

APPENDIX N

COVID-19 SENSITIVITY ANALYSIS: AVIATION ACTIVITY FORECASTS

The Aviation Activity Forecasts presented in **Appendix B** of this Environmental Assessment (EA) represent the expected level of activity at O'Hare during the forecast period of 2019 through 2030.¹ This forecast was prepared prior to the onset of the COVID-19 pandemic. The purpose of this analysis is to provide an assessment of whether and when O'Hare International Airport (O'Hare or the airport) will recover from the pandemic by examining areas of sensitivity.

In March 2020, demand for air travel decreased precipitously due to the global health crisis of the COVID-19 pandemic (COVID-19 or pandemic). While demand for air travel in the United States (U.S.) has begun to recover, the markets that have recovered the fastest are destination leisure markets such as Miami, Fort Myers, and Denver. O'Hare has been slower than other large hubs to recover because its demand is dependent on business travel. However, schedules for the first quarter of 2022 show that airlines have added capacity to meet demand. This demonstrates the carriers' confidence in the O'Hare market and the carriers' commitment to O'Hare's continued role as a dual hub.

For the purposes of understanding the impact that COVID-19 has had on air travel demand on O'Hare, the FAA Forecasting Team examined two scenarios that could lead to a shift in O'Hare's passenger demand, thus changing the passenger level or mix and aircraft fleet mix in the forecast. Both scenarios analyzed a lower than forecasted demand. The two scenarios evaluated were:

1. **Scenario 1**, which examined O'Hare's role as a connecting hub to assess whether the trend seen nationally of Low-Cost Carrier (LCC) and Ultra Low Cost Carrier (ULCC) growth will increase point-to-point traffic at O'Hare and/or threaten O'Hare's role as a connecting hub and
2. **Scenario 2**, which examined the impact the pandemic has had on O'Hare international traffic as well as shifts in business traffic

Another factor included in the sensitivity analysis is the increase in all cargo air freighter operations at O'Hare. During COVID-19, the shift from bricks-and-mortar retail to e-commerce trend accelerated. In 2020, O'Hare recorded cargo operations that were not forecast to occur in 2026. However, more recent supply chain issues and the return of U.S. passenger airlines to long-haul wide-body flights have caused this trend to level off and, in some cases, reverse.

It should be noted that the pre-pandemic period of 2018 and 2019 represented record high traffic levels in the U.S. and O'Hare. The carriers enjoyed years of profitability leading up to and including 2019. For this reason, the base year of the forecast was a high point at the top of the business cycle, which means that the forecast following this base year will be relatively high. This factor, combined with the depth of the loss in aviation activity because of COVID-19, eliminated the need to conduct a high activity scenario. Since all the environmental impacts of the baseline analysis are already estimated, and the focus of this sensitivity analysis anticipates that when and if O'Hare returns to that forecast, no additional environmental analysis will be required.

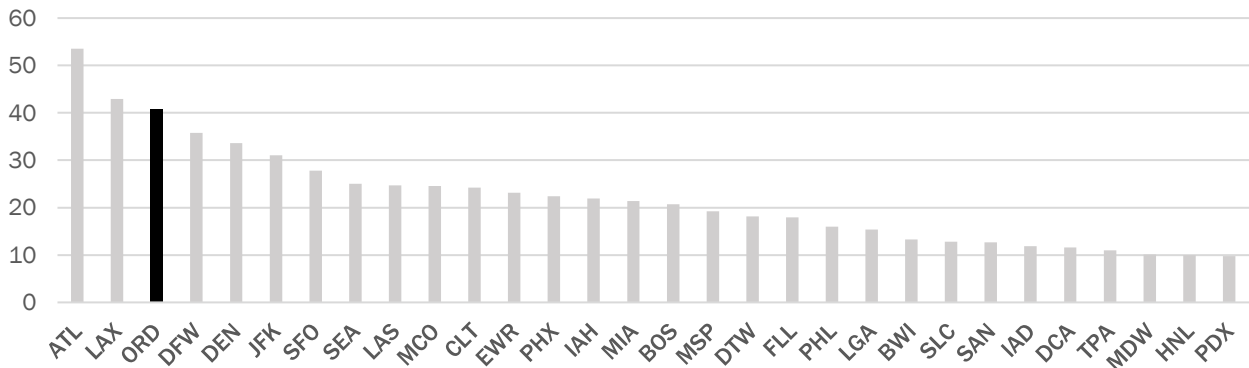
¹ Appendix B, Attachment B-1, Analysis of the Impact of Project Delays on the Forecast of Passenger Activity, addresses the shift of the original project forecast interim and build out years from 2023 to 2025 and 2030 to 2032, respectively.

Scenario 1: O'Hare's Role as a Connecting Hub

Impact of COVID-19 on O'Hare

O'Hare is the only airport in the U.S. that accommodates two airline hubs. The dual hub has large connecting complexes for both American Airlines (American, or AA) and United Airlines (United, or UA). As illustrated in **Figure N-1**, O'Hare was the third largest airport in the U.S., with over 40 million enplanements in 2019.

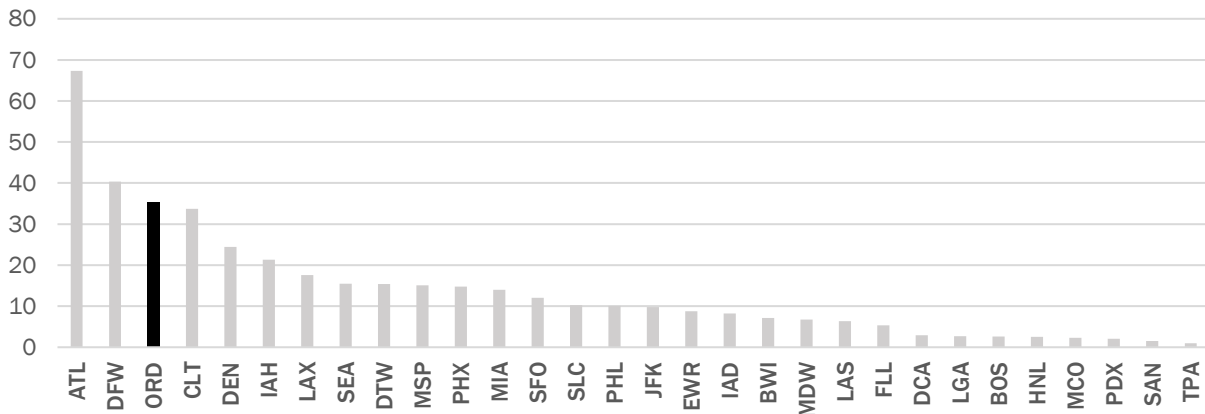
FIGURE N-1
RANKING OF LARGE HUB AIRPORTS ENPLANEMENTS (CY 2019, MILLIONS)



Source: FAA Enplanement Database

During this same period, O'Hare was also the third largest connecting airport in the U.S. behind Delta Air Lines' hub at Atlanta and American Airlines' hub at Dallas/Fort Worth, as shown in **Figure N-2**. Keys to O'Hare's success are its superior geographic location and the size of its local market.

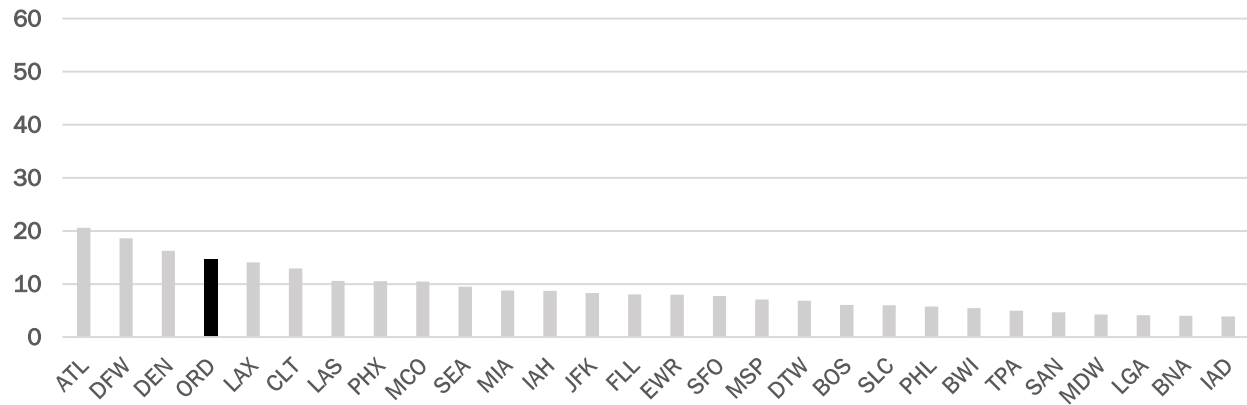
FIGURE N-2
RANKING OF LARGE HUB AIRPORTS CONNECTING PASSENGERS (CY 2019, MILLIONS)



Source: FAA Enplanement Database, USDOT O&D Summary, Sabre MIDT

Due to COVID-19's dire impact on aviation, O'Hare's rank fell to fourth largest airport in the nation in 2020 as shown in **Figure N-3**. O'Hare's enplanements decreased from 40.9 million in 2019 to 14.6 million in 2020, a decline of 26 million passengers. While all airports were negatively impacted by COVID-19, business markets, including Chicago, with strict COVID protocols have experienced more muted recoveries.

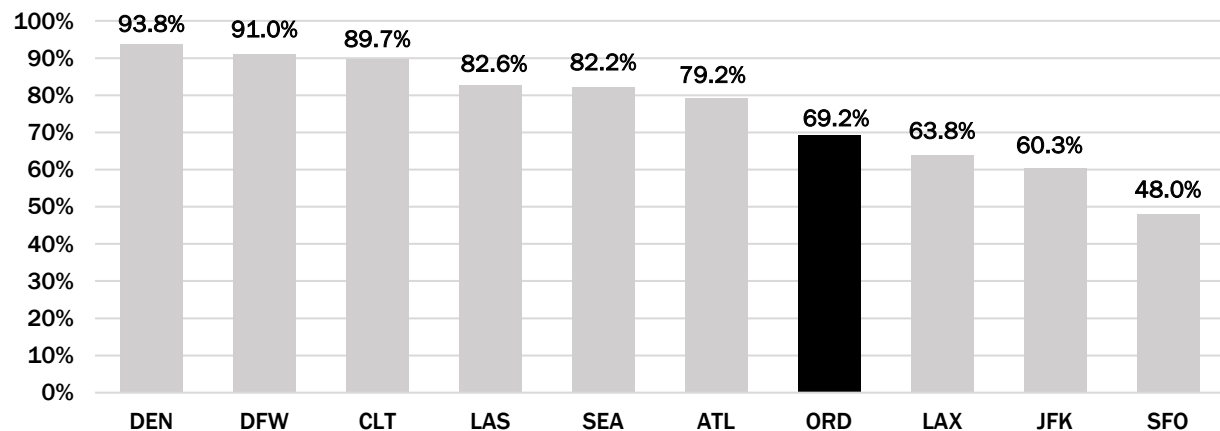
FIGURE N-3
RANKING OF LARGE HUB AIRPORTS ENPLANEMENTS (CY 2020, MILLIONS)



Source: FAA Enplanement Database

By the end of 2021, O'Hare's seat capacity had recovered more slowly than those of many other large U.S. airports, ranking seventh largest in country as shown in **Figure N-4**. The slower recovery at O'Hare was due to stricter COVID-19 regulations, the fact that it is not a destination market, and its reliance on business and international traffic (which has experienced a more attenuated recovery).

