enplaned cargo per all-cargo operation.

Source: Airport Management Records, 2001; Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc.

Table A-6

Summary of Enplaned All-Cargo Tonnage Projections ^{1/}

Year	Domestic			International			Total All Cargo Tons
	Freight & Express	Mail ^{2/}	Total	Freight & Express	Mail	Total	
Historic:							
1990	107,259	1,856	109,115	20,035	0	20,035	129,149
1991	108,188	6,236	114,424	19,746	0	19,747	134,171
1992	152,342	4,127	156,469	23,587	0	23,587	180,056
1993	150,530	3,990	154,520	24,729	7	24,736	179,256
1994	183,188	4,004	187,192	37,778	0	37,778	224,970
1995	175,453	3,062	178,515	48,901	40	48,941	227,456
1996	191,818	2,854	194,671	76,014	281	76,295	270,966
1997	200,148	3,349	203,498	85,247	339	85,585	289,083
1998	213,480	11,756	225,236	94,913	461	95,374	320,610
1999	196,883	10,392	207,274	92,020	171	92,191	299,465
2000	190,029	7,297	197,327	106,908	485	107,393	304,720
2001	178,198	2,398	180,596	125,878	1,823	127,701	308,298
Projected:^{3/}							
2002 ^{2/}	211,410 ^{4/}	8,118 ^{4/}	219,528	98,660 ^{4/}	448 ^{4/}	99,108	318,636
2003	215,873 ^{4/}	8,290 ^{4/}	224,163	100,743 ^{4/}	457 ^{4/}	101,200	325,363
2004	220,337 ^{4/}	8,461 ^{4/}	228,798	102,826 ^{4/}	467 ^{4/}	103,293	332,090
2005	224,800 ^{4/}	8,632 ^{4/}	233,432	104,909 ^{4/}	476 ^{4/}	105,385	338,817
2006	229,263 ^{4/}	8,804 ^{4/}	238,067	106,992 ^{4/}	486 ^{4/}	107,477	345,544
2007	233,727 ^{4/}	8,975 ^{4/}	242,702	109,075 ^{4/}	495 ^{4/}	109,570	352,271
2008	238,190 ^{4/}	9,147 ^{4/}	247,336	111,157 ^{4/}	504 ^{4/}	111,662	358,998
2009	242,653 ^{4/}	9,318 ^{4/}	251,971	113,240 ^{4/}	514 ^{4/}	113,754	365,725
2010	247,116 ^{4/}	9,489 ^{4/}	256,606	115,323 ^{4/}	523 ^{4/}	115,847	372,453
2011	251,580 ^{4/}	9,661 ^{4/}	261,241	117,406 ^{4/}	533 ^{4/}	117,939	379,180
2012	256,043 ^{4/}	9,832 ^{4/}	265,875	119,489 ^{4/}	542 ^{4/}	120,031	385,907
2013	260,506 ^{4/}	10,004 ^{4/}	270,510	121,572 ^{4/}	552 ^{4/}	122,124	392,634
2014	264,970 ^{4/}	10,170 ^{4/}	275,145	123,650 ^{4/}	560 ^{4/}	124,216	399,400
2015	269,433 ^{4/}	10,346 ^{4/}	279,779	125,738 ^{4/}	571 ^{4/}	126,308	406,088
2016	273,896 ^{4/}	10,518 ^{4/}	284,414	127,821 ^{4/}	580 ^{4/}	128,401	412,815
2017	278,359 ^{4/}	10,689 ^{4/}	289,049	129,904 ^{4/}	590 ^{4/}	130,493	419,542
2018	282,823 ^{4/}	10,860 ^{4/}	293,683	131,987 ^{4/}	599 ^{4/}	132,586	426,269
2019	287,286 ^{4/}	11,032 ^{4/}	298,318	134,069 ^{4/}	608 ^{4/}	134,678	432,996
2020	291,750 ^{4/}	11,204 ^{4/}	302,953	136,150 ^{4/}	620 ^{4/}	136,770	439,700
2021	296,213 ^{4/}	11,375 ^{4/}	307,587	138,235 ^{4/}	627 ^{4/}	138,863	446,450
2022	300,676 ^{4/}	11,546 ^{4/}	312,222	140,318 ^{4/}	637 ^{4/}	140,955	453,177
Average Annual Growth Rates:							
1990-2001:	4.7%	2.4%	4.7%	18.2%	89.0% ^{5/}	18.3%	8.2%
2000 - 2014:	2.4%	2.4%	2.4%	1.0%	1.0%	1.0%	2.0%
2014 - 2022:	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%

Notes:

- ^{1/} Total s may not add up due to rounding
- ^{2/} It is assumed that the decline in domestic mail carried by all-cargo carriers is attributed to the USPS policy to transport all mail to destinations within 1,000 miles by truck. Additional analysis of monthly activity for 2002 is necessary for confirmation of this assumption.
- ^{3/} In effort to prevent the demand projections from being distorted by the events of September 11, 2001, 2000 cargo enplaned levels form the basis of all cargo enplaned projections.
- ^{4/} The projected share for domestic and international freight & express and mail was based on the 2000 share to represent the recent levels of enplaned cargo per all-cargo operation.
- ^{5/} Represents the average annual growth rate for 1995 - 2001

Source: Airport Management Records, 2001; Ricondo & Associates, Inc.
 Prepared by: Ricondo & Associates, Inc.

international enplaned belly cargo levels are expected to reach 444,680 and 49,670 tons for freight/express and mail, respectively, at 2014. These demand levels would reach 542,522 and 60,596 tons respectively at 2022.