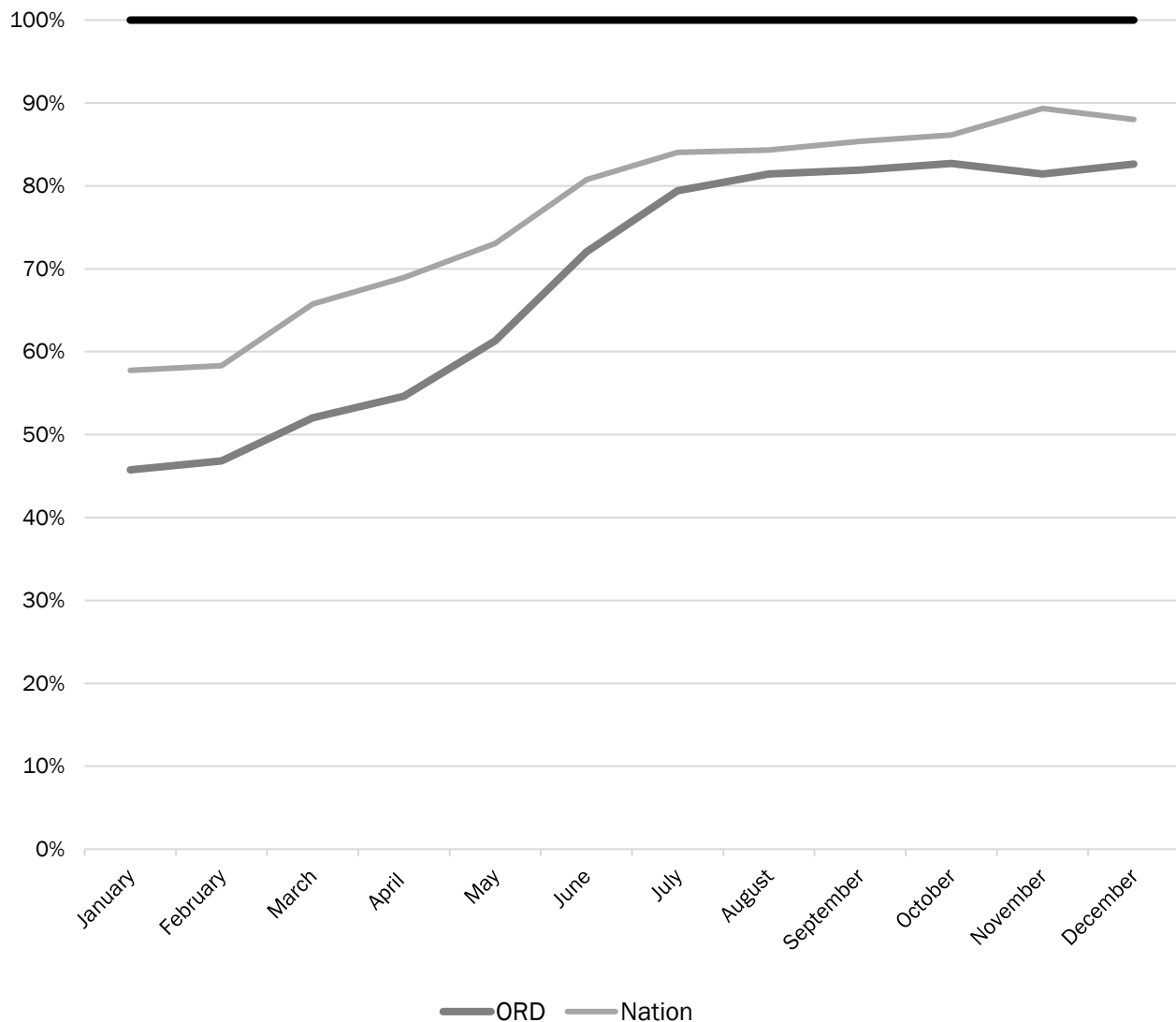
FIGURE N-4
CAPACITY RECOVERY AT THE 10 LARGEST U.S. AIRPORTS (CY 2021 AS A PERCENT OF CY 2019; 10 LARGEST U.S. AIRPORTS DEFINED BASED ON 2019 SEAT DEPARTURES)



Source: Innovata Schedules via Diio by Cirium; data pulled December 9, 2021

Throughout 2021, O'Hare lagged the nation's recovery but closed the gap as the year progressed as shown in **Figure N-5**. At the beginning of 2021, O'Hare's seat capacity was twelve percentage points below the U.S. average. At the end of 2021, O'Hare's seat capacity recovery deficit was reduced by half.

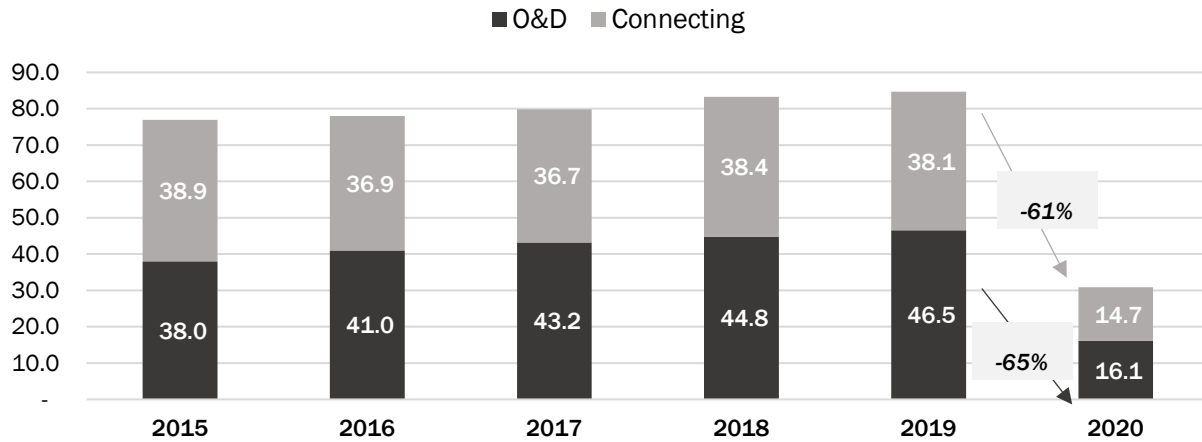
**FIGURE N-5
SEAT RECOVERY AT O'HARE AND THE NATION (JANUARY–DECEMBER 2021 AS A PERCENT OF 2019)**



Source: Innovata Schedules via Diio by Cirium; data pulled December 9, 2021

From 2015 to 2019, O'Hare's local passenger market increased an average of 5.2 percent per year as shown in **Figure N-6**. In 2020, local and connecting traffic decreased 65 percent and 61 percent, respectively. O'Hare's connecting ratio remained relatively stable throughout the period of increases and decreases, which provides evidence that O'Hare's role as a connecting hub will continue.

FIGURE N-6
O'HARE'S HISTORICAL O&D AND CONNECTING PASSENGERS (CY 2015 - CY 2020, MILLIONS)

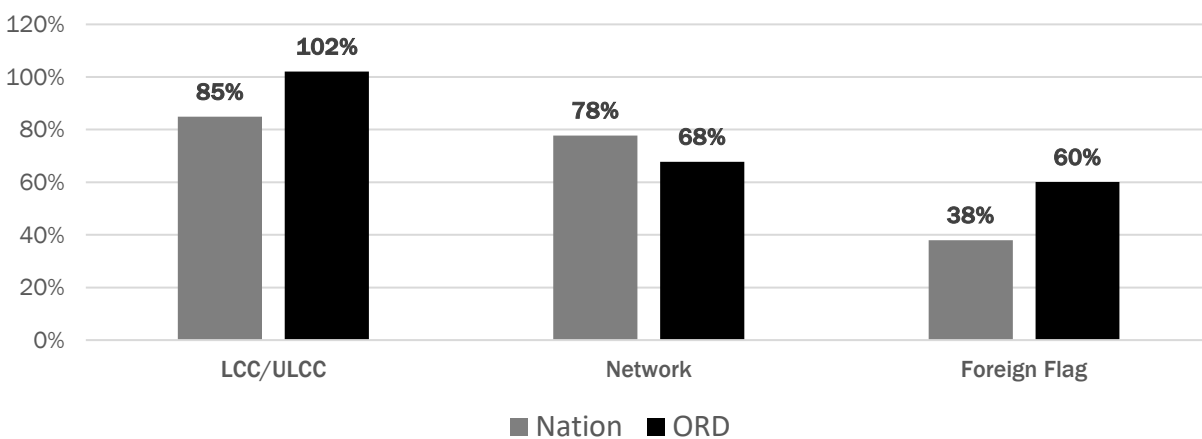


Sources: CDA website, USDOT O&D Summary, Sabre MIDT

N.1.1.2 Impacts of LCC/ULCC Service at O'Hare

LCC and ULCC have led the recovery of seat capacity throughout the nation and at O'Hare as shown in **Figure N-7**. The LCC/ULCC carriers have succeeded during the pandemic because they cater to leisure travelers, the dominant segment of travel demand in 2020 and 2021. At O'Hare, LCC/ULCCs had more seat departures scheduled in 2021 than in 2019. This was fueled by the entrance of Southwest in 2021, when the carrier added almost a million seat departures.