In comparison to belly cargo, annual all-cargo enplanements during 2001 at O'Hare actually experienced a moderate increase from the 2000 demand levels. While domestic all-cargo enplanements actually declined, international all-cargo increased, resulting in an overall increase of 1.1 percent. Similar to belly cargo, however, both domestic and international cargo levels serviced on all-cargo aircraft are expected to increase throughout the planning horizon. On that basis, 300,676 and 11,546 tons of domestic freight/express and mail, respectively, is projected during 2022. At the same time, 140,318 and 637 tons of international freight/express and mail is projected.

Appendix B. Support/Ancillary Facility Requirements

This section supplements the support/ancillary facility requirements presented in Section 4, *Support/Ancillary Facility Plan Development*. It documents in greater details the assessment of support/ancillary facilities that are necessary to accommodate the existing and projected levels of activity for the Airport. The purpose of this comparison is to quantify future facility development needs to assist in the identification of future land use and facility development strategies for the Airport.

In order to quantify facility needs on an incremental basis, facility requirements are established for each of the following planning level: 2007, 2009, 2013, and 2018. The facility requirements predicated for 2018 demand levels serve a benchmark for quantifying the ultimate facility configuration for the preferred development strategies. Support/ancillary facilities needed to support the operation of the Airport include:

- Cargo facilities
- Airline maintenance facilities
- GSE maintenance facilities
- Flight kitchens
- The Airport maintenance/DOA facilities
- GA/FBO facilities

This assessment evaluates each support/ancillary facility separately to determine their adequacy for serving the existing and demand levels projected for each of the following planning level: 2007, 2009, 2013, and 2018.

The methodology for assessing the facility requirements for each facility type varies. Typically, the methodology entails comparing the gross facility areas with an associated demand level and an assessment of the currently utilization of space. Tenant surveys were conducted to identify the adequacy of the existing facilities to satisfy the current demand levels. For those who responded, the information pertaining to the current utilization of their facilities was incorporated into this analysis. Subsequent discussions with DOA staff also contributed to the assessment of the existing facilities. Through this process, planning ratios were identified for each facility component. To obtain the facility requirements, the recommended planning ratios for each component are applied to the projected demand levels corresponding to each planning level.

The existing ancillary facilities encompass approximately 601 acres. The following provides a brief description for each category of ancillary facility:

- **Cargo Facilities** serve both the all-cargo (freight) activity and belly cargo that is transported on regularly scheduled passenger aircraft. The air cargo industry can be classified in two operating types: (1) freight/express cargo, and (2) mail. For the purpose of this assessment, the cargo facility requirements at the Airport are based on the combined enplaned cargo tonnage demand levels of both freight/express cargo and mail. On that basis, on-Airport enplaned cargo tonnage defines the need for warehouse buildings and truck dock areas. The need for apron is associated with the total peak month enplaned on/off-Airport cargo tonnage and the demand for auto parking facilities is correlated to the warehouse gross area. At

ORD, most cargo facilities are located within the southern airfield (i.e. south of Runway 9R/27L), with a few located immediately east of the terminal complex.

- **Airline Maintenance Facilities** are dedicated to the maintenance of air carrier aircraft. For the purpose of this assessment, annual aircraft operations form the basis for identifying future airline maintenance facilities. Typically, airline maintenance facilities serve the needs of aircraft storage and repair. They include hangar buildings, airside apron, and auto parking. Currently, these facilities are located in the Northwest Maintenance Area, north of Runway 9L/27R, between Runway 14L/32R and 14R/32L.
- **Ground Service Equipment (GSE) Maintenance** includes the facilities dedicated to the maintenance of ground power units, baggage carts, dollies, tow bars, tug and tractors, scissor lifts, and maintenance stands among other GSE. These services typically include, but are not limited to routine, preventive, or emergency maintenance. GSE maintenance facilities typically include hangar, apron, storage yard, and auto parking. At O'Hare, these facilities are currently primarily located in the Northwest Maintenance Area.
- **Flight Kitchens** provide catering services to the airlines. Generally, the primary structural components comprise buildings and truck dock areas. Currently, the flight kitchens are dispersed throughout the Airport, with facilities located in the East Services Area and Northwest Maintenance Area.
- **Airport Maintenance/DOA Facilities** include DOA's maintenance and administrative facilities. Typically, airport maintenance facilities require warehouse for storage, repair, or construction purposes. Administrative facilities primarily require offices to support DOA management activities and parking space to accommodate DOA's employees and visitors.
- **General Aviation (GA)/Fixed Base Operators (FBO)** provide passenger terminal facilities as well as fueling, aircraft parking, and, to varying degrees, aircraft maintenance. The Airport has one FBO, Signature Flight Support.

The ancillary facility requirements through 2018 increase by approximately 15 percent, encompassing an estimated total area of 694 acres. **Table B-1** summarizes the requirements by each facility category.

The following sections provide greater details on the establishment of the facility requirements contained in the summary table above.

B.1 Cargo Facilities

The assessment of the facility requirements for cargo facilities evaluates the warehouse, loading dock, airside apron, truck docking, and auto-parking areas associated with the existing cargo facilities. During a preliminary analysis of enplaned cargo tonnage, it was determined that approximately 87.9 percent of total cargo (belly cargo and all cargo on-Airport tenants) is processed on-Airport, while 12.1 percent of all cargo is processed off-Airport. These percentages were estimated based on the 2001 Airport Activity Statistics (summarized by belly and all cargo operators) and information collected in the inventory process. It was assumed that any cargo tonnage recorded for carriers not known to have on-Airport facilities, was processed off-Airport. The estimated 12.1 percent of cargo processed off-Airport is assumed representative of the cargo operators who transfer cargo directly between the aircraft and surface transportation modes, thus not requiring warehousing on-Airport. This share of off-Airport cargo is assumed to remain constant over the planning periods.

Table B-1
Facility Requirements Summary

	Existing Facilities Available (Acres)	Recommended Facilities for Existing Conditions	Facility Requirements (Acres)			
			2007	2009	2013	2018
Cargo Facilities ^{1/}	263.0	212.8	234.6 ^{2/}	261.9 ^{2/}	287.9 ^{2/}	315.9 ^{2/}
Aircraft Maintenance ^{3/}	222.0	211.8	211.8	211.8	211.8	211.8
GSE Maintenance	32.6	20.8	23.3	23.9	25.2	26.8
Flight Kitchens	16.8	8.3	8.9	9.3	10.0	11.0
Airport Maintenance & DOA ^{4/}	60.5	60.5	73.9	90.8	105.9	115.0
GA/FBO	6.5	13.2	13.2	13.2	13.2	13.2
Total	601.4	527.4	565.7	610.9	654.1	693.8

Notes:

^{1/} Cargo Facilities include the United State Postal Service Facilities (Building 600 and 514), encompassing a total site area of approximately 60 acres.

^{2/} Cargo building facility requirements reflect facilities required for on-Airport cargo only.

^{3/} Aircraft maintenance facilities for 2007, 2009, 2013, and 2018 were capped at the recommended facilities for existing conditions.

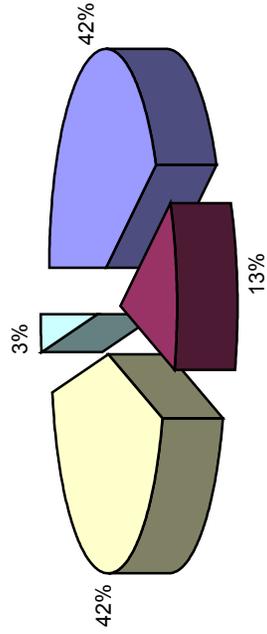
^{4/} The facility requirements for 2007, 2009, 2013, and 2018 assumes 5, 10, 20, 30 percent increase for all facilities, respectively.

Sources: Airport Facilities Inventory, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit B-1 illustrates the share of cargo processed on/off-Airport. As a result, the evaluation of cargo warehouse correlates with the peak month on-Airport enplaned cargo (tons), while the evaluation of the airside apron is based on the peak month enplaned total cargo (tons). The assessment of truck loading dock areas and auto parking correlates with the needs associated with the warehouse facilities. These needs were identified according to the gross area of the cargo warehouse.

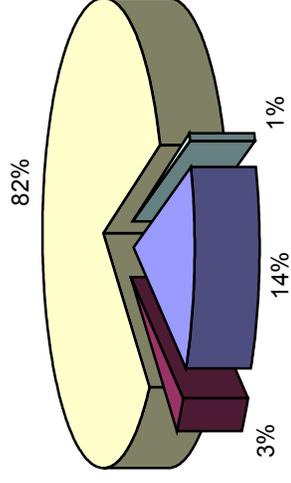
During the survey of cargo tenants, surplus facilities were identified for warehouse and airside apron. It was estimated that 50 percent of the existing warehouse for building 610 (United Airlines cargo facility) is surplus facility. Similarly, 30 percent of the existing warehouses for building 513 (BAX Global facility), 515 (DHL and Air Canada cargo facility), 516 (JAL, EVA, and BA cargo facility), 517(Korean air cargo facility), and 613 (Northwest cargo facility) are surplus facilities. In addition, an estimated 50 percent of the existing apron was identified as surplus facilities for building 609 (American Airlines cargo facility) and 613. KLM and United Parcel Service (UPS), however, indicated a need for additional warehouse and small package sorting facility, respectively. **Table B-2** summarizes the recommended cargo facilities for the existing conditions based on facility surpluses and deficiencies. The recommended facilities assume that better utilization of the existing surplus space will occur. Since the surplus facilities exceed the facility requirements identified during the survey of cargo tenants, the total recommended cargo facilities required to meet the existing demand level have been reduced to approximately 213 acres assuming effective use of this surplus space.