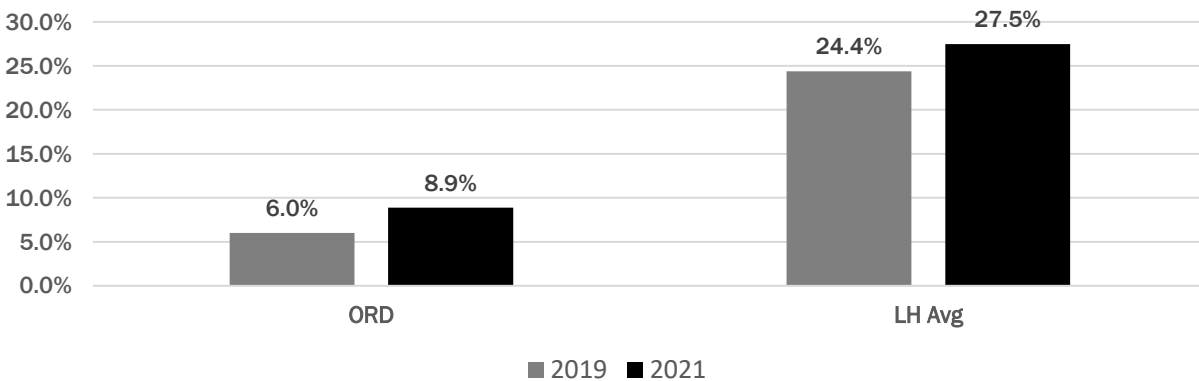
FIGURE N-7
SEAT DEPARTURES PERCENT RECOVERED BY CARRIER TYPE (CY 2021 AS A PERCENT OF CY 2019)



Source: Innovata Schedules via Diio by Cirium; data pulled December 9, 2021 (LCC/ULCCs represent U.S. carriers)

Despite Southwest commencing service at O'Hare, LCC/ULCCs have a limited presence at the airport. LCC/ULCC carriers represented less than ten percent of O'Hare's seat departures in 2021. This is compared to the average of large hub airports where LCC/ULCCs represented more than 25 percent of the total seat departures. As shown in **Figure N-8**, O'Hare's LCC/ULCC share increased from six percent in 2019 to 8.9 percent in 2021 compared to the Large Hub average of 24.4 percent in 2019 to 27.5 percent in 2021.

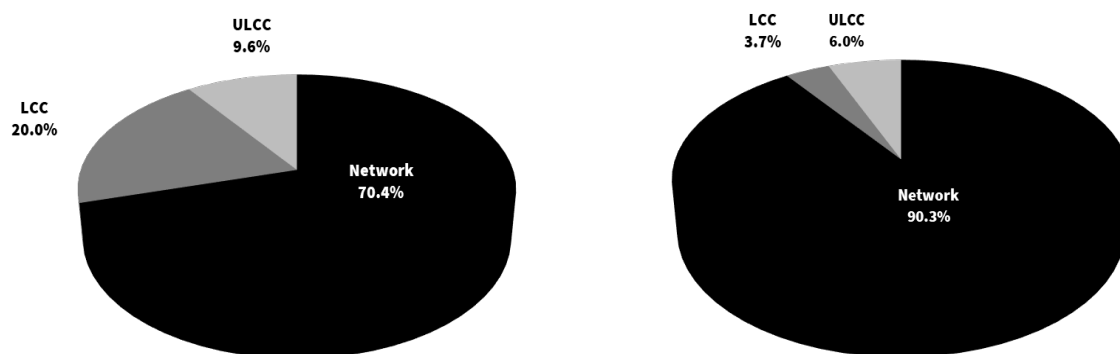
FIGURE N-8
SHARE OF SEAT CAPACITY FLOWN ON LCC/ULCC (CY 2019 COMPARED TO CY 2021)



Source: Innovata Schedules via Diio by Cirium; data pulled December 9, 2021 (LCC/ULCCs represent U.S. carriers)

As shown in **Figure N-9**, the difference in share is even more pronounced in the domestic market; LCCs/ULCCs represented almost 30 percent of the Large Hub seat capacity, whereas O'Hare's share of LCC/ULCC represented less than ten percent. The disproportionately high presence of network carriers has limited O'Hare's recovery and dampened the impact that the LCC/ULCCs can have on the local market.

FIGURE N-9
LARGE HUB DOMESTIC SEAT CAPACITY BY CARRIER TYPE (LEFT) AND O'HARE DOMESTIC SEAT CAPACITY BY CARRIER TYPE (RIGHT) (CY 2021)



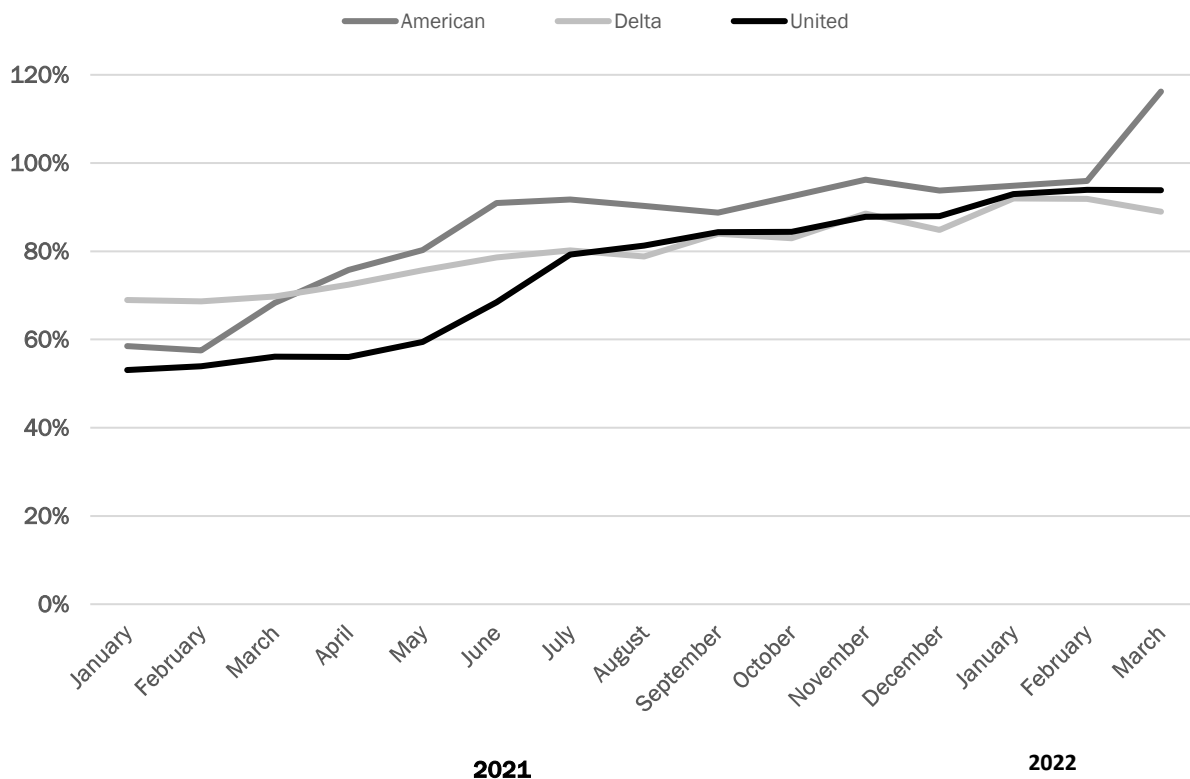
Source: Innovata Schedules via Diio by Cirium; data pulled December 9, 2021 (LCC/ULCC represent U.S. carriers)

N.1.1.3 Network Carriers at O'Hare

At O'Hare, network carriers represent over 80 percent of the total seat capacity and 90 percent of the domestic seat capacity. The seat capacity deployed in the dual hub by American and United is a critical part of O'Hare's recovery to 2019 passenger levels and growth beyond.

A comparison of the network carrier's recovery across the nation shown in **Figure N-10** indicates that American is leading the recovery. American is expected to be back to 2019 levels in the first quarter of 2022, while United continues to recover more slowly.

FIGURE N-10
NETWORK CARRIERS RECOVERY (JANUARY 2021–MARCH 2022 AS A PERCENT OF 2019)



Source: Innovata Schedules via Diio by Cirium; data pulled December 15, 2021

American's capacity recovery at O'Hare resembles that at other U.S. airports—slightly faster than that of United. By the end of 2021, American's seat capacity at O'Hare recovered to 70 percent, while United's seat capacity was 66 percent of its 2019 seat departures as shown in **Figure N-11**.

FIGURE N-11
AMERICAN AND UNITED PERCENT RECOVERED AT O'HARE (SEAT DEPARTURES, CY 2021 AS A PERCENT OF CY 2019)

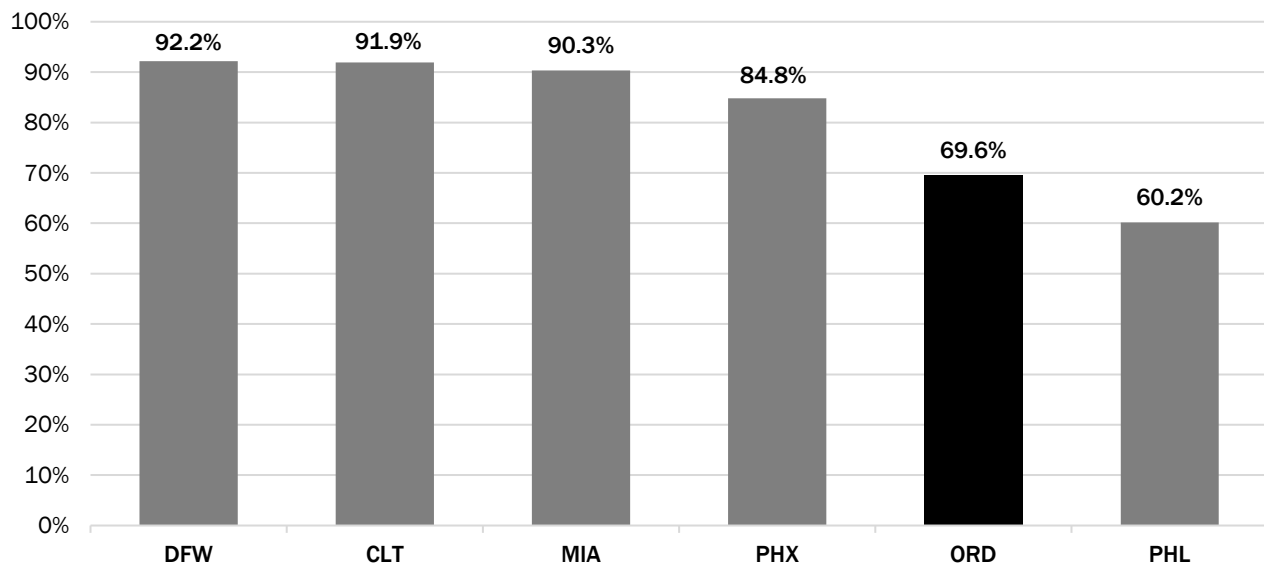


Source: Innovata Schedules via Diio by Cirium; data pulled December 15, 2021

N.1.1.4 American Airlines at O'Hare

While American leads the recovery back to 2019 levels at O'Hare, the carrier is adding back service to O'Hare more slowly than at its largest hub airports except Philadelphia, as indicated in **Figure N-12**. In general, American's hubs can be characterized in two groups: (1) those that participated in the recovery and (2) those that are situated in markets where local authorities have implemented stricter COVID-19 guidelines. The airports subject to stricter COVID guidelines, O'Hare included, have recovered more slowly.