Total Enplaned Cargo On-Airport



Total Cargo On-Airport: 570,182.4 Tons
87.9 % of Total Cargo

Total Enplaned Cargo Off-Airport



Total All-Cargo Off-Airport: 78,712.2 Tons



Source: 2002 Airport Facilities Inventory; DOA Airport Activity Statistics; Ricondo & Associates, Inc
Prepared by: Ricondo & Associates, Inc.

Exhibit B-1

**2001 Cargo Enplanements
On-Airport vs. Off-Airport Cargo Tenants**

Since a greater cargo demand was experienced at the Airport during 2000 than 2001, it was selected as the base year for establishing the recommended planning ratios. On-Airport peak month enplaned cargo tonnage and total enplaned cargo tonnage in 2000 exceeded the 2001 demand levels. Therefore, the 2000 peak month enplaned cargo demand level and the adjusted facility needs and the form the basis for establishing the recommended planning ratios for cargo facility requirements.

Table B-2

Recommended Cargo Facilities for Existing Conditions

	Existing Facilities	Facility Size		Recommended
		Surplus	Deficiency	
Warehouse (s.f.)	3,067,016	429,190 ^{1/}	195,968 ^{2/}	2,833,794
Airside Apron (s.f.)	3,388,029	534,670 ^{3/}	64,553 ^{2/}	2,917,912
Truck Dock Area (s.f.)	817,317	136,933 ^{1/}	58,841 ^{2/}	739,224
Number of Parking Stalls (qty)	4,976	433 ^{1/}	399 ^{2/}	4,942
Auto Parking/Access/Circulation (s.f.)	1,364,897	139,348 ^{1/}	161,718 ^{2/}	1,387,267
Other (s.f.)	2,818,825	1,428,323 ^{1/}	0 ^{2/}	1,390,502 ^{4/}
Total Area (s.f.)	11,456,084	2,668,464	481,079	9,268,699
Total Area (acres)	263.0	61.3	11.0	212.8

Notes:

^{1/} Surplus facilities identified for buildings 610 (UA Cargo Facility), 513 (BAX Global Facility), 515 (DHL and Air Canada Cargo Facility), 516 (JAL, EVA, and BA Cargo Facility), 517 (Korean Air Cargo Facility), and 613 (Northwest Cargo Facility). Based on preliminary discussions with tenants, it was estimated that 50% of existing areas for building 610 is surplus facilities. Similarly, it was estimated that 30% of existing areas for buildings 513, 515, 516, 517, and 613, are surplus facilities

^{2/} Deficiencies were identified for buildings 609 (American Airlines Cargo Facility) and 618 (KLM Royal Dutch Cargo Facility) as well as for UPS small package sorting facility. Based on preliminary discussions with tenants, it was estimated that 100% and 70% were facilities deficiencies for buildings 609 and 618, respectively. The UPS sorting facility deficiencies were based on discussions with UPS.

^{3/} Apron surplus was identified for building 609 (American Airlines Cargo Facility) and 613 (Northwest Cargo Facility). It was estimated that 50 percent of the existing apron areas is surplus facilities.

^{4/} For planning purposes, a 15 percent contingency is recommended for other areas.

Sources: Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc.

Table B-3 summarizes the recommended planning ratios for the assessment of the cargo facility requirements. As shown, the recommended warehouse facilities require an estimated total area of 2,833,794 square feet. In 2000, the peak month enplaned cargo on-Airport was 68,153 tons. Therefore, the recommend planning ratio to assess cargo warehouse facilities resulted in 40 square feet per peak month on-Airport enplaned cargo ton. Although approximately 12 percent of cargo is processed off-Airport, thus not requiring warehouse, cargo operators still require apron space to perform the loading/unloading of cargo between aircraft and surface transportation modes. Therefore the planning ratio established for the assessment of cargo facilities apron space was based on the peak month total enplaned cargo ton and resulted in 35 square feet per peak month total enplaned cargo ton. It should be noted that the difference in peak month on-Airport enplaned cargo ton and total enplaned cargo ton shown in Table B-3 do not correspond to the 12.1 percent of cargo processed off-Airport. This percentage was derived based on annual enplaned cargo, and do not necessarily correspond to the peak month share.

Table B-3**Cargo Facility Planning Factors Summary^{1/}**

Facility Component	Planning Metric	Recommended Facilities ^{2/}	Existing Demand Level (2000)/ Related Facility Size	Recommended Planning Factor
Warehouse	s.f. per peak month on-Airport enplaned cargo ton	2,833,794 s.f.	68,153 tons	40:1
Airside Apron	s.f. per peak month total cargo enplaned cargo ton	2,917,912 s.f.	86,268 tons	35:1
Truck Dock Area	percent of warehouse area	739,224 s.f.	2,833,794 s.f.	23%
Number of Parking Stalls	stalls per 1,000 s.f. of building	4,942 stalls	2,833,794 s.f.	2
Auto Parking/Access/Circulation	percent of warehouse area	1,387,267 s.f.	2,833,794 s.f.	49%
Other	percent of overall cargo facility area	1,390,502 s.f.	9,268,699 s.f.	15%^{3/}

Notes:

^{1/} Planning factor ratios may not reflect actual value due to rounding.^{2/} The recommended facilities for the existing conditions were based on discussions and surveys with the airport tenants.^{3/} For planning purposes, a 15 percent contingency is recommended for other areas.Sources: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Based on the above recommended planning ratios, **Table B-4** summarizes the facility requirements associated with each functional area of the cargo facilities. As shown, cargo facilities at the Airport increase from an existing 263 acres to approximately 316 acres in 2018, thus representing an overall increase of 20 percent. This estimate of future requirements assumes effective utilization of excess space currently apparent in the cargo facilities. On this basis, future cargo facility needs were projected through 2018. As depicted in **Table B-4**, approximately 235, 262, and 288 acres of airport property are required in 2007, 2009, and 2013. If excess space (estimated at 50 acres) in the existing cargo facilities cannot be effectively utilized, a commensurate increase in the cargo facility requirements could be necessary.

Table B-4**Cargo Facility Requirements^{1/}**

	Facility Requirements					
	Existing Facilities Available	Recommended Facilities for Existing Conditions	2007	2009	2013	2018
Enplaned Cargo Tons						
Total Annual Enplaned	772,996	772,996	963,517	1,050,805	1,116,788	1,225,283
Peak Month On-Airport Enplaned	68,153	68,153	84,693	89,289	98,166	107,702
Peak Month Total Enplaned	86,268	86,268	96,352	101,580	111,679	122,528
Facility Requirements						
Building Facility (s.f.)	3,067,016	2,833,794	3,387,700	3,571,600	3,926,600	4,308,100
Airside Apron (s.f.)	3,388,029	2,917,912	3,372,300	3,555,300	3,908,800	4,288,500
Number of Truck Docks (qty)	640	586	701	739	812	891
Truck Dock Area (s.f.)	817,317	739,224	779,200	821,500	903,100	990,900
Number of Parking Stalls (qty)	4,976	4,942	5,908	6,228	6,847	7,513
Auto Parking/Access/Circulation (s.f.)	1,364,897	1,387,267	1,658,400	1,748,500	1,922,200	2,109,000
Other (s.f.)	2,818,825	1,390,502	1,021,900	1,711,500	1,881,600	2,064,400
Total Area (s.f.)	11,456,084	9,268,699	10,219,500	11,408,400	12,542,300	13,760,900
Total Area (acres)	263.0	212.8	234.6	261.9	287.9	315.9

Notes:

^{1/} Cargo Facilities include the United State Postal Service Facilities (Building 600 and 514), which encompass a total site area of approximately 60 acres.^{2/} All areas and quantities for 2007, 2009, 2013, and 2018 have been rounded to the nearest hundred and nearest ten, respectively.^{3/} Cargo warehouse facility requirements for 2007, 2009, 2013, and 2018 reflect facilities required for on-Airport cargo only.

Sources: Airport Facilities Inventory, Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc.

B.2 Airline Maintenance

Aircraft maintenance facility requirements at an airport are driven by airline decisions and not related directly to activity at the airport. The development of these facilities at an airport is strictly a policy decision made by the airlines themselves. Many airports, including some commercial service airports, do not have dedicated aircraft maintenance facilities on site. Some airports may have large maintenance facilities dedicated to passenger aircraft yet have little or no commercial service. Others (like O'Hare) have significant commercial service and a significant number of aircraft maintenance facilities. Since there is no direct relationship between airline maintenance facility requirements and activity at an airport, the assessment of long-term facility needs for airline maintenance facilities is purely speculative.

Table B-5 summarizes the recommended airline maintenance facilities identified to serve the existing demand levels. As shown, the existing airline maintenance facilities encompass a total area of approximately 220 acres. During discussions with the airline tenants and DOA staff, surplus facilities were identified. In addition, DOA staff indicated that United Parcel Services (UPS) and Atlantic Coast Airlines have expressed their interest in developing aircraft maintenance facilities at the Airport. However, surplus facilities exceed the facility requirements identified by UPS and ACA. Even considering UPS and ACA requirements, the total recommended airline maintenance facilities required to meet the existing demand levels is approximately 212 acres. As such, gross airline maintenance facility requirements for 2007, 2009, 2013, and 2018 are maintained at the existing

requirement level, approximately 212 acres. It should be noted that although more hangar facilities are required, adequate space is available within existing surplus areas dedicated to airline maintenance functions to accommodate these facilities. **Table B-6** summarizes the airline maintenance facility requirements.

Table B-5**Recommended Airline Maintenance Facilities for Existing Conditions**

	Facility Size			
	Existing Facilities	Surplus	Deficiency	Recommended
Hangar (s.f.)	1,229,808	187,299	289,600	1,332,109
Airside Apron (s.f.)	3,546,071	565,817	360,000	3,340,254
Number of Parking Stalls (qty)	2,610	237	369	2,743
Auto Parking/Access/Circulation (s.f.)	798,326	107,523	120,000	810,804
Other (s.f.)	4,098,139	355,569	0	3,742,570
Total Area (s.f.)	9,672,344	1,216,208	769,600	9,225,736
Total Area (acres)	222.0	27.9	17.7	211.8

Notes:

^{1/} Surplus facilities identified for buildings 750 (UAL Hangar 5/5A - Maintenance Facility), 757 (UAL Maintenance Facility), and 770 (UAL Maintenance Facility). Based on preliminary discussions with tenants, it was estimated that 30 % of existing areas for building 750 is surplus facilities. Similarly, it was estimated that 100% of the existing areas for building 757 and 770 are facilities surplus.