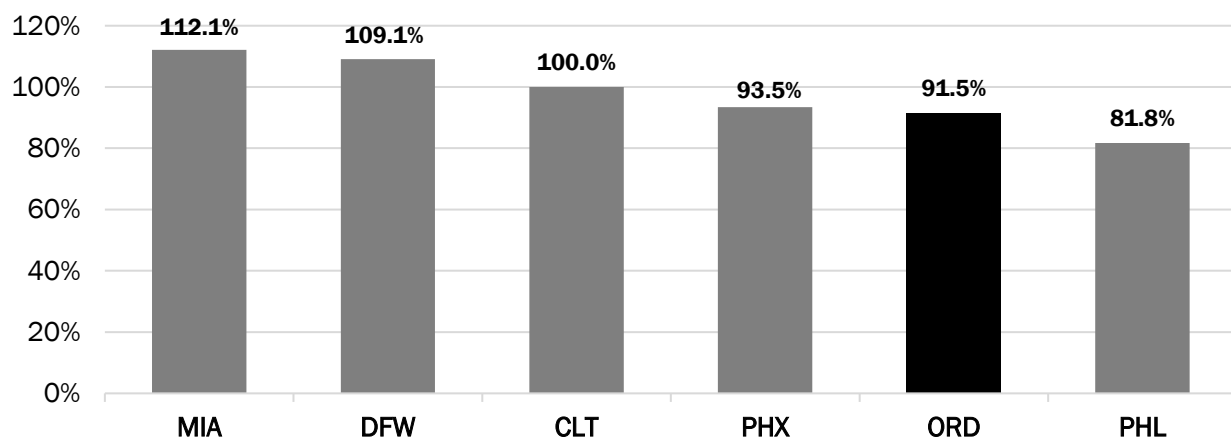
FIGURE N-12
CHANGE IN AMERICAN AIRLINES SEAT CAPACITY FOR THE MAJOR AMERICAN AIRLINES HUBS (CY 2021 AS A PERCENT OF CY 2019)



Source: Innovata Schedules via Diio by Cirium; data pulled December 13, 2021

American's capacity at O'Hare is expected to be at 92 percent of 2019 levels by the first quarter of 2022 as shown in **Figure N-13**. O'Hare's expected recovery in 2022 is in line with Phoenix's and ahead of Philadelphia's. American's commitment to the O'Hare operation is evidenced by the anticipated first quarter of 2022 recovery.

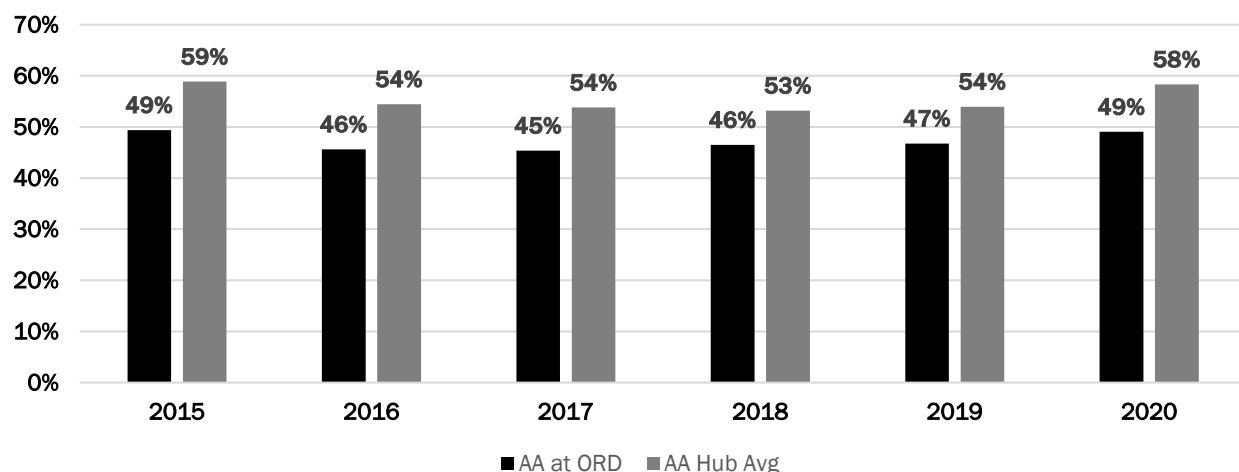
FIGURE N-13
CHANGE IN AMERICAN AIRLINES SEAT CAPACITY FOR MAJOR AMERICAN AIRLINES HUBS (1ST QUARTER 2022 AS A PERCENT OF 1ST QUARTER 2019)



Source: Innovata Schedules via Diio by Cirium; data pulled December 13, 2021

American's share of connecting passengers has remained stable at O'Hare, ranging from a low of 45 percent in 2017 to a high of 49 percent in 2015 and 2020 as **Figure N-14** indicates.

FIGURE N-14
AMERICAN AIRLINES' PERCENT CONNECTING AT O'HARE AND HUB AVERAGE (CY 2015–CY 2020)

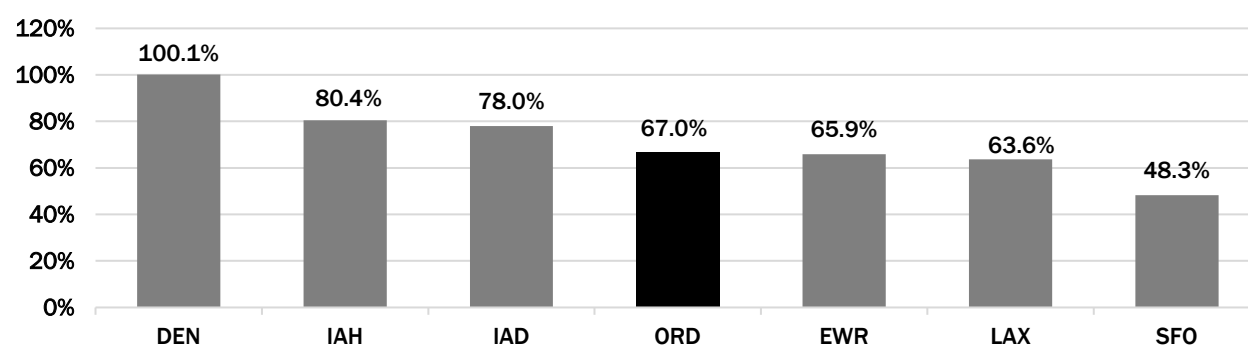


Sources: USDOT T-100 and USDOT O&D Summary via Diio by Cirium

United Airlines at O'Hare

By the end of 2021, United had offered 67 percent of its 2019 O'Hare seat capacity. O'Hare ranked fourth of United's seven largest hubs, ahead of Newark, Los Angeles, and San Francisco as **Figure N-15** shows. Similar to American's hubs, United's seven hub airports could be grouped into two categories: (1) those that participated in the recovery, e.g., Denver and Houston, and (2) those that are situated in markets with stricter COVID-19 guidelines along with more reliance on business travel, e.g., Washington, O'Hare, Newark, Los Angeles, and San Francisco. The airports subject to stricter COVID-19 guidelines along with a reliance on business travel have recovered more slowly.

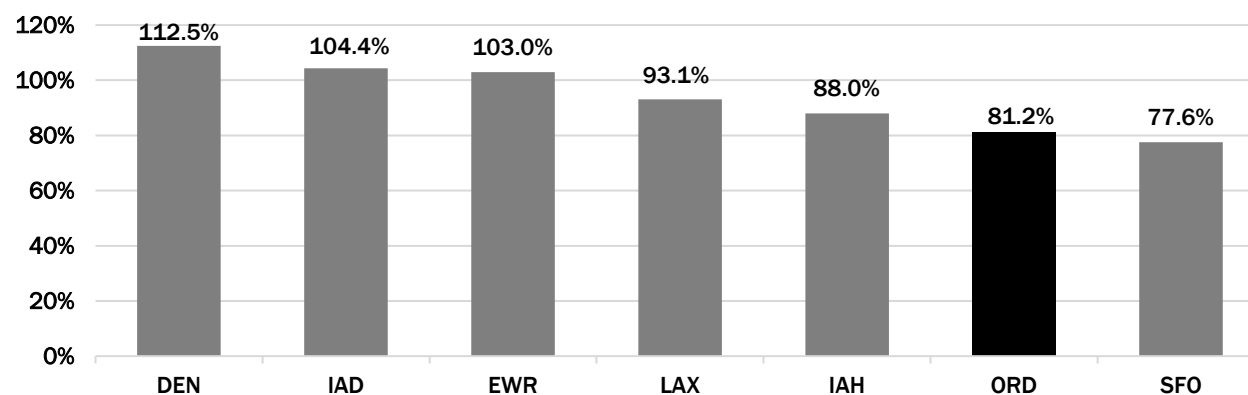
FIGURE N-15
CHANGE IN UNITED AIRLINES SEAT CAPACITY FOR UNITED AIRLINES HUBS (CY 2021 AS A PERCENT OF CY 2019)



Source: Innovata Schedules via Diio by Cirium; data pulled December 13, 2021

In the first quarter of 2022, United was expected to offer 81 percent of 2019 seat capacity at O'Hare, as shown in **Figure N-16**. O'Hare ranked sixth among its hubs, only ahead of San Francisco. United's increase in recovery of seat capacity of 14 percentage points from CY 2021 provides strong evidence of the airline's commitment to maintain O'Hare as a connecting hub.