^{2/} Deficiencies are based on aircraft maintenance facility requirements provided by the United Parcel Service (UPS) and Atlantic Coast Airlines (ACA).

Sources: Airport Facilities Inventory, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table B-6**Maintenance Facility Requirements Summary^{1/}**

	Facility Requirements					
	Existing Facilities Available	Recommended Facilities for Existing Conditions	Facility Requirements			
			2007	2009	2013	2018
Hangar (s.f.)	1,229,808	1,332,109	1,332,109	1,332,109	1,332,109	1,332,109
Airside Apron (s.f.)	3,546,071	3,340,254	3,340,254	3,340,254	3,340,254	3,340,254
Number of Parking Stalls (qty)	2,610	2,743	2,743	2,743	2,743	2,743
Auto Parking/Access/Circulation (s.f.)	798,326	810,804	810,804	810,804	810,804	810,804
Other (s.f.)	4,098,139	3,742,570	3,742,570	3,742,570	3,742,570	3,742,570
Total Area (s.f.)	9,672,344	9,225,736	9,225,736	9,225,736	9,225,736	9,225,736
Total Area (acres)	222.0	211.8	211.8	211.8	211.8	211.8

Notes:

^{1/} Aircraft Maintenance facilities for 2009, 2013, 2018, and 2022 were capped at the recommended existing conditions.

Sources: 2002 Airport Facilities Inventory, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

B.3 Airline Ground System Equipment (GSE) Maintenance

The components evaluated for the purpose of this assessment are similar to the components evaluated for the airline maintenance facilities. The evaluation of buildings and the airside apron are predicated on the annual air carrier operations. The assessment of auto parking areas correlates with the needs associated with the building facility. These needs were established according to the gross area of the building facility.

Table B-7 yields the recommended airline GSE maintenance facilities required to serve the existing air carrier operation demand levels. American, United, and Continental currently operate GSE maintenance facilities at the Airport, which encompass a total site of approximately 33 acres. During the survey and discussion efforts, surplus facilities including building, apron, and auto parking were identified. These surplus facilities comprise a total area of approximately 12 acres. As a result, the recommended GSE maintenance facilities necessary to serve the existing air carrier operation demand levels have been reduced to an estimated total site of 21 acres.

Table B-7

Recommended Airline GSE Maintenance Facilities for Existing Conditions

	Facility Size			
	Existing Facilities	Surplus	Deficiency	Recommended
Building (s.f.)	258,420	107,226	^{1/} 0	151,194
Airside Apron (s.f.)	454,956	62,589	^{1/} 0	392,368
Number of Parking Stalls (qty)	406	141	^{1/} 0	265
Auto Parking/Access/Circulation (s.f.)	137,895	49,691	^{1/} 0	88,205
GSE Storage Yard (s.f.)	568,967	294,140	^{1/} 0	274,827
Total Area (s.f.)	1,420,238	513,646	0	906,592
Total Area (acres)	32.6	11.8	0	20.8

Notes:

^{1/} Surplus facilities identified for buildings 723 (AAL Ground Equipment and Maintenance Facility), 744 (UAL Ground Equipment and Maintenance Facility), and 780 (Continental Airlines Vehicle Maintenance). Based on preliminary discussions with tenants, it was estimated that 30%, 50%, and 20% are facilities surplus for buildings 723, 744, and 780, respectively.

Sources: 2002 Airport Facilities Inventory, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Similar to the assessment of the airline maintenance facility requirements, the above recommended facility needs and annual air carrier operation demand levels form the basis for establishing the recommended planning ratios necessary to derive the airline GSE maintenance facilities requirements. **Table B-8** summarizes the planning factors associated with the airline GSE maintenance facilities. As shown, the recommended planning factors for the airline GSE maintenance building and airside apron are 0.18 and 0.46 square feet per annual air carrier operation, respectively. The planning factor for auto parking/access/circulation and the GSE storage yard area represented 58 and 30 percent of the building and the overall GSE maintenance facility area, respectively.

Table B-8Airline GSE Maintenance Facility Planning Factors Summary^{1/}

Facility Component	Planning Metric	Recommended Facilities ^{2/}		Existing Demand Level (2001)/ Related Facility Size	Recommended Planning Factor
Building	s.f. per annual air carrier operation	151,194	s.f.	855,392 operations	0.18
Airside Apron	s.f. per annual air carrier operation	392,368	s.f.	855,392 operations	0.46
Number of Parking Stalls	stalls per 1,000 s.f. of building	265	stalls	151,194 s.f.	2
Auto Parking/Access/Circulation	percent of building area	88,205	s.f.	151,194 s.f.	58%
GSE Storage Yard	percent of overall GSE maint. facility area	274,827	s.f.	906,592 s.f.	30%

Notes:

^{1/} Planning factor ratios may not reflect actual value due to rounding.^{2/} The recommended facilities for the existing conditions were based on discussions and surveys with the airport tenants.Sources: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table B-9 presents the airline GSE maintenance facility requirements for 2007, 2009, 2013, and 2018. These requirements are based on the planning factors presented in Table B-8 and the projected demand levels for each component of the airline GSE maintenance facilities. Currently, these airline support facilities encompass a total of approximately 33 acres. In 2018, Table B-10 shows a need for 27 acres of total space dedicated for airline GSE maintenance facilities. These needs could be accommodated by the existing facilities. Thus, no additional facilities are anticipated.

B.4 Flight Kitchens

In flight catering services are provided to the domestic and foreign flag carriers serving ORD by three primary flight kitchens:

- United Airlines
- Gate Gourmet
- Sky Chef

The services provided by these facilities include preparing meals and snacks, storing and handling beverages, and transporting these services to and from the aircraft.

Table B-9

Airlines GSE Maintenance Facility Requirements

	Facility Requirements					
	Existing Facilities Available	Recommended Facilities for Existing Conditions	2007	2009	2013	2018
Annual Air Carrier Operations	832,303	832,303	950,427	976,984	1,030,102	1,094,959
Facility Requirements						
Building (s.f.)	258,420	151,194	171,100	175,900	185,400	197,100
Airside Apron (s.f.)	454,956	392,368	436,000	448,100	472,500	502,300
Number of Parking Stalls (qty)	406	265	300	308	325	345
Auto Parking/Access/Circulation (s.f.)	137,895	88,205	99,800	102,600	108,200	115,000
GSE Storage Yard (s.f.)	568,967	274,827	307,500	316,100	333,300	354,300
Total Area (s.f.)	1,420,238	906,592	1,014,400	1,042,700	1,099,400	1,168,700
Total Area (acres)	32.6	20.8	23.3	23.9	25.2	26.8

Sources: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

The flight kitchen facilities at ORD were evaluated on an aggregate basis according to peak month departing passengers. The evaluation of truck loading dock areas and auto-parking was performed analogous to the methodology used for the previous assessments.

Tables B-10 and B-11 summarize the recommended flight kitchen facilities and planning factors by each functional area, respectively. As shown, the existing flight kitchens comprise approximately 17 acres of on-Airport property. Based on field observations and discussions with the DOA, it was estimated that 75 and 50 percent of building 504 (Gate Gourmet) and 511 (Sky Chef) are surplus facilities. The utilization of these existing facilities was significantly impacted by the terrorist attacks of September 11, and the resultant reductions in airline catering as carriers and caterers adjusted to new security rules and difficult economic conditions. These surplus facilities total approximately 8 acres of airport property. Therefore, the recommended total areas of flight kitchen facilities necessary to serve the existing air carrier demand levels encompass approximately 8 acres.

Table B-12 summarizes the facility requirements for flight kitchen facilities. These requirements are based on the recommended planning ratios presented in Table B-11 and the projected demand levels for peak month departing passengers. As depicted, the future facility needs increase from 8.9 acres in 2007 to approximately 11 acres in 2018. Therefore no increase in facility area is anticipated through 2018.

Table B-10
Recommended Flight Kitchen Facilities for Existing Conditions

	Facility Size			
	Existing Facilities	Surplus	Deficiency	Recommended
Building Facility (s.f.)	258,420	100,560	^{1/} 0	^{2/} 184,748
Truck Dock Area (s.f.)	30,000	15,000	^{1/} 0	^{2/} 15,000
Number of Parking Stalls (qty)	509	291	^{1/} 0	^{2/} 219
Auto Parking/Access/Circulation (s.f.)	177,441	100,379	^{1/} 0	^{2/} 77,062
Other (s.f.)	237,866	155,183	^{1/} 0	^{2/} 82,683
Total Area (s.f.)	703,727	371,122	0	359,493
Total Area (acres)	16.2	8.5	0.0	8.3

Notes:

^{1/} Facilities Surplus identified for buildings 504 (Gate Gourmet) and 511 (Sky Chef). Based on field observations and discussions with the Department of Aviation (DOA), it was estimated that 75% and 50% are surplus facilities for buildings 504 and 511, respectively.

Sources: Airport Facilities Inventory, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table B-11
Flight Kitchen Facility Planning Factors Summary

Facility Component	Planning Metric	Recommended Facilities ^{2/}		Existing Demand Level (2001)/ Related Facility Size	Recommended Planning Factor
Building	s.f. per peak month departing passenger	184,748	s.f.	3,061,711 enplanements	0.05
Truck Dock Area	percent of building area	15,000	s.f.	184,748 s.f.	8%
Number of Parking Stalls	stalls per 1,000 s.f. of building	219	qty	184,748 s.f.	1
Auto Parking/Access/Circulation	Percent of building area	77,062	s.f.	184,748 s.f.	42%
Other	percent of overall kitchen facility area	82,683	s.f.	359,493 s.f.	23% ^{3/}

Notes:

^{1/} Planning factor ratios may not reflect actual value due to rounding.

^{2/} The recommended facilities for the existing conditions were based on discussions and surveys with the airport tenants.

^{3/} For planning purposes, a 23 percent contingency is recommended for other areas.