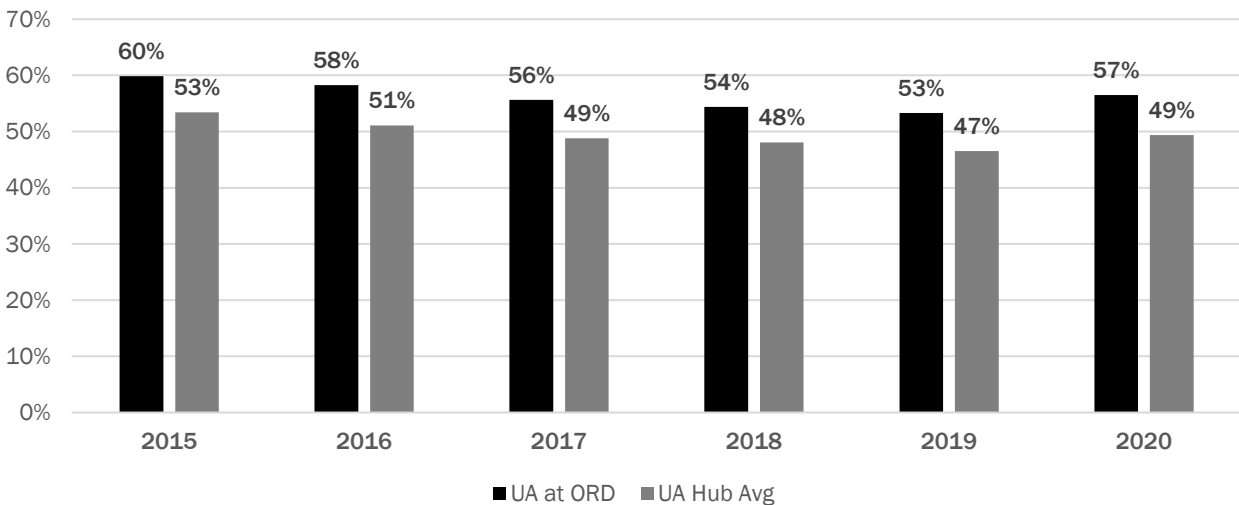
FIGURE N-16
CHANGE IN UNITED AIRLINES SEAT CAPACITY FOR UNITED AIRLINES HUBS (1ST QUARTER 2022 AS A PERCENT OF 1ST QUARTER 2019)



Source: Innovata Schedules via Diio by Cirium; data pulled December 13, 2021

As illustrated in **Figure N-17**, United's share of connecting passengers has remained stable. O'Hare has a higher share of connecting passengers, at 57 percent in 2020, than United's system average, 49 percent.

FIGURE N-17
UNITED AIRLINES PERCENT CONNECTING AT O'HARE AND HUB AVERAGE (CY
2015 - CY 2020)



Sources: USDOT O&D Summary and USDOT T-100

Scenario 1 Conclusions

Prior to the COVID-19 pandemic, O'Hare was the third largest airport in terms of total and connecting passengers. While O'Hare has been negatively impacted by COVID-19 and is recovering more slowly than the nation, O'Hare's recovery is assured. However, the pandemic has lengthened the timeframe it will take for O'Hare to reach the CDA's traffic and activity forecasts.

O'Hare is the only dual hub in the U.S. in which both American and United have major operations. In 2021, American led the recovery at O'Hare with United moving more slowly. Despite the introduction of Southwest service in 2021, the network carriers remain dominant. Through 2020, O'Hare's share of passengers connecting has remained stable. The combination of O'Hare's stable connecting ratio and a limited presence at O'Hare of LCC/ULCC suggest there is no threat to O'Hare's role as a connecting hub. As such, there is no evidence that the local market has outpaced the CDA's 2019 forecast of the local market.

Scenario 2: The Pandemic's Impact on O'Hare's International and Business Traffic

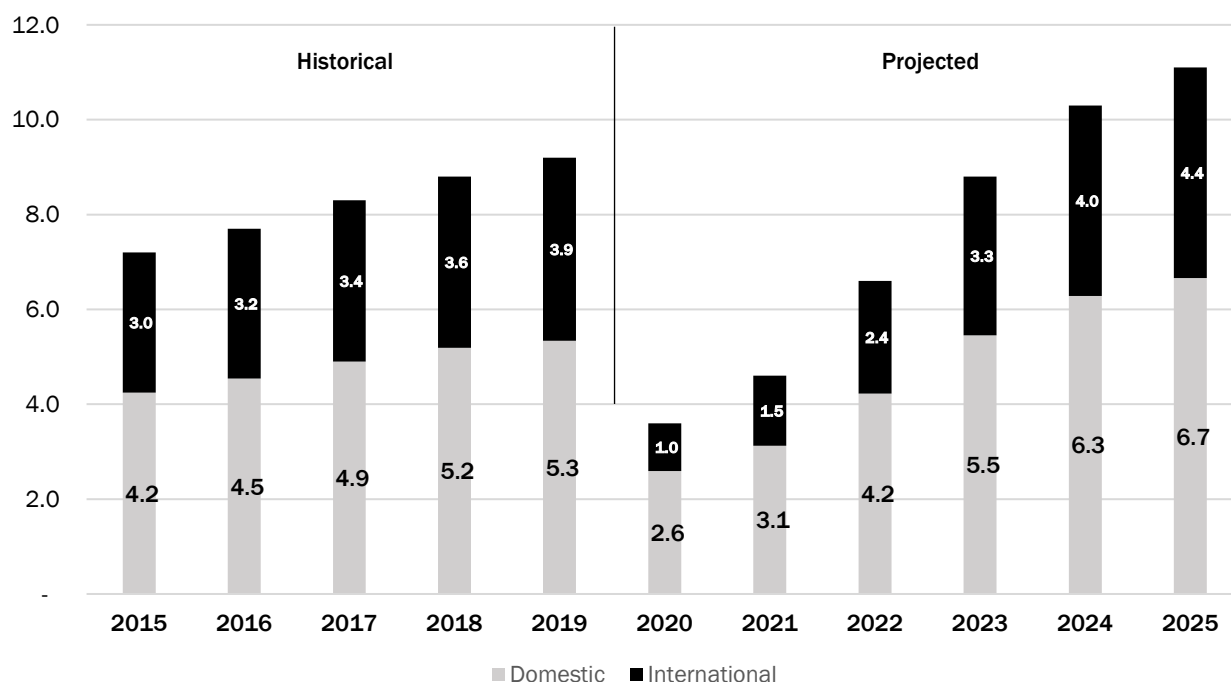
Scenario 2 Introduction

The recovery of international traffic at O'Hare is well underway. Traffic in the Latin/Caribbean and Trans-Atlantic regions is likely to reach pre-pandemic levels in summer of 2022 barring adverse public health developments. Traffic in the Canadian and Trans-Pacific regions is likely not to recover until 2023 and 2024, respectively, due to more restrictive travel requirements or outright border closures. The aircraft operated on international flights are likely to be substantially similar, though A-380 and B-747 craft are likely to be replaced by A-330, A-350, B-777, and B787 equipment. Traffic recovery patterns are not expected to impact

day/night splits of activity. Following the recovery in 2024, international activity is expected to resume previously forecasted levels.

This forecast is broadly consistent with Airports Council International's projections of November 1, 2021, as shown in **Figure N-18**. International passenger traffic remained weak in the first half of 2021, and the expected surge in air travel demand for the second half of the year did not materialize despite an increasing number of people getting vaccinated. International passenger traffic recovery lagged significantly behind domestic traffic recovery in 2021 and is forecast to reach only 1.47 billion passengers for the year, or 38.7 percent of the 2019 level. This was a 1.9 percent decrease from ACI's July 2021 assessment.

FIGURE N-18
AIRPORT COUNCIL INTERNATIONAL MEDIUM-TERM GLOBAL PASSENGERS
(BILLIONS)



Source: Airports Council International, November 2021

Although international passenger traffic is projected to remain weaker than domestic passenger traffic in 2022, some improvement is expected. International passenger volume is forecast to reach approximately 2.4 billion passengers by year-end 2022, which equates to 62.2 percent of 2019 levels.

International Passenger Traffic Performance at O'Hare

A record number of international passengers were accommodated at O'Hare in 2019. Following the onset of the pandemic, international passengers decreased 97.8 percent year over year in April 2020 as shown in **Table N-1**. Since then, international passengers have recovered to a decrease of 37.1 percent in November 2021 from the same month in 2019. November 2021 international passenger totals made a strong recovery as the U.S. eased restrictions on visitors from the Canada, Mexico, Brazil, China, India, Iran, South Africa,

Europe, and the United Kingdom. This is evidence that demand for air travel will recover quickly once public health regulations are eased.

TABLE N-1
INTERNATIONAL PASSENGERS BY MONTH AT O'HARE

	2019	2020	2021	2020 vs. 2019 change	2021 vs. 2019 change
January	991,401	1,001,242	293,299	1.0%	-70.4%
February	840,010	785,532	199,607	-6.5%	-76.2%
March	1,177,170	501,725	285,734	-57.4%	-75.7%
April	1,164,558	25,685	298,119	-97.8%	-74.4%
May	1,313,404	34,985	348,782	-97.3%	-73.4%
June	1,421,622	86,105	473,296	-93.9%	-66.7%
July	1,480,766	144,604	607,736	-90.2%	-59.0%
August	1,431,287	184,899	685,675	-87.1%	-52.1%
September	1,200,996	170,945	531,986	-85.8%	-55.7%
October	1,152,178	175,301	529,889	-84.8%	-54.0%
November	959,480	209,322	603,531	-78.2%	-37.1%
December	1,065,919	297,555		-72.1%	
Total	14,198,791	3,617,900		-74.5%	

Source: Chicago Department of Aviation

The impact of the Omicron variant, which began in December 2021, is likely to slow or temporarily reverse international passenger recovery through February. However, the trend in international traffic recovery prior to the spread of the Omicron variant demonstrates that passengers will travel when regulations allow them to do so and infection rates remain at well-managed levels.

Latin and Caribbean Airline Service Recovery at O'Hare

As further evidence that passengers are willing to travel, Latin and Caribbean destination seat capacity at O'Hare has already recovered and begun to increase significantly above 2019 levels as shown in **Table N-2**. Following the onset of the pandemic, Latin and Caribbean capacity decreased 94.4 percent year over year in April 2020. Since then, Latin and Caribbean capacity recovered to 2019 levels by July/August 2021 and have been as much as 19.3 percent above 2019 levels during the last four months of 2021. The rapid recovery is a result of strong demand for travel to Mexico and the Caribbean following the availability of COVID-19 vaccines in the first half of 2021. In 2022, airlines at O'Hare are planning for capacity levels similar to those deployed prior to the pandemic in 2019 in the winter months and higher levels in the late spring early summer months.

TABLE N-2
LATIN AND CARIBBEAN SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	193,811	196,156	139,950	199,057	1.2%	-27.8%	2.7%
February	177,201	181,249	122,756	173,645	2.3%	-30.7%	-2.0%
March	213,058	189,883	128,180	205,411	-10.9%	-39.8%	-3.6%
April	172,279	28,381	104,893	181,017	-83.5%	-39.1%	5.1%
May	121,341	6,835	109,755	152,586	-94.4%	-9.5%	25.7%
June	128,304	14,975	121,584	146,437	-88.3%	-5.2%	14.1%
July	145,530	31,115	140,005		-78.6%	-3.8%	
August	125,645	38,848	130,413		-69.1%	3.8%	
September	85,574	39,618	102,075		-53.7%	19.3%	
October	96,973	49,443	110,880		-49.0%	14.3%	
November	134,304	87,625	160,008		-34.8%	19.1%	
December	184,399	134,269	200,415		-27.2%	8.7%	
Total	1,778,419	998,397	1,570,914		-43.9%	-11.7%	

Source: Official Airline Guide Schedules

Transatlantic Airline Service Recovery at O'Hare

Transatlantic seat capacity at O'Hare will reach approximately 81.5 to 88.5 percent of pre-pandemic levels in November and December of 2021 as shown in **Table N-3**. Following the onset of the pandemic, transatlantic capacity decreased 86 percent year over year in April 2020. Since then, transatlantic capacity has steadily increased with current levels reflecting the ease of restrictions on visitors from Europe and the United Kingdom in November. While the onset of the Omicron variant can be expected to negatively impact traffic, this downturn is expected to last no longer than three months. During the winter and spring of 2022, airlines have planned for capacity levels similar to those deployed prior to the pandemic in 2019.

TABLE N-3
TRANSATLANTIC SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	252,473	249,310	127,446	244,245	-1.3%	-49.5%	-3.3%
February	212,887	224,035	103,622	218,224	5.2%	-51.3%	2.5%
March	273,034	223,716	123,475	276,009	-18.1%	-54.8%	1.1%
April	332,738	46,581	135,737	355,319	-86.0%	-59.2%	6.8%

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
May	400,616	56,282	164,119	413,332	-86.0%	-59.0%	3.2%
June	424,419	79,991	207,940	428,657	-81.2%	-51.0%	1.0%
July	437,520	105,794	257,496		-75.8%	-41.1%	
August	434,748	142,088	286,348		-67.3%	-34.1%	
September	413,558	146,144	282,833		-64.7%	-31.6%	
October	378,180	148,721	274,287		-60.7%	-27.5%	
November	271,085	124,840	220,855		-53.9%	-18.5%	
December	271,573	114,980	240,426		-57.7%	-11.5%	
Total	4,102,831	1,662,482	2,424,584		-59.5%	-40.9%	

Source: Official Airline Guide Schedules

Canada Airlines Service Recovery at O'Hare

Canada's seat capacity has remained significantly below pre-pandemic levels, as the border was essentially closed for much of 2020 and 2021 as shown in **Table N-4**. The Canadian government continues to impose requirements for travel to Canada and continues to discourage Canadians from travelling abroad. Following the onset of the pandemic, Canada's capacity decreased 96.2 percent year over year in May 2020. Since then, Canada's capacity has increased, but current capacity levels remain between 35.5 percent and 45.6 percent of pre-pandemic levels. For the winter of 2022, airlines are planning for capacity levels between 42.3 percent and 59.9 percent of those deployed prior to the pandemic in 2019. In the spring of 2022, airlines have planned for capacity levels between 71.2 percent and 74.3 percent of pre-pandemic levels, but these higher levels and further recovery depend on progressive easing of travel requirements.

TABLE N-4
CANADA SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	89,704	78,689	9,701	37,966	-12.3%	-89.2%	-57.7%
February	82,521	74,377	6,873	38,470	-9.9%	-91.7%	-53.4%
March	96,690	78,743	5,882	57,891	-18.6%	-93.9%	-40.1%
April	102,588	15,248	6,441	73,006	-85.1%	-93.7%	-28.8%
May	119,020	4,477	10,784	89,403	-96.2%	-90.9%	-24.9%
June	123,984	7,208	20,427	92,178	-94.2%	-83.5%	-25.7%
July	129,939	19,117	22,306		-85.3%	-82.8%	
August	128,209	14,902	26,492		-88.4%	-79.3%	
September	117,888	12,662	29,844		-89.3%	-74.7%	

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
October	111,692	9,992	33,973		-91.1%	-69.6%	
November	87,574	10,016	31,088		-88.6%	-64.5%	
December	79,370	10,276	36,161		-87.1%	-54.4%	
Total	1,269,179	335,707	239,972		-73.5%	-81.1%	

Source: Official Airline Guide Schedules

Transpacific Airline Service Recovery at O'Hare

Transpacific seat capacity has remained significantly below pre-pandemic levels as borders in the Asia Pacific region remain essentially closed (shown in **Table N-5**). Following the onset of the pandemic, transpacific capacity decreased 87.6 percent year over year in May 2020. Since then, transpacific capacity has increased, but current capacity levels remain between 39.4 percent and 42.0 percent of pre-pandemic levels. For winter of 2022, airlines planned for capacity levels between 45.6 percent and 65.5 percent of those deployed prior to the pandemic in 2019. For the spring of 2022, airlines planned for capacity levels between 76.6 percent and 80.8 percent of pre-pandemic levels. However, these higher levels are dependent on the opening of borders in the Asia Pacific region.

TABLE N-5
TRANSPACIFIC SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	114,070	102,140	39,331	51,981	-10.5%	-65.5%	-54.4%
February	99,182	69,604	34,990	55,684	-29.8%	-64.7%	-43.9%
March	114,678	54,159	39,146	75,149	-52.8%	-65.9%	-34.5%
April	110,077	19,107	37,540	88,925	-82.6%	-65.9%	-19.2%
May	117,119	14,547	36,997	90,929	-87.6%	-68.4%	-22.4%
June	115,716	16,025	28,179	88,583	-86.2%	-75.6%	-23.4%
July	115,585	25,123	29,982		-78.3%	-74.1%	
August	120,515	30,143	38,889		-75.0%	-67.7%	
September	107,340	30,587	33,745		-71.5%	-68.6%	
October	108,840	29,336	34,883		-73.0%	-68.0%	
November	98,069	32,694	38,604		-66.7%	-60.6%	
December	105,598	37,456	44,392		-64.5%	-58.0%	
Total	1,326,789	460,921	436,678		-65.3%	-67.1%	

Source: Official Airline Guide Schedules

American Airlines International Service Recovery at O'Hare

American Airlines international seat capacity remained significantly below pre-pandemic levels until November 2021, at which point it substantially recovered to near pre-pandemic levels as shown in **Table N-6**. American's international capacity is typically focused on Canada, Europe, and the Latin/Caribbean regions, with no service to the Asia/Pacific region. Because Europe and the Latin/Caribbean regions have recovered to a greater degree than have the Canada or the Asia/Pacific regions, American's international capacity recovery is likely to be complete in 2022. Canada traffic is likely to recover quickly once travel restrictions are eased, just as short- and medium haul traffic in the domestic and Latin/Caribbean regions have. American has retired its entire A-330, B-757, and B-767 fleets, which when combined with delays in B-787 deliveries, limited American's ability to add more international capacity than currently planned in the short-term. American Airlines executives are most bullish among U.S. airlines for a recovery, including business traffic, in 2022.

TABLE N-6
AMERICAN AIRLINES INTERNATIONAL SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	67,106	69,515	40,864	64,497	3.6%	-39.1%	-3.9%
February	71,159	74,459	50,036	57,424	4.6%	-29.7%	-19.3%
March	90,755	78,135	57,954	88,488	-13.9%	-36.1%	-2.5%
April	86,394	17,868	29,781	99,252	-79.3%	-65.5%	14.9%
May	104,663	6,368	24,900	96,662	-93.9%	-76.2%	-7.6%
June	117,914	11,670	36,446	114,196	-90.1%	-69.1%	-3.2%
July	123,904	20,612	47,055		-83.4%	-62.0%	
August	124,676	15,935	42,846		-87.2%	-65.6%	
September	104,294	15,572	42,172		-85.1%	-59.6%	
October	97,050	19,071	47,941		-80.3%	-50.6%	
November	62,252	26,424	61,659		-57.6%	-1.0%	
December	74,430	26,319	73,123		-64.6%	-1.8%	
Total	1,124,597	381,948	554,777		-66.0%	-50.7%	

Source: Official Airline Guide Schedules

United Airlines International Service Recovery at O'Hare

United Airlines international seat capacity remains significantly below pre-pandemic levels, reaching approximately 72.7 percent of pre-pandemic levels in December 2021 as shown in **Table N-7**. United's international capacity is focused on Asia, Canada, and Europe, with limited service to the Latin/Caribbean region. Because the recoveries in Asia/Pacific and Canada regions have lagged compared to other regions, United's international capacity recovery is likely not to be complete until 2024. United has not retired any wide-body aircraft, so it is able to add international capacity quickly as travel restrictions and demand permits. However, United has 54 Pratt and Whitney-powered B-777 aircraft that remain grounded

indefinitely as a result of a series of uncontained in-flight engine failures. In summer 2022, United plans to redeploy capacity from the Asia/Pacific region to Europe. United Airlines executives are confident that demand, including business demand, will recover fully, though they have not identified a timetable for recovery.

TABLE N-7
UNITED AIRLINES INTERNATIONAL SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	213,532	187,748	75,142	147,666	-12.1%	-64.8%	-30.8%
February	187,706	168,613	62,190	137,912	-10.2%	-66.9%	-26.5%
March	237,095	157,958	78,505	171,999	-33.4%	-66.9%	-27.5%
April	226,499	1,253	76,373	208,542	-99.4%	-66.3%	-7.9%
May	227,440	8,904	87,759	217,071	-96.1%	-61.4%	-4.6%
June	222,506	9,540	85,518	211,638	-95.7%	-61.6%	-4.9%
July	227,352	20,522	101,703		-91.0%	-55.3%	
August	218,535	34,741	117,312		-84.1%	-46.3%	
September	191,348	38,945	112,109		-79.6%	-41.4%	
October	187,122	40,069	107,696		-78.6%	-42.4%	
November	179,766	55,591	115,230		-69.1%	-35.9%	
December	187,172	70,896	136,042		-62.1%	-27.3%	
Total	2,506,073	794,780	1,155,579		-68.3%	-53.9%	

Source: Official Airline Guide Schedules

Other U.S.-Flag Airlines' International Service Recovery at O'Hare

Other U.S. Flag airlines' international seat capacity has recovered, and shall continue to exceed 2019 levels and increase in the first half of 2022 as shown in **Table N-8**. Other U.S. Flag airlines offering international service at O'Hare include Frontier, Southwest, and Spirit which provide flights to the Latin/Caribbean region. The Latin/Caribbean region has recovered the most quickly among the international regions, and the performance of other U.S. Flag airlines reflects this. These airlines operate A-320 family and B-737 family aircraft and their fleets have not changed during the pandemic. These airlines have largely continued to grow throughout the pandemic and have the aircraft orders to continue to support further growth in the future.

TABLE N-8
OTHER U.S.-FLAG AIRLINES INTERNATIONAL SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	26,266	27,294	20,920	29,473	3.9%	-20.4%	12.2%
February	23,500	26,460	19,036	26,658	12.6%	-19.0%	13.4%
March	28,962	26,890	16,864	30,535	-7.2%	-41.8%	5.4%
April	27,906	5,052	16,806	29,880	-81.9%	-39.8%	7.1%
May	21,416	976	21,946	30,597	-95.4%	2.5%	42.9%
June	23,996	1,365	23,120	25,892	-94.3%	-3.7%	7.9%
July	26,674	6,932	24,211		-74.0%	-9.2%	
August	21,090	6,610	18,377		-68.7%	-12.9%	
September	14,380	7,856	16,264		-45.4%	13.1%	
October	13,840	9,494	19,054		-31.4%	37.7%	
November	22,642	17,288	23,590		-23.6%	4.2%	
December	26,602	22,338	29,143		-16.0%	9.6%	
Total	277,274	158,555	249,331		-42.8%	-10.1%	

Source: Official Airline Guide Schedules

Foreign Flag Airlines International Service Recovery at O'Hare

Foreign Flag airline international seat capacity remains below 2019 levels, and is likely to remain so as the travel to Canada and the Asia/Pacific remains restricted as shown in **Table N-9**. Foreign flag airlines offer service largely to Canada and Europe, along with some capacity to the Asia/Pacific region, and very limited capacity to the Latin/Caribbean region. Service to Canada will likely not recover until 2023 given its relatively restrictive travel requirements, and service to the Asia/Pacific region will not likely recover until 2024 given the prevalence of border closures in that region. Service to Europe will likely fully recover by summer 2022 as European airlines reinstate pre-pandemic capacity and reallocate capacity from Asia to the U.S. Foreign flag airlines have retired large numbers of A-380's and B-747's and now fly A-330, A-350, B-777, and B-787 aircraft in their place.

TABLE N-9
FOREIGN FLAG AIRLINES INTERNATIONAL SEAT CAPACITY BY MONTH AT O'HARE

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
January	343,154	341,738	179,502	291,613	-0.4%	-47.7%	-15.0%
February	289,426	279,733	136,979	264,029	-3.3%	-52.7%	-8.8%
March	340,648	283,518	143,360	323,438	-16.8%	-57.9%	-5.1%

	2019	2020	2021	2022	2020 vs. 2019 change	2021 vs. 2019 change	2022 vs. 2019 change
April	376,883	85,144	161,651	360,593	-77.4%	-57.1%	-4.3%
May	404,577	65,893	187,050	401,920	-83.7%	-53.8%	-0.7%
June	428,007	95,624	233,046	404,129	-77.7%	-45.6%	-5.6%
July	450,644	133,083	276,820		-70.5%	-38.6%	
August	444,816	168,695	303,607		-62.1%	-31.7%	
September	414,338	166,638	277,952		-59.8%	-32.9%	
October	397,673	168,858	279,332		-57.5%	-29.8%	
November	326,372	155,872	250,076		-52.2%	-23.4%	
December	352,736	177,428	283,086		-49.7%	-19.7%	
Total	4,569,274	2,122,224	2,712,461		-53.6%	-40.6%	

Source: Official Airline Guide Schedules

Scenario 2 Conclusion

The recovery of international traffic at O'Hare has been robust in markets where public health requirements permit air travel with minimal restrictions. Traffic in the Latin/Caribbean and transatlantic regions are likely to reach pre-pandemic levels in the summer of 2022 barring adverse public health developments. Traffic in the Canadian and transpacific regions is likely not to recover until 2023 and 2024, respectively, due to more restrictive travel requirements or outright border closures. The aircraft operated on international flights are likely to be substantially similar, though A-380 and B-747 planes are likely to be replaced by A-330, A-350, B-777, and B787 equipment. Traffic recovery patterns are not expected to impact day/night splits of activity. Following recovery in 2024, international activity is expected to resume at previously forecasted levels.

Business Traffic Recovery at O'Hare

The business travel market is important to O'Hare's recovery. Its recovery slowed late in the fourth quarter of 2021 due to the omicron variant, which delayed workers' return to the office. Nevertheless, the airlines remain optimistic. In the fourth quarter of 2021, small and medium business travel were roughly 80 percent recovered, while large corporate travel was only 40 percent recovered. Both American and United are optimistic that large corporate travel will return in a significant way in 2022 as companies come back more fully into the office and return to in-person meetings with clients and colleagues. However, they do not expect full recovery of large corporate travel until 2023.

Cargo Activity Trends at O'Hare

In 2020, O'Hare recorded approximately 30 thousand cargo operations, a level previously forecast by the City's consultant for 2026. This is more than offset by the decrease in passenger operations. O'Hare recorded approximately 538,000 passenger operations in 2020, significantly fewer than the approximately 946,000 forecast by the City's consultant.

While cargo operations increased rapidly in 2020 and the beginning of 2021, average daily nighttime cargo departures only increased by one. Like annual operations, the decrease in nighttime passenger departures

more than offset the increase in nighttime cargo departures. While freight nighttime departures increased by one departure per night, average total daily nighttime departures at O'Hare declined by 55 departures per night.

In 2021, cargo operations have leveled off, indicating that this was a one-time step change reflecting an acceleration in the shift to e-commerce and the transportation of Personal Protective Equipment and vaccines. In recent months, supply chain issues have reversed some of the shift to e-commerce back to bricks-and-mortar shops. Domestic cargo operations have experienced year-over-year contraction each month from April to November 2021 and a decrease of 5.2 percent year-over-year for the first eleven months of 2021.

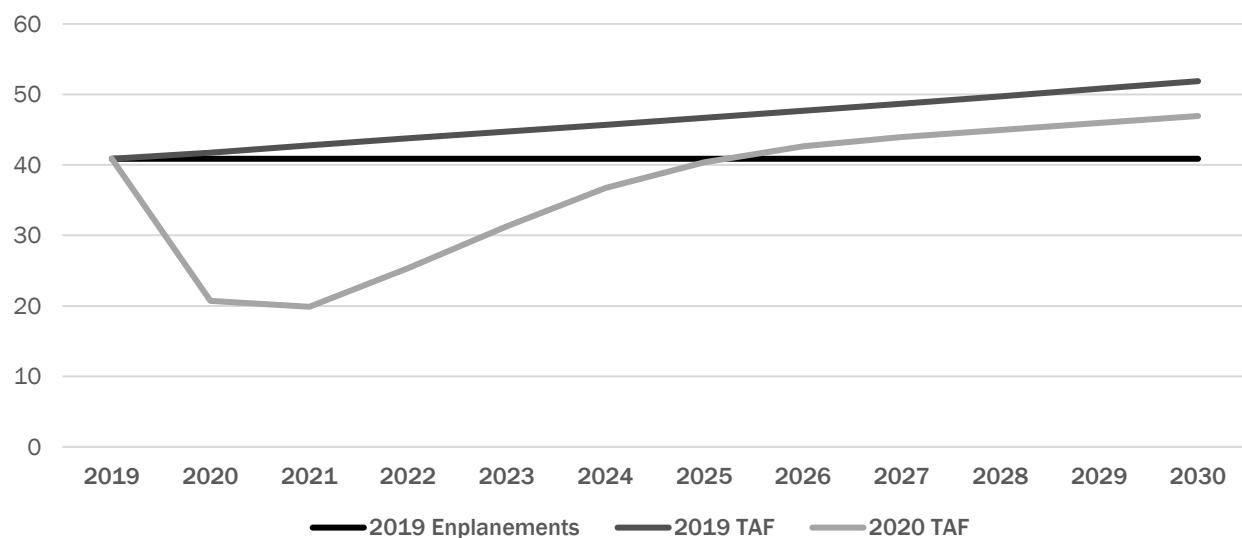
International cargo operations increased 9.1 percent year-over-year in November and are up 14.1 percent for the first eleven months of 2021. As international passenger operations are reinstated with belly capacity for cargo, international cargo operations will be reduced.

While cargo operations increased rapidly in 2020 and the beginning of 2021, nighttime cargo operations only increased by one. Cargo operations will be flat or will decrease in 2021 and should return to forecasted levels by 2026. Cargo fleet mix will remain unchanged. The one incremental daily nighttime cargo operation will be overshadowed by the decrease in passenger nighttime operations.

Implications for the Forecast Based on the Sensitivity Analysis

In **Figure N-19**, the 2020 FAA Terminal Area Forecast (TAF) has the airport recovering to 2019 enplanement levels between 2025 and 2026, but never fully recovering to the anticipated enplanements in the 2019 TAF.

**FIGURE N-19
COMPARISON OF THE FAA TERMINAL AREA FORECAST (2019 TAF COMPARED TO
2020 TAF, MILLIONS)**



Source: FAA Terminal Area Forecast, converted to Calendar Year based on .75 Current Year + .25 Future Year

Based on the sensitivity analysis conducted, the FAA Forecast Team estimates that enplanements will recover to 2019 levels in 2023 and will almost fully recover to the CDA's 2019 forecast levels by 2027. The

sensitivity analysis forecasts that enplanement levels remain three percent below the CDA's 2019 forecast in 2030. The sensitivity analysis forecasts that O'Hare will reach the CDA's 2030 forecast enplanement level between 2031 and 2032 as shown in **Table N-10**.

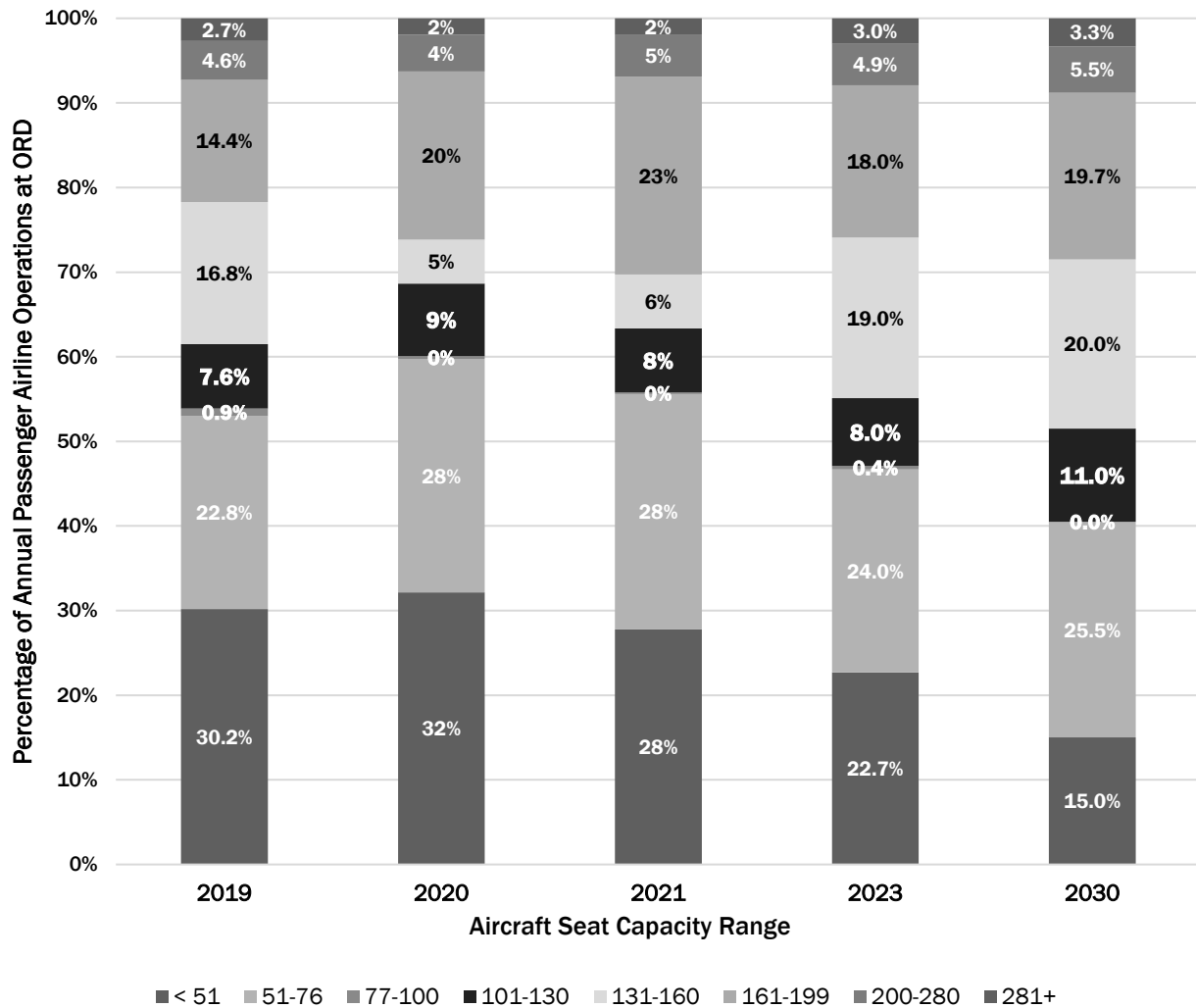
Domestic traffic at O'Hare represents 85 percent of total activity at the airport. While domestic enplanements are forecast to return to 2019 levels in 2023, the loss of traffic due to COVID-19 will not be made up by 2030 due to a delay in the recovery of business traffic. In contrast, international traffic represents a much smaller segment of travel at O'Hare but is expected to recover to 2019 levels by 2024. The significant pent-up demand for international travel will cause international enplanements to recover to the CDA's 2019 forecast in 2025 and remain on track with the forecast through 2030.

TABLE N-10
ADJUSTED FORECAST TO REFLECT IMPACTS FROM COVID-19

	Domestic	International	Total	Percent of 2019 CDA Forecast
2018	35,339,515	6,283,495	41,623,010	100%
2019	35,225,163	7,099,395	42,324,558	97%
2020	13,620,425	1,809,701	15,430,126	35%
2021	24,287,477	2,739,109	27,026,585	59%
2022	33,463,905	6,034,486	39,498,391	85%
2023	35,577,415	6,566,940	42,144,355	89%
2024	37,356,285	7,099,395	44,455,680	92%
2025	38,850,537	7,688,502	46,539,039	95%
2026	40,016,053	7,884,482	47,900,535	96%
2027	41,016,454	8,080,467	49,096,921	97%
2028	41,836,783	8,276,506	50,113,289	97%
2029	42,673,519	8,472,683	51,146,202	97%
2030	43,526,989	8,669,019	52,196,008	97%
2031	44,397,529	8,904,660	53,302,189	99%
2032	45,285,480	9,146,706	54,432,186	102%
Sources: FAA Third Party Consultant Adjustments to CDA Forecast; 2021 is an estimate				

As shown in **Figure N-20**, analysis of the fleet mix at O'Hare indicated no significant change in how the commercial carriers served it nor will there be any anticipated change in the forecast of the fleet. Differences in average aircraft size are largely due to American increasing the seat density on the B737-800 rather than a change in aircraft type.

FIGURE N-20
O'HARE'S PASSENGER AIRLINES FLEET MIX (CY 2019–CY 2030)



Sources: Innovata Schedules via Cirium and CDA Annual Forecast and Induced Demand Technical Document 08-23-2019;

Note: American increased the seat density on the B737-800, moving the aircraft from the 131-160 seat category to the 161-199 seat category.

N.1 NOISE SENSITIVITY ANALYSIS

The noise analysis for this EA utilized a Design Day Forecast Schedule (DDFS) prepared prior to the COVID-19 Pandemic. Details of this forecast can be found in **Appendix B** and **Appendix E**. A sensitivity analysis of COVID effects on the forecast was developed and provided in **Section 1.3.9**. A sensitivity analysis for noise impacts due to COVID-19 effects on the forecast is included below.

Average annual day-night sound level (DNL) contours are generally defined by the following:

- Aircraft types in the fleet
- Level of operations

- Runway use
- Split between day and night operations

Fleet Mix

The sensitivity analysis concluded that while there may be minor shifts in the type of aircraft being used on routes, the fleet mix assumptions used in the forecast remain valid. The original forecast had already assumed airline phaseouts of older aircraft and higher use of newer aircraft. While COVID-19 may have accelerated those retirements, and airlines will use substantially similar types of planes, these changes would not have a significant effect on the noise results.

Level of Operations

Regarding the level of operations, the sensitivity analysis shows that O'Hare has been slow to recover but would do so fully as a major connecting hub for both United and American. Therefore, the Interim and Build Out forecasts should be met as evaluated in the EA but on a slightly delayed timeline. The sensitivity analysis estimates that operations will reach 921,000 in 2025 and 985,000 in 2030. After the effects of COVID-19, the operations will reach the CDA's 2030 forecast of operations between 2031 and 2032.

Runway Use

Runway use is driven by airline schedules and markets served. The sensitivity analysis determined that the network carriers remain dominant and there was no threat to O'Hare's role as a connecting hub. Therefore, the runway use assumptions developed based on the forecast remain valid.

Day/Night Split

While recovery of cargo and international traffic has occurred at different paces, flight schedules are expected to return to pre-pandemic levels. The traffic recovery patterns between passenger and cargo airlines at O'Hare are not expected to impact day/night splits of activity; therefore, the forecasted assumptions for the levels of day and night operations remain valid.

Overall, the sensitivity analysis showed the forecasted assumptions and levels used for the noise analysis in this EA remain valid and provide a conservative estimate of noise results for each condition.

N.2 AIR QUALITY AND CLIMATE SENSITIVITY ANALYSIS

The COVID-19 sensitivity analysis indicates that the number of aircraft operations will be less in the Interim and Build Out Conditions than were used in this EA to evaluate the impact of the Proposed Action on air quality. The reduction in aircraft operations would also be less than was used to derive the level of greenhouse gases (GHG) with and without the Proposed Action (i.e., the operations used to evaluate potential impacts to climate). The COVID-19 Sensitivity Analysis indicates that while there may be minor shifts in the type of aircraft being used on routes, the fleet mix assumptions used in the forecast remain valid. The number of auxiliary power units (APU) and ground support equipment (GSE) to support the number of aircraft operations would also be reduced. Finally, the Sensitivity Analysis indicates that the number of passenger enplanements, which determines the volume of motor vehicles traveling to, and on, airport property, would be less in the Interim and Build Out Conditions. While there are no changes in the forecast emissions from training fires, stationary sources, or electrical consumption, the reduction in aircraft

operations and enplanements would reduce the total tons of air pollutant, pollutant precursor, and GHG emission levels as well as the air pollutant concentrations presented in **Chapter 5** of this EA.

N.3 SURFACE TRANSPORTATION SENSITIVITY ANALYSIS

The surface transportation and parking forecasts included in the O'Hare Terminal Area Plan and Air Traffic Procedures EA, **Appendix K**, included the review of expected level of activity at O'Hare during the forecast period of 2019 through 2030. The surface transportation activity level forecasts were prepared prior to the onset of the COVID-19 pandemic. This analysis focuses on the potential for change in the CDA's airside traffic levels and passenger activity forecasts in terms of aircraft fleet mix, passenger demand, and predicted landside traffic volumes and related curbside, shuttle, and parking activity for the 2025 Interim Proposed Action and 2032 Build Out Proposed Action Conditions.

The pandemic sensitivity analysis, located earlier in this appendix, evaluated two scenarios with regards to passenger demand, level, and aircraft fleet mix in the forecast. The two scenarios evaluated were:

1. **Scenario 1**, which examined O'Hare's role as a connecting hub to assesses whether the trend seen nationally of LCC and ULCC growth will increase point-to-point traffic at O'Hare and/or threaten O'Hare's role as a connecting hub
2. **Scenario 2**, which examined the impact of the pandemic on O'Hare international traffic as well as shifts in business traffic

N.3.1 Summary of the Forecast Impacts

The results of the sensitivity analysis concluded that enplanements will recover to 2019 levels in 2023 and will reach the CDA's 2030 forecast enplanement level between 2031 and 2032.

Analysis of the aircraft fleet mix at O'Hare indicated that there was no significant change in how the commercial carriers served it and there will be no notable change in the forecast of the aircraft fleet.

Based on the sensitivity analysis, enplanements will be less than the CDA's 2023 forecast but will return to the projected 2030 Build Out Proposed Action in 2032. Cargo and fleet mix changes appear to not be affected and have recovered to forecasted levels. In conclusion, impacts from the pandemic on the airside activity (enplanement, aircraft mix, flight schedules) and regional growth in local surface traffic on off-airport roadways are not expected to result in any higher levels of surface transportation activity (including curbside movements, on- and off-airport roadway traffic volumes, employee and public buses, and parking operations) than originally evaluated.