Sources: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table B-12

Flight Kitchen Facility Requirements Summary

	Facility Requirements					
	Existing Facilities Available	Recommended Facilities for Existing Conditions	2007	2009	2013	2018
Peak Month Enplanements	2,900,576	2,900,576	3,309,000	3,451,200	3,736,600	4,115,200
Facility Requirements						
Building Facility (s.f.)	285,308	184,748	198,500	207,100	224,200	246,900
Number of Truck Docks (qty)	62	31	33	35	38	41
Truck Dock Area (s.f.)	30,000	15,000	16,100	16,800	18,200	20,000
Number of Parking Stalls (qty)	509	219	235	245	265	292
Auto Parking/Access/Circulation (s.f.)	177,441	77,062	82,800	86,400	93,500	103,000
Other (s.f.)	237,866	82,683	88,800	92,700	100,300	110,500
Total Area (s.f.)	730,615	359,493	386,200	403,000	436,200	480,400
Total Area (acres)	16.8	8.3	8.9	9.3	10.0	11.0

Sources: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

B.5 Airport Maintenance and Department of Aviation (DOA)

The existing airport maintenance and Department of Aviation (DOA) facilities occupy approximately a total of 27 and 32 acres of on-Airport property, respectively. Airport maintenance facilities at ORD include but are not limited to buildings, warehouse, salt storage, and runway deicer facilities.

Based on comments by airport personnel, the existing airport maintenance facilities are generally adequate to meet existing demands. However, it is anticipated that expansion of the airfield will require commensurate expansion of airport maintenance facilities in the future. Total airport maintenance/DOA facilities are assumed to increase between years 2002 and 2018 with growth over 2002 of 5 percent in 2007, 10 percent in 2009, 20 percent in 2013, and 30 percent in 2018. This growth through 2018 is based on the increase in air carrier runways at the airport. Total airport maintenance/DOA facilities are assumed to increase moderately between years 2002 and 2018 with growth over 2002 of 25 percent in 2007, 50 percent in 2009, 75 percent in 2013, and 90 percent in 2018. This growth through 2018 is based on a 90 percent increase pavement due to the OMP.

Table B-13 summarizes the existing facilities as well as the future facility needs identified based on the above assumption. As shown, the existing Airport maintenance/DOA facilities comprise a total site area of approximately 61 acres. Facility requirements identified for 2018 encompass an estimated total area of 115 acres.

B.6 General Aviation (GA)/Fixed Based Operator (FBO)

GA activities at the Airport are limited to only one FBO, Signature Flight Support (SFS). Considering the low level of these types of activities, the SFS FBO facility is evaluated on an aggregate basis according to the level of peak month GA operations at the Airport.

Table B-13

Airport Maintenance/DOA Future Facility Requirements

	Existing Facilities Available	2007	2009	2013	2018
Building Facility (s.f.)	416,920	521,200	625,400	729,600	792,100
Airside Apron (s.f.)	33,145	41,400	49,700	58,000	63,000
Truck Dock Area (s.f.)	2,000	2,500	3,000	3,500	3,800
Number of Parking Stalls (qty)	878	1,100	1,320	1,540	1,670
Auto Parking/Access/Circulation (s.f.)	376,865	395,700	565,300	659,500	716,000
Other (s.f.)	1,807,078	2,258,800	2,710,600	3,162,400	3,433,400
Total Area (s.f.)	2,634,008	3,217,100	3,951,000	4,609,500	5,004,500
Total Area (acres)	60.5	73.9	90.8	105.9	115.0

Notes:

^{1/} The facility requirements for 2007, 2009, 2013, and 2018, assumes a 25, 50, 75, and 90 percent increase of the existing facilities for all components of the Airport maintenance/DOA facilities, respectively.

Sources: Airport Facilities Inventory, Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc

SFS has recently initiated development of new FBO facilities at the Airport on the former military site. Development of these facilities was necessitated by the planned development of Terminal 6, which utilizes space occupied by the current FBO facilities. The planned FBO facilities will occupy a site of approximately 13.2 acres, providing apron, terminal building and parking facilities. Since GA activity is forecast to remain constant throughout the planning period at levels slightly less than currently experienced, it is not anticipated that additional facilities beyond those currently planned for the new FBO facility will be needed during this timeframe. **Table B-14** summarizes the FBO facility needs at the Airport.

Table B-14

Recommended GA/FBO Facilities for Existing Conditions

	Facility Size			
	Existing Facilities	Surplus	Deficiency	Recommended
Building Facility (s.f.)	30,397	19,147	-	11,250
Airside Apron (s.f.)	223,400	-	250,236	473,636
Number of Parking Stalls (qty)	70	-	149	219
Auto Parking/Access/Circulation (s.f.)	23,194	-	48,056	71,250
Other (s.f.)	5,714	-	15,286	21,452
Total Area (s.f.)	282,705	19,147	313,578	577,588
Total Area (acres)	6.5	0.4	7.2	13.2

Notes:

^{1/} Represents the existing General Aviation apron owned by the Department of Aviation (DOA)

^{2/} Deficient and surplus facilities identified for Signature Flight Support Terminal (Building 521) are based on the new General Aviation site facility requirements and interviews with the DOA.

Sources: Airport Facilities Inventory, Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc.