CHAPTER 3

IMPACT RE-EVALUATION

As noted in **Chapter 2**, this Written Re-Evaluation (Re-Evaluation) of the O'Hare Modernization Environmental Impact Statement (EIS) describes the temporary changes to the environment that would be caused by implementation of the Proposed Interim Fly Quiet. The construction and final state of the O'Hare Modernization Program (OMP) described in the EIS have not changed. The Proposed Interim Fly Quiet would only change nighttime runway use during the period from late 2019 until early 2021 (when Runway 9R/27L closes, excluding periods of runway reconstruction).

This Re-Evaluation focuses on:

- Changes in impacts associated with the Proposed Interim Fly Quiet.
- Non-OMP-related changes in the airport environs.
- Changes in regulations and modeling methods that have occurred in specific discipline areas (such as a new noise and air quality model) largely described in **Chapter 2.**

Based on the changes resulting from the Proposed Interim Fly Quiet, FAA considered the temporary effects to conditions described in the EIS and determined that additional analysis was warranted for:

- Noise and Land Use
- Air Quality
- Climate
- Cumulative Impacts
- Environmental Justice

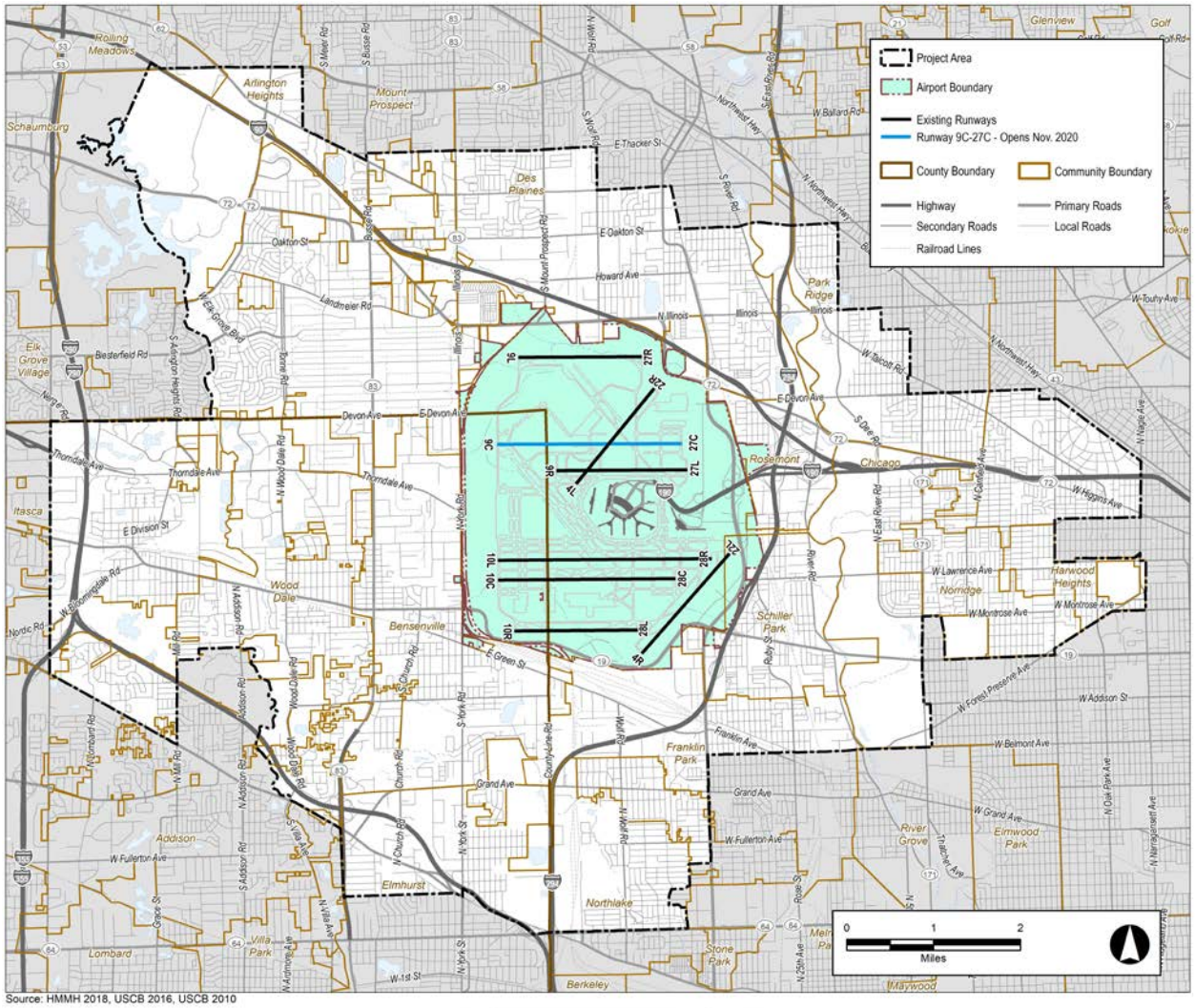
This Re-Evaluation considers the effects of the Proposed Interim Fly Quiet for each of these categories. Details concerning the analysis in the above categories are documented in **Appendix C** through **Appendix G**. As noted in **Chapter 2**, this Re-Evaluation also considers the effects of Revised Interim Fly Quiet 1 and 2. For details, see **Appendices C, D, E,** and **F**.

For the purposes of describing potential impacts in the vicinity of O'Hare, FAA defined a project area. This project area is the same used in the EIS. The area includes all or portions of the 18 communities surrounding O'Hare in which aircraft noise exposure has the potential to reach levels of significance. These 18 communities are Addison, Arlington Heights, Bensenville, Chicago, Des Plaines, Elk Grove Village, Elmhurst, Franklin Park, Harwood Heights, Itasca, Mount Prospect, Norridge, Northlake, Park Ridge, Rolling Meadows, Rosemont, Schiller Park, Wood Dale, and portions of unincorporated Cook and DuPage counties. The project area is shown by the dashed line in **Figure 3-1**. A modeling analysis area for evaluating reportable changes in noise levels beyond the 65 DNL was also established which extends 25 nautical miles in each direction from O'Hare. The project effects to communities outside the project area would not be significant.

Between the publication of the Draft and this Final Proposed Interim Fly Quiet Re-Evaluation document, FAA undertook additional quality control analyses of calculations and results presented.

Changes between the two documents primarily concern designation of multi-family versus single-family dwelling unit assignments. Additionally, data pertaining to dwelling units where sound-insulation mitigation is currently in progress was changed to reflect current status. The changes made to these results were not substantial and do not alter FAA's determinations.

FIGURE 3-1
EIS PROJECT AREA



3.1 NOISE

This section presents the aircraft noise analysis conducted as part of this Re-Evaluation for the Existing Fly Quiet and the Proposed Interim Fly Quiet. Details of the interim nighttime preferential runway use configurations analyzed during these analysis periods are discussed in **Chapter 2**. In general, the methods,

models, and procedures undertaken for noise analysis in this Re-Evaluation parallel those used in the EIS and the 2015 Re-Evaluation. The analysis includes similar summaries of the operational data used in calculating noise exposure levels, how noise is characterized and described, how people respond to it, and FAA guidance on land-use compatibility with various levels of noise exposure. **Appendix C** provides detailed information on each of these aspects of noise characterization and impact analysis.

3.1.1 Regulatory Context

The analysis of aviation noise impacts is an FAA responsibility for federal actions. This Re-Evaluation follows guidance and regulations provided in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures,[1] on how the impact assessment should occur and other federal statutes, regulations, and specific agency orders. A listing of these is presented in **Appendix C.**

These laws and guidance documents direct the use of DNL—the Day-Night Average Sound Level—the noise metric used for most environmental impact analyses.[2] DNL, a cumulative sound level, provides a measure of the total sound energy during a specified time period. DNL logarithmically averages the sound levels of multiple events at a location over a 24-hour period, with a 10-decibel (dB) weighting added to all sounds occurring during nighttime hours (between 10:00:00 p.m. and 6:59:59 a.m.).[3] The 10 dB increase for nighttime events represents the added intrusiveness of noise that occurs during sleeping hours. Ambient sound levels during the nighttime are typically about 10 dB lower than during the daytime hours.

The noise analysis considers the impacts of the Proposed Interim Fly Quiet using FAA's thresholds of significance. The significance threshold for changes in noise, in accordance with FAA Order 1050.1F, is when an action, compared to the no action alternative for the same timeframe, would cause noise-sensitive areas to experience a noise increase of at least 1.5 dB at or above 65 DNL as shown in **Table 3-1**. **Table 3-1** also lists FAA-defined noise significance thresholds as well as reportable changes of noise levels.

TABLE 3-1
DNL NOISE THRESHOLDS

	65 DNL or higher	Greater than or equal to 60 DNL but less than 65 DNL	Greater than or equal to 45 DNL but less than 60 DNL
Minimum Change in DNL with Alternative	1.5 dB	3.0 dB	5.0 dB
Level of Change	Significant	Reportable	Reportable
Source: FAA Order 1050.1F and the 1050.1F Desk Reference.			

3.1.2 Aircraft Noise Exposure for Existing Fly Quiet

Noise exposure from aircraft operations for an average annual day representing the Existing Fly Quiet during an 11-month period between November 2019 and January 2021 was developed. Fly Quiet operations

[1] Federal Aviation Administration, FAA Order 1050.1F; Washington, DC, effective July 16, 2015, Paragraph 9-2 and following, pg. 9-1.
[2] Part 150 and FAA Order 1050.1F directs the use of DNL for evaluating land-use compatibility and change of exposure for assessing significance of environmental impacts.
[3] A 10 dB change in sound levels is perceived by the average person as a doubling (or halving) of the sound's loudness.

cannot be implemented during the summer months of 2019 and 2020 due to runway rehabilitation projects on Runways 4L/22R and 4R/22L.

During the Existing Fly Quiet, in the daytime (7:00 a.m. to 9:59 p.m.), the typical arrival runways used are 9L, 10C, 10R, 27L, 27R, and 28C. At nighttime (10:00 p.m. to 6:59 a.m.), the typical arrival runways used are 9L, 10C, 10L, 27L, 27R, 28C, and 28R. For departures during the day, the typical runways used are 9R and 22L, and intersection departures from Runways 10L and 28R. At night, the typical departure runways used are 9R, 10L, 22L, and 28R, and intersection departures from Runways 10L and 28R.

Exhibit 3-1 provides the arrival runway use modeled for the Existing Fly Quiet and **Exhibit 3-2** provides the departure runway use modeled for the Existing Fly Quiet.

Modeled flight tracks to and from each runway end were developed and entered into Aviation Environmental Design Tool[4] (AEDT 2d) to represent the flight path routes for each condition. A set of modeled flight tracks represents a flight path route to or from a runway and flight operations are weighted to represent the dispersion of actual traffic for that route. **Exhibit 3-3** presents all the modeled flight tracks for the Existing Fly Quiet and Proposed Interim Fly Quiet and displays the arrival and departure tracks to all runways.

3.1.2.1 Data Sources

The Total Airspace and Airport Modeler (TAAM) output files and 2017–18 Airport Noise Management System (ANMS) radar data are the two primary data sources used to develop the AEDT inputs for the Existing Fly Quiet. The data sources are shown in **Table 3-2**. The following text summarizes how the input data for AEDT was developed.

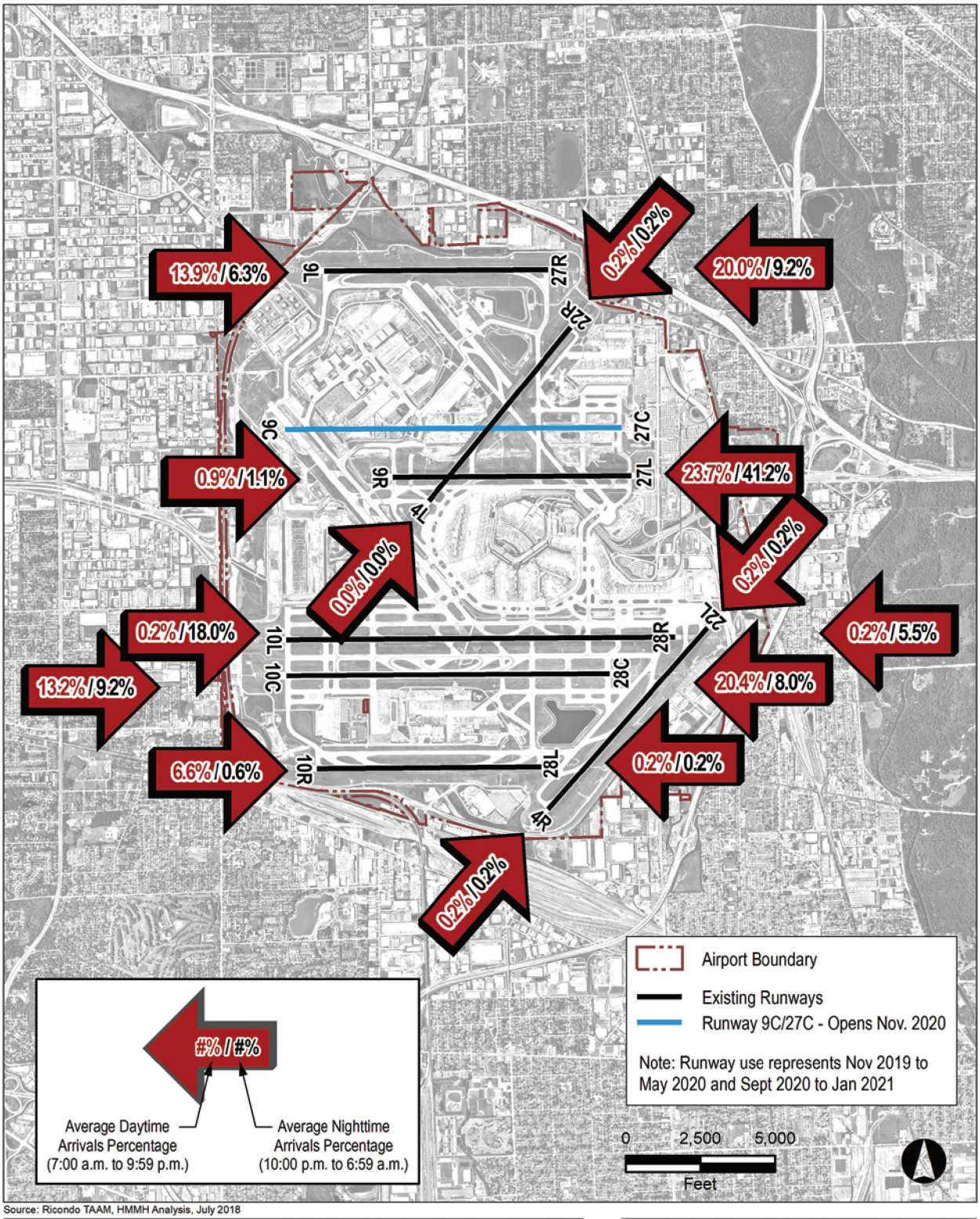
TAAM output files, created by the Chicago Department of Aviation (CDA), provided runway and flight track usage for the Existing Fly Quiet. TAAM output consisted of flight numbers, aircraft types, origin/destination cities, routes used, and operation times. The output also provided flight tracks and runway use percentages for daytime and nighttime periods for the Existing Fly Quiet. Current radar data was used to supplement TAAM files and identify routings that may not have captured the breadth of a flight corridor or aircraft traffic from a lightly used runway.

The FAA Air Traffic Workgroup[5] reviewed and accepted the TAAM simulations conducted to analyze the Existing Fly Quiet. Radar data downloaded from the Chicago ANMS supplemented the TAAM output. The ANMS data sample consisted of one week per month for two periods (January to May 2017 and September 2017 to April 2018) with a total of 91 days. This data was used to refine and add flight tracks, in some cases identifying tracks where TAAM simulation had generated none.

Details of the average annual daily aircraft operations, separated by daytime and nighttime departures and arrivals for the Existing Fly Quiet, are presented in **Appendix C.** Details on modeled runway use, development of modeled flight tracks, examples of modeled TAAM tracks, and plots of radar data supporting the noise modeling methodology are also in **Appendix C.**

[4] Current Version of AEDT used is Version 2d.

[5] The Air Traffic Workgroup is comprised of representatives from O'Hare Tower (ORD ATCT), Chicago TRACON (C90), Chicago ARTCC (ZAU), the National Air Traffic Controllers Association (NATCA), FAA Chicago Airports District Office (CHI-ADO), FAA's third-party Contractor, HMMH, and Ricondo & Associates, Inc.



Source: Ricondo TAAM, HMMH Analysis, July 2018

Chicago O'Hare International Airport
Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Existing Fly Quiet Arrival Runway Use

▶ Exhibit 3-1

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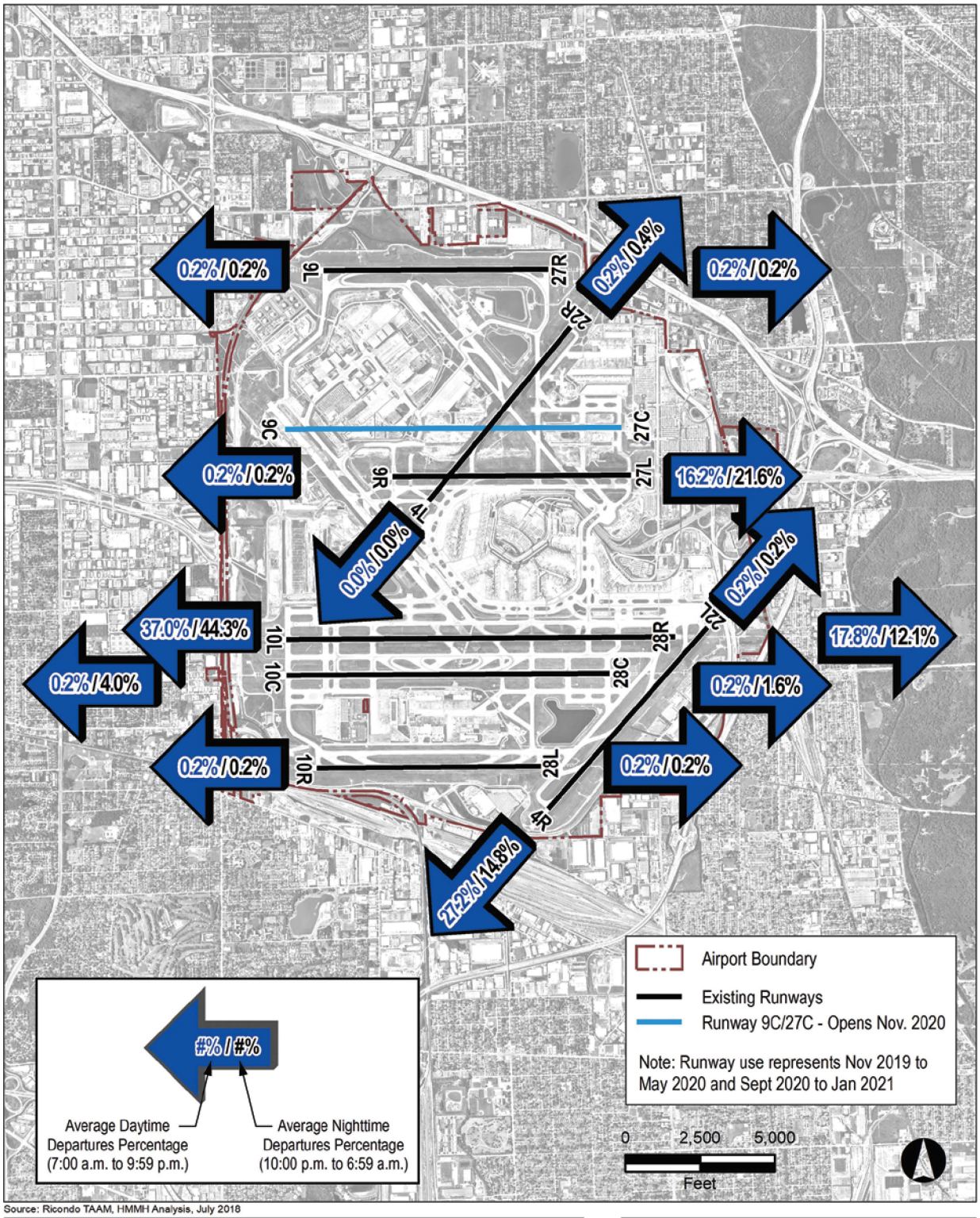

Source: Ricondo TAAM, HMMH Analysis, July 2018

Chicago O'Hare International Airport
Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Existing Fly Quiet Departure Runway Use

▶ Exhibit 3-2

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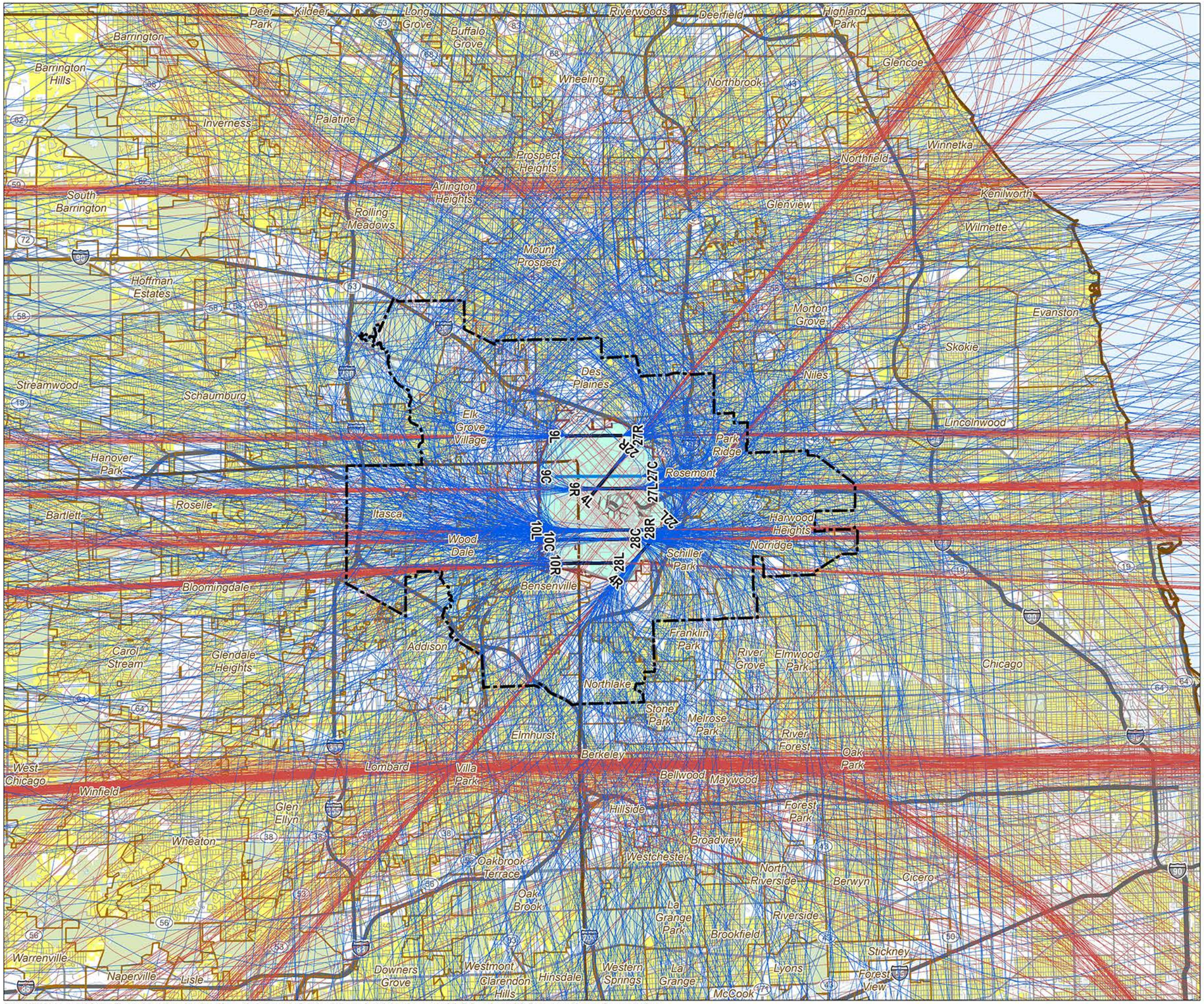

Source: HMMH, Landrum & Brown, Ricondo & Associates, NearMap US Inc., Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Departure Flight Tracks
- Arrival Flight Tracks
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020
- Noise Sensitive Land Use
- Open Space, Recreation
- Water
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

Note: Model tracks represent November 2019 to May 2020 and September 2020 to January 2021

0 3 6
Miles

All Model Tracks

▶ Exhibit 3-3

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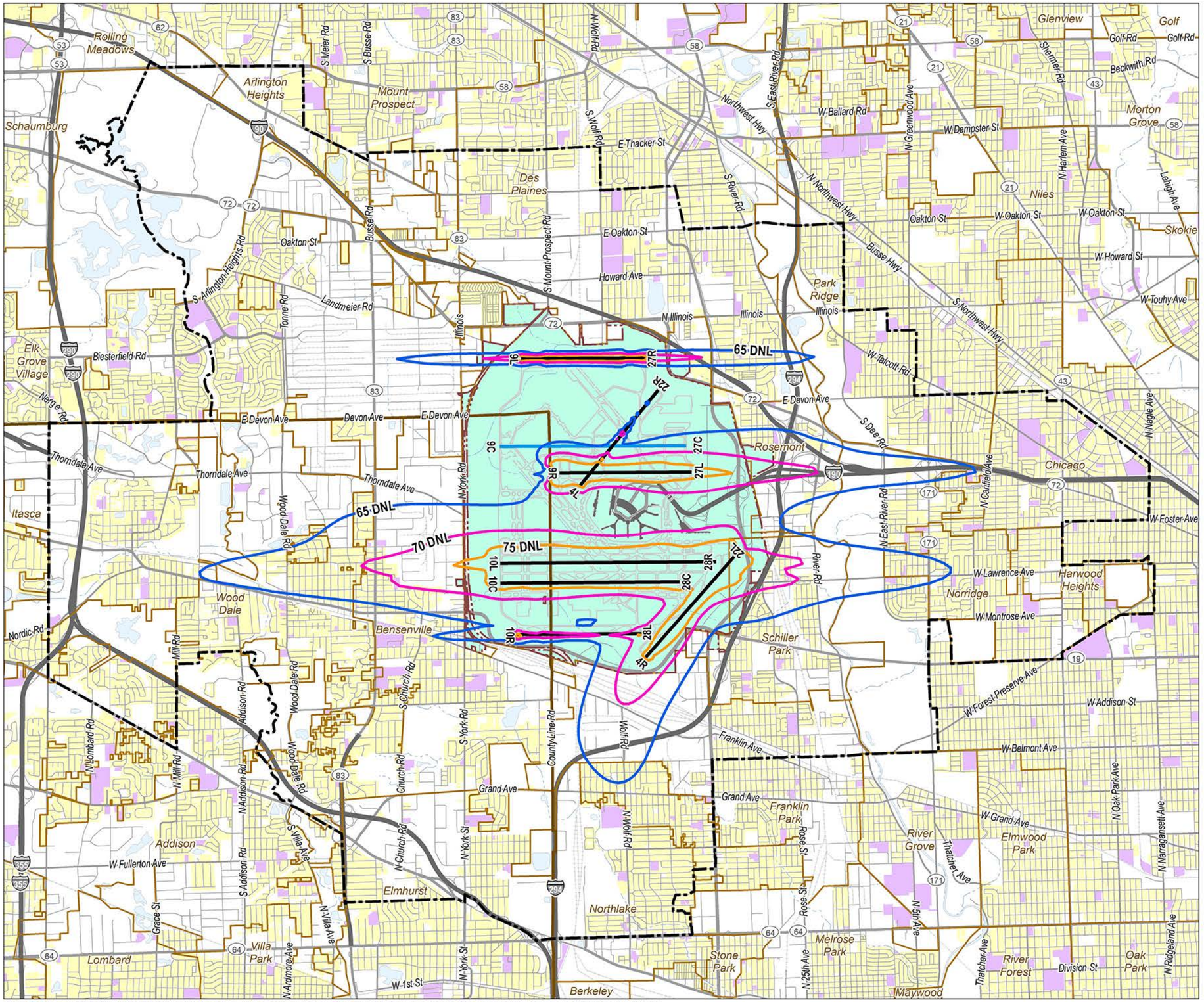

Source: HMMH, Landrum & Brown, Ricondo & Associates, NearMap US Inc., Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Existing Fly Quiet 65 DNL Noise Contour
- Existing Fly Quiet 70 DNL Noise Contour
- Existing Fly Quiet 75 DNL Noise Contour
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020

Land Use

- Residential
- Public, Hospital, Institutional
- Compatible
- Water
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1 2 Miles

Existing Fly Quiet DNL Noise Contours

▶ Exhibit 3-4

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TABLE 3-2
DATA SOURCES FOR EXISTING FLY QUIET

Noise Model Input Data	Source
Airfield Layout	CDA-surveyed runway coordinates
Aircraft Operations	TAAM Design Day Forecast
Aircraft Fleet Mix	TAAM Design Day Forecast
Flight Profiles	AEDT and 2017–18 ANMS data
Stage Length	City Pairs from TAAM Design Day Forecast Schedule
Runway Use	TAAM
Flight Track Location	TAAM and 2017–18 ANMS data
Flight Track Use	TAAM and 2017–18 ANMS data
Weather Conditions	AEDT
Terrain	United States Geological Survey (USGS)
Source: HMMH, 2018.	

3.1.2.2 Analysis and Results[6]

Table 3-3 provides estimates of the total area, noise-sensitive sites, population, and housing unit counts exposed to aircraft noise of at least 65 DNL. As presented, the area exposed to least 65 DNL is approximately 9,063 acres. Land exposed to at least 65 DNL includes nearly 836 acres of single-family residential use; approximately 56 acres of multi-family residential use; and nearly 447 acres of public parks.

The Existing Fly Quiet area exposed to greater than or equal to 65 DNL includes 24 noise sensitive sites including four schools, all of which have been sound insulated by the CDA. The Existing Fly Quiet exposes 14,232 people and 5,054 housing units to greater than or equal to 65 DNL. Of the 5,054 housing units, 4,124 have been sound insulated by the CDA.

Exhibit 3-4 depicts the 65, 70, and 75 DNL contours for the Existing Fly Quiet. The 65 DNL contour has three lobes that extend to the east: 1) From Runway 9L/27R extending to 2,000 feet past Interstate 294, 2) From Runway 9R/27L along Interstate 90 nearly to North Osage Avenue, and 3) From Runways 10R/28L and 10C/28C through Norridge past Route 171, almost to Prospect Avenue.

To the south, the 65 DNL contour extends nearly to Wellington Avenue due to departures from Runway 22L heading to the south and east. To the west, the 65 DNL contour extends west from Runway 10L/28R to Green Street. The 65 DNL contour also extends west from Runways 10R/28L and 10C/28C into Bensenville, through Wood Dale, and into Itasca, remaining just north of Route 19 almost to South Prospect Avenue. Lastly, the 65 DNL contour extends west from Runway 9L/27R almost to Busse Road.

[6] Between the publication of the Draft and this Final Proposed Interim Fly Quiet Re-Evaluation document, FAA undertook additional quality control analyses of calculations and results presented. Changes between the two documents primarily concern designation of multi-family versus single-family dwelling unit assignments. Additionally, data pertaining to dwelling units where sound-insulation mitigation currently in progress was changed to reflect status as of August 2018. The changes made to these results were not substantial and do not alter FAA's determinations.

The Existing Fly Quiet 70 DNL contour has three lobes that extend to the east. One lobe is from Runway 9L/27R extending to Interstate 90. The second lobe is from Runway 9R/27L along the Kennedy Expressway to the interchange with North River Road, and the third lobe is from Runway 10R/28L and 10C/28C, ending between Forster Avenue and North River Road.

To the south, the 70 DNL contour extends over the railroad tracks due to departures from Runway 22L heading to the south and east. To the west, the 70 DNL contour extends west from Runways 10R/28L and 10C/28C into Bensenville, almost to North Poplar Avenue.

Only airport and industrial land uses would be exposed to greater than or equal to 75 DNL.

TABLE 3-3
NOISE EXPOSURE FOR EXISTING FLY QUIET

		DNL Contour Bands			
Land Use (Acres)	**Compatibility**	**65-70**	**70-75**	**75+**	**Total**
Single-Family	Noncompatible	802.0	33.8	-	835.8
Multi-Family		36.0	20.2	-	56.2
Mobile Homes		-	-	-	-
Commercial	Compatible	278.5	15.2	-	293.7
Industrial		2,011.3	525.0	14.4	2,550.7
Public Parks		446.5	0.4	-	446.9
Institutional (see note 1)		29.1	5.9	-	35.0
Undeveloped		110.1	10.0		120.1
Airport		2,102.8	1,274.9	1,336.4	4,714.1
Water		10.9	-	-	10.9
	Total	**5,827.2**	**1,885.4**	**1,350.8**	**9,063.4**
Noise-Sensitive Facilities (Count)					
Public Parks		7	1	-	8
Historic Properties		5	-	1	6
Places of Worship		5	-	-	5
Nursing Homes		-	-	-	-
Hospitals		-	-	-	-
Libraries		1	-	-	1
Universities		-	-	-	-
Schools		3	1	-	4
Sound-insulated Schools (included above)		*3*	*1*		*4*
	Total	**21**	**2**	**1**	**24**
Population and Housing (Count)					
Population		12,389	1,843	-	14,232
Housing Units		4,423	631	-	5,054
Non-mitigated single-family housing units (included above)		*527*	*8*	-	*535*
Non-mitigated multi-family housing units (included above)		*364*	*31*	-	*395*
Sound-insulated single-family housing units (included above)		*2,921*	*203*	-	*3,124*
Sound-insulated multi-family housing units (included above)		*611*	*389*	-	*1,000*

Note 1: For the purposes of this document, Institutional land use is considered compatible.
Sources: ORD_RSIP_August 2018 database: City of Chicago.
2010 U.S. Census Bureau Census Block Population Data.
Existing Fly Quiet Contour, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, April 2019.

3.1.3 Aircraft Noise Exposure for Proposed Interim Fly Quiet

Noise exposure from aircraft operations for an average annual day representing the Proposed Interim Fly Quiet during an 11-month period between November 2019 and January 2021 was developed. Implementation of Proposed Interim Fly Quiet operations during the summer months of 2019 and 2020 cannot occur due to runway rehabilitation projects on Runways 4L/22R and 4R/22L.

The difference between nighttime operations in the Existing Fly Quiet and the Proposed Interim Fly Quiet consists of runway use changes during a portion of the nighttime period. The Fly Quiet Tests conducted by the CDA and FAA between July 2016 and October 2017 provide the basis for the Proposed Interim Fly Quiet as detailed in **Section 2.2.2** and **Appendix A**.

During the Proposed Interim Fly Quiet, the runway use remains unchanged during the daytime. Modification of runway usage occurs to nighttime operations as described in **Section 2.2.2**. During the daytime (7:00 a.m. to 9:59 p.m.), typical arrival runways would be 9L, 10C, 10R, 27L, 27R, and 28C. During nighttime (10:00 p.m. to 6:59 a.m.), the typical arrival runways would be 4R, 9L, 10C, 10L, 22R, 27L, 27R, and 28C. For daytime departures, the typical runways would be 9R, 22L, and intersection departures from 10L and 28R. During nighttime, the typical departure runways would be 9R, 10L, 22L, 28C, and 28R and intersection departures would be from 10L and 28R.

Exhibit 3-5 and **Exhibit 3-6** provide the modeled arrival and departure percentages of runway use, respectively, for the Proposed Interim Fly Quiet.

Modeled flight tracks to and from each runway end were developed and entered in AEDT for both the Existing Interim Fly Quiet and the Proposed Interim Fly Quiet. The modeled flight tracks for the Proposed Interim Fly Quiet are the same as those in the Existing Fly Quiet; the difference is how often those tracks are used. Changes to track use are due to modifications in combinations of runways and routes used in the Proposed Interim Fly Quiet. Refer to **Exhibit 3-3** to review all modeled flight tracks and the arrival and departure track structure to all runways.

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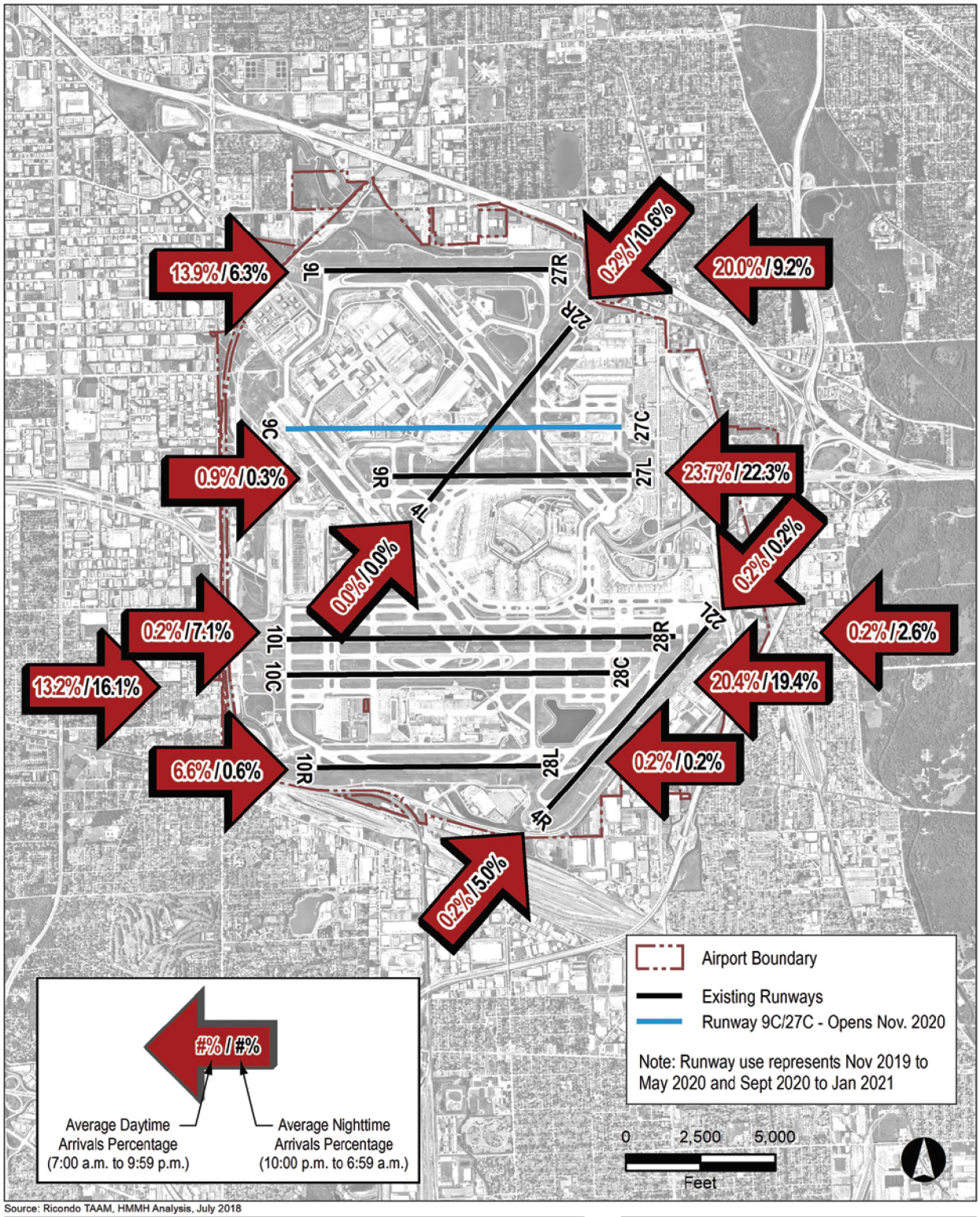

Source: Ricondo TAAM, HMMH Analysis, July 2018

Chicago O'Hare International Airport
Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Proposed Interim Fly Quiet Arrival Runway Use

▶ Exhibit 3-5

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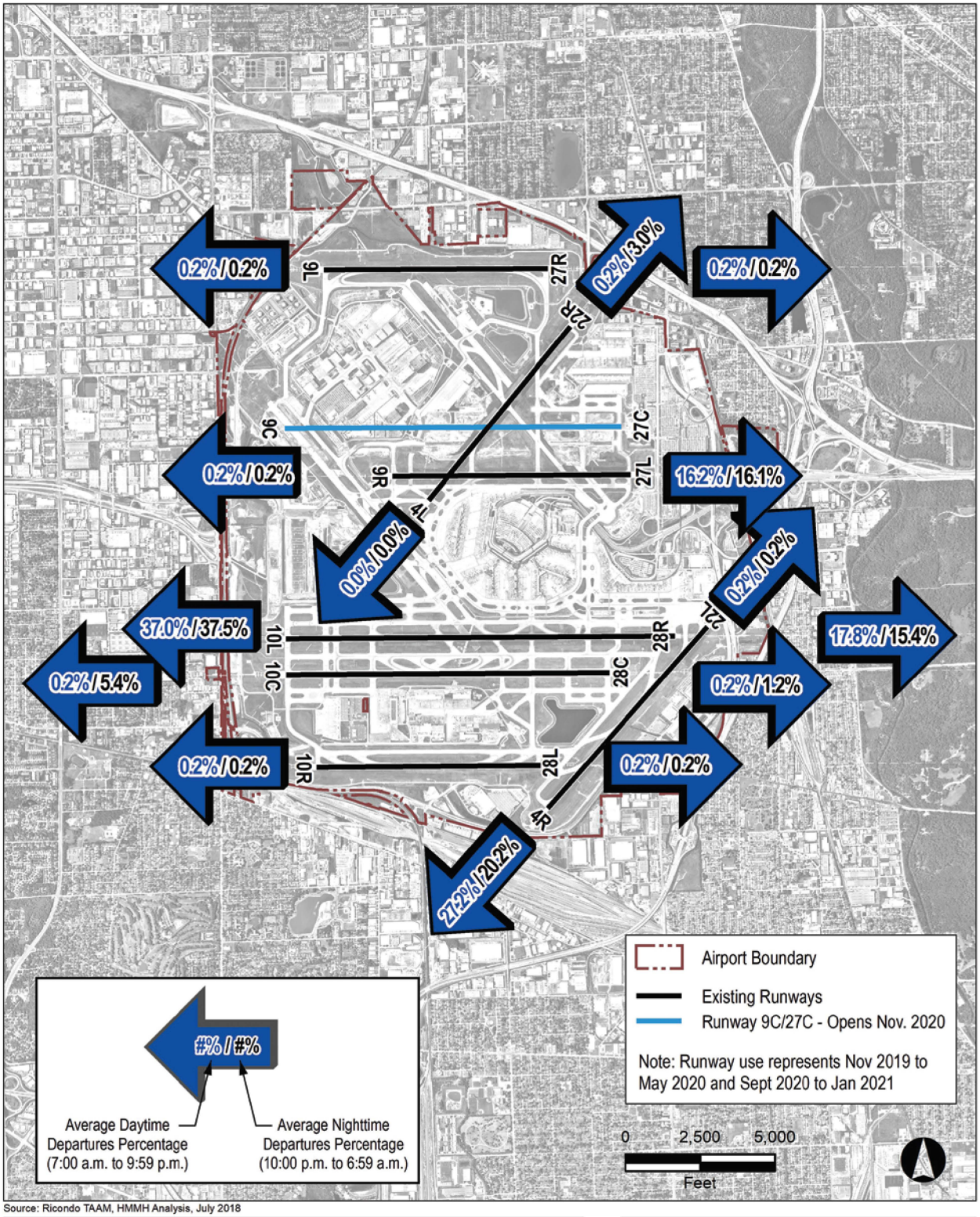

Source: Ricondo TAAM, HMMH Analysis, July 2018

Chicago O'Hare International Airport
Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Proposed Interim Fly Quiet Departure Runway Use

▶ Exhibit 3-6

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3.1.3.1 Data Sources

The Existing Fly Quiet TAAM output, 2017–18 ANMS data, and the Proposed Interim Fly Quiet CDA Runway Use Process are the three primary data sources used to develop the noise model inputs for the Proposed Interim Fly Quiet. The following summarizes how the input data for AEDT was developed.

The daytime operations for the Proposed Interim Fly Quiet are the same as for the Existing Fly Quiet. Most of the Proposed Interim Fly Quiet data developed from the Existing Fly Quiet came from the TAAM simulations and ANMS radar data. As in the daytime, TAAM and ANMS data from the Existing Fly Quiet provided the operational levels and routes flown for the nighttime. However, the CDA Runway Use Process provided the nighttime runway use.[7] **Appendix A** provides details of the CDA Runway Use Process development, including input, output, and adjustments made to the data.

The CDA Runway Use Process modified the nighttime Existing Fly Quiet TAAM data by incorporating the Proposed Interim Fly Quiet configurations and rotation. Additionally, the Proposed Interim Fly Quiet adjustments to assigned runways include modifications to represent non-standard runway operating configurations. Merging of the daytime and nighttime data sets for the noise analysis follows the process detailed in **Appendix C**.

Table 3-4 presents the noise model input data for AEDT and the source of the data. As noted above, the CDA Runway Use Process (shown in bold) is the only new data source compared to Existing Fly Quiet.

TABLE 3-4
DATA SOURCES FOR PROPOSED INTERIM FLY QUIET

Noise Model Input Data	Source
Airfield Layout	CDA surveyed runway coordinates
Aircraft Operations	TAAM Design Day Forecast
Aircraft Fleet Mix	TAAM Design Day Forecast
Flight Profiles	AEDT and 2017–18 ANMS data
Stage Length	City Pairs
Runway Use	TAAM (Day), **CDA Runway Use Process (Night)**
Flight Track Location	TAAM and 2017–18 ANMS data
Flight Track Use	TAAM and 2017–18 ANMS data
Weather Conditions	AEDT
Terrain	USGS
Source: HMMH, 2018.	

3.1.3.2 Analysis and Results

Table 3-5 provides estimates of the total area, noise sensitive sites, population, and housing unit counts exposed to aircraft noise of at least 65 DNL. As presented, the area exposed to at least 65 DNL would be

[7] Results were provided on 8/16/2018.

approximately 9,072 acres. This land area would include approximately 832 acres of single-family residential use; nearly 65 acres of multi-family residential use; and nearly 379 acres of public parks.

The area exposed to greater than or equal to 65 DNL would include 24 noise sensitive sites including four schools, all of which have been sound-insulated by the CDA. The Proposed Interim Fly Quiet would expose 15,680 people and 5,623 housing units to greater than or equal to 65 DNL. Of the 5,623 housing units, 4,120 have been sound insulated by the CDA.

Exhibit 3-7 depicts the 65, 70, and 75 DNL contours for the Proposed Interim Fly Quiet. The 65 DNL contour has three lobes that extend to the east. One lobe from Runway 9L/27R extends approximately 1,800 feet past Interstate 294. The second lobe from Runway 9R/27L extends east along Interstate 90 to North East River Road, and the third lobe from Runways 10R/28L and 10C/28C extends through Norridge past North Canfield Avenue to just past Ozanam Avenue.

To the south, the 65 DNL contour extends nearly to West Grand Avenue due to departures from Runway 22L heading to the south and east. Due to arrivals to Runway 4R, the 65 DNL extends to the southwest almost to County Line Road. To the west, the 65 DNL contour extends from Runway 10R/28L to Green Street. The 65 DNL contour also extends west from Runways 10L/28R and 10C/28C into Bensenville, through Wood Dale, and south to Route 19's intersection with Miller Lane. The 65 DNL contour extends west from Runway 9L/27R east of Busse Road. It also extends to the northeast from Runway 4L/22R into Des Plaines ending south of Fargo Street.

The Proposed Interim Fly Quiet 70 DNL contour has three lobes extending to the east. One lobe from Runway 9L/27R extends just past Interstate 90 towards Mannheim Road. The second lobe extends from Runway 9R/27L along the Kennedy Expressway to the interchange with Interstate 294 and the third, from Runways 10R/28L and 10C/28C, extends along West Lawrence Avenue ending east of North River Road.

To the south, the 70 DNL contour would extend south of Franklin Avenue due to departures from Runway 22L heading to the south and east. To the west, the 70 DNL contour would extend from Runways 10R/28L and 10C/28C into Bensenville almost to Busse Road.

Only airport and industrial land uses would be exposed to greater than or equal to 75 DNL.

TABLE 3-5
NOISE EXPOSURE FOR PROPOSED INTERIM FLY QUIET

		DNL Contour Bands			
Land Use (Acres)	**Compatibility**	**65-70**	**70-75**	**75+**	**Total**
Single-Family	Noncompatible	798.5	33.7	-	832.2
Multi-Family		43.2	21.6	-	64.8
Mobile Homes		-	-	-	-
Commercial	Compatible	216.7	21.1	-	237.8
Industrial		2,020.0	508.4	10.2	2,538.6
Public Parks		369.3	9.2	-	378.5
Institutional (see note 1)		39.2	8.1	-	47.3
Undeveloped		100.0	11.4	-	111.4
Airport		2,170.9	1,288.3	1,394.7	4,853.9
Water		7.2	-	-	7.2
	Total	5,765.0	1,901.8	1,404.9	9,071.7

	DNL Contour Bands			
Noise-Sensitive Facilities (Count)	**65-70**	**70-75**	**75+**	**Total**
Public Parks	8	1	-	9
Historic Properties	5	-	1	6
Places of Worship	5	-	-	5
Nursing Homes	-	-	-	-
Hospitals	-	-	-	-
Libraries	-	-	-	-
Universities	-	-	-	-
Schools	3	1	-	4
Sound-Insulated Schools (included above)	*3*	*1*	-	*4*
Total	21	2	1	24
Population and Housing (Count)				
Population	13,473	2,207	-	15,680
Housing Units	4,766	857	-	5,623
Non-mitigated single-family housing units (included above)	*871*	*13*	-	*884*
Non-mitigated multi-family housing units (included above)	*496*	*123*	-	*619*
Sound-insulated single-family housing units (included above)	*2,936*	*176*	-	*3,112*
Sound-insulated multi-family housing units (included above)	*463*	*545*	-	*1,008*

Note: For the purposes of this document, Institutional land use is compatible.
Sources: ORD_RSIP_August 2018 database: City of Chicago.
2010 U.S. Census Bureau Census Block Population Data.
Proposed Interim Fly Quiet Contour, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, April 2019.

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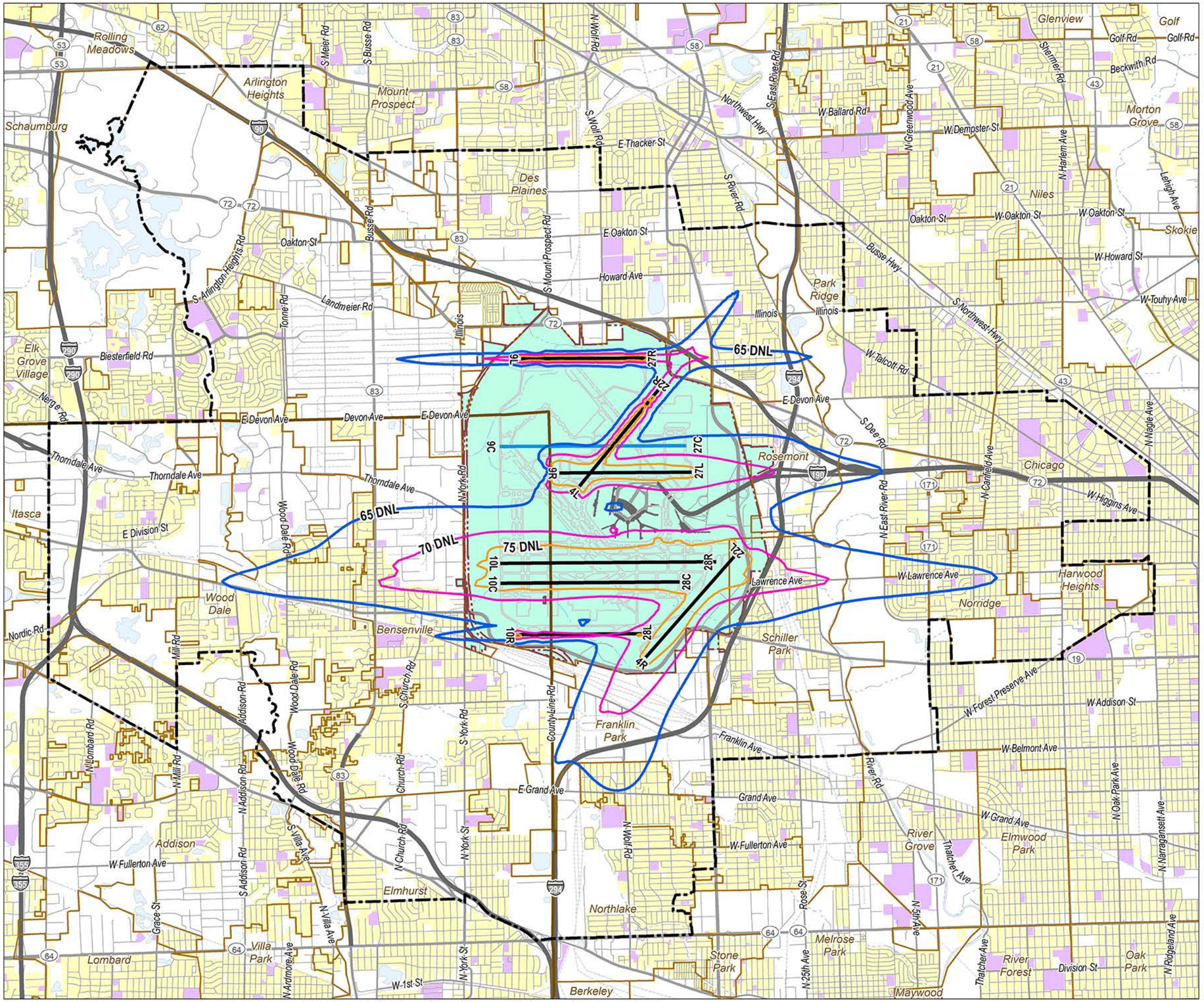

Source: HMMH, Landrum & Brown, Ricondo & Associates, NearMap US Inc., Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Proposed Interim Fly Quiet 65 DNL Noise Contour
- Proposed Interim Fly Quiet 70 DNL Noise Contour
- Proposed Interim Fly Quiet 75 DNL Noise Contour
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020

Land Use

- Residential
- Public, Hospital, Institutional
- Compatible
- Water
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1 2 Miles

Proposed Interim Fly Quiet DNL Noise Contours

▶ Exhibit 3-7

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3.1.4 Change in Aircraft Noise Exposure

Exhibit 3-8 shows a comparison of the 65 DNL contours for the Existing Fly Quiet and the Proposed Interim Fly Quiet. In general, the Proposed Interim Fly Quiet would cause a net increase in area covered by the 65 DNL contour. While some areas would experience an increase in acreage, others would experience a decrease in acreage due to the changes in nighttime runway use. Starting at the north end of the airport and working clockwise around the airport, the 65 DNL contour area extending to the north from Runway 22R would increase. The 65 DNL contour area extending to the east from Runway 27L would decrease, while the contour area extending to the east from Runways 28R and 28C would shift slightly to the south. The 65 DNL contour area extending to the south from Runway 4R would increase. The 65 DNL contour area extending to the west from Runways 10L and 10C would decrease but also shift slightly to the south, and the area extending to the west from Runway 9L would remain the same.

Table 3-6 summarizes the changes in potentially noncompatible land use acreage, numbers of noise-sensitive facilities, and population/housing units exposed to at least 65 DNL for the Proposed Interim Fly Quiet relative to Existing Fly Quiet. Potentially noncompatible land use would increase by five acres. The total number of noise-sensitive facilities (exposed to at least 65 DNL) would not change. The population and numbers of housing units exposed to at least 65 DNL would increase by 1,448 and 569, respectively. See **Appendix C** for additional details.

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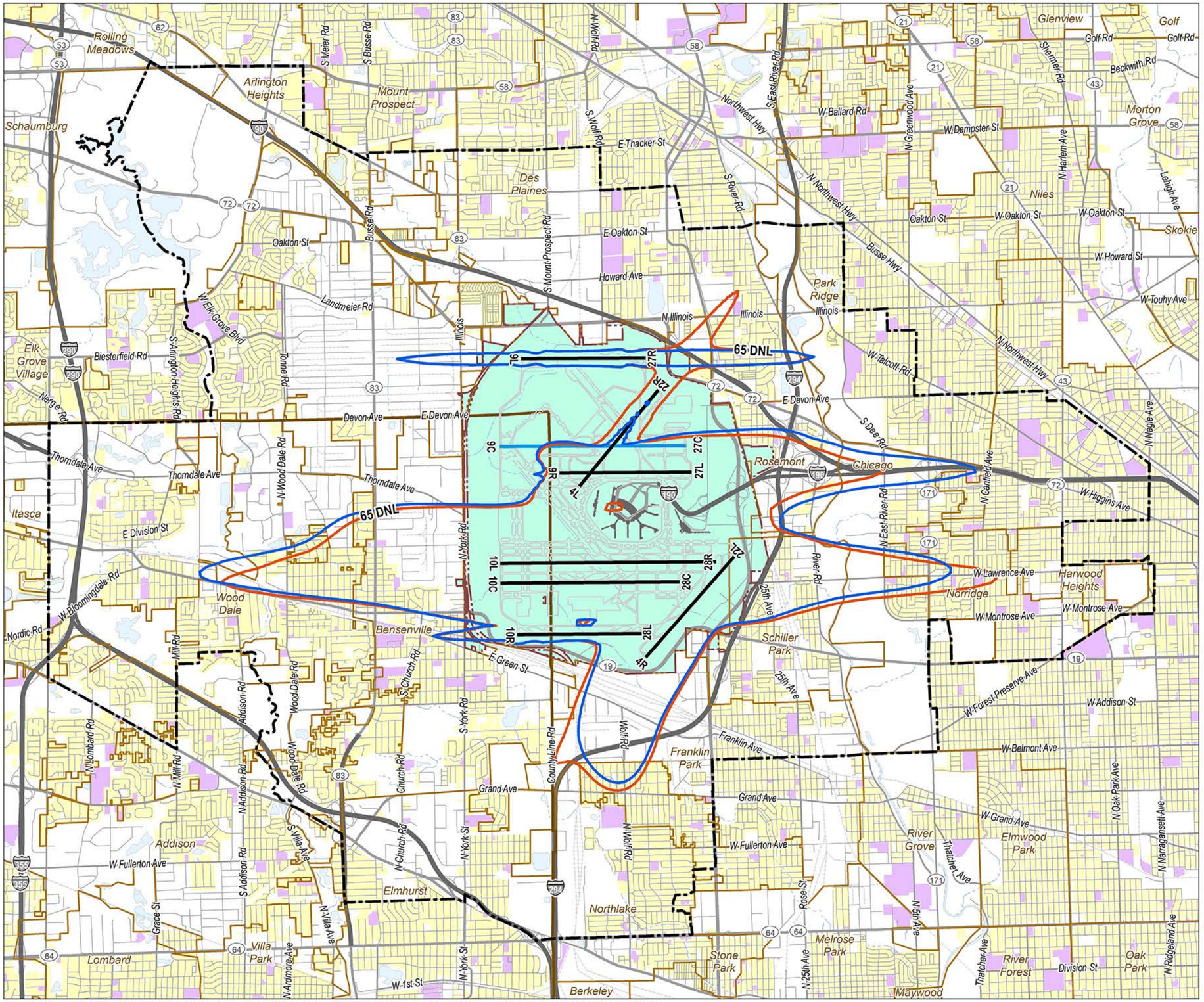

Source: HMMH, Landrum & Brown, Ricondo & Associates, NearMap US Inc., Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Existing Fly Quiet 65 DNL Noise Contour
- Proposed Interim Fly Quiet 65 DNL Noise Contour
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020

Land Use

- Residential
- Public, Hospital, Institutional
- Compatible
- Water
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1 2 Miles

Existing and Proposed Interim Fly Quiet DNL Noise Contours

▶ Exhibit 3-8

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TABLE 3-6
CHANGE IN NONCOMPATIBLE ACREAGE, NOISE-SENSITIVE FACILITIES, AND POPULATION/HOUSING UNIT COUNTS FOR THE PROPOSED INTERIM FLY QUIET 65 DNL, RELATIVE TO THE EXISTING FLY QUIET

Parameter	Existing Fly Quiet	Proposed Interim Fly Quiet	Net Change Between Proposed and Existing Fly Quiet
Potentially Noncompatible Land Use (Acres) (see note 1)			
Single-Family	835.8	832.2	(3.6)
Multi-Family	56.2	64.8	8.6
Mobile Homes	-	-	-
Total	**892.0**	**897.0**	**5.0**
Noise-Sensitive Facilities (Count)			
Public Parks	8	9	1
Historic Properties	6	6	-
Places of Worship	5	5	-
Nursing Homes	-	-	-
Hospitals	-	-	-
Libraries	1	-	(1)
Universities	-	-	-
Schools	4	4	-
Sound-insulated Schools (included above)	*4*	*4*	-
Total	**24**	**24**	**-**
Population and Housing (Count)			
Population	14,232	15,680	1,448
Housing Units	5,054	5,623	569
Non-mitigated single-family housing units (included above)	*535*	*884*	*349*
Non-mitigated multi-family housing units (included above)	*395*	*619*	*224*
Sound-insulated single-family housing units (included above)	*3,124*	*3,112*	*(12)*
Sound-insulated multi-family housing units (included above)	*1,000*	*1,008*	*8*

Note 1: For the purposes of this document, Institutional land use is considered compatible.

Sources: ORD_RSIP_August 2018 database: City of Chicago.
2010 U.S. Census Bureau Census Block Population Data.
Proposed Interim Fly Quiet Contour, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, April 2019.

Table 3-7 summarizes the population and housing units that would be exposed to a significant noise impact within the 65 DNL or would experience a reportable increase between the 60 DNL and 65 DNL contours due to the Proposed Interim Fly Quiet. The Proposed Interim Fly Quiet would expose 167 people and 57 housing units across nearly 16 acres to a significant noise increase, and would expose 3,256 people and 1,094 housing units across nearly 154 acres to a reportable noise increase. The Proposed Interim Fly Quiet would expose 147 people and 56 housing units across nearly 33 acres to a significant noise decrease, and would expose no one to a reportable noise decrease.

TABLE 3-7
SUMMARY OF SIGNIFICANT IMPACTS AND REPORTABLE CHANGES TO NOISE-SENSITIVE SITES, HOUSING UNITS, AND POPULATION FOR PROPOSED INTERIM FLY QUIET

Parameter	Experience at least a 1.5 dB Increase at or above 65 DNL of Existing Fly Quiet (significant)	Experience at least a 3.0 dB Increase at or above 60 DNL and less than 65 DNL of Existing Fly Quiet (reportable)	Experience at least a 1.5 dB Decrease at or above 65 DNL of Existing Fly Quiet (significant)	Experience at least a 3.0 dB Decrease at or above 60 DNL and less than 65 DNL of Existing Fly Quiet (reportable)
Potentially Noncompatible Land Use (Acres)	15.9	153.8	33.4	-
Noise-Sensitive Facilities (Count)	1	-	1	-
Population (Count)	167	3,256	147	-
Housing Units (Count)	57	1,094	56	-

Note: The Noise-Sensitive Facility that would experience an increase is a park (Administrative & Leisure Center, Des Plaines; P22). The Noise-Sensitive Facility that would experience a decrease is a place of worship (Holy Resurrection Church, Chicago; W25)

Sources: ORD_RSIP_August 2018 database: City of Chicago.
2010 U.S. Census Bureau Census Block Population Data.
Proposed Interim Fly Quiet Contour, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, April 2019.

3.2 AIR QUALITY

This section summarizes the methodology and results of the air quality analysis performed to evaluate the effect of the Proposed Interim Fly Quiet on local and regional air pollutant and pollutant precursor emissions. **Appendix E** provides a detailed description of the methodologies used to evaluate air quality conditions in this Re-Evaluation. The air quality analysis, which focused on emissions from nighttime (10:00 p.m. to 6:59 a.m.) aircraft operations associated with the Proposed Interim Fly Quiet, provides estimated amounts of pollutants, pollutant precursors, and predicted pollutant concentrations at receptor locations at and near O'Hare.

3.2.1 Regulatory Context

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for air pollutants considered harmful to the health of the public and the environment. Primary standards provide protection for public health, while secondary standards protect public welfare (e.g., damage to buildings, vegetation, and visibility). There are NAAQS for six air pollutants, referred to as the "criteria" air pollutants. These six pollutants are:

- Carbon monoxide (CO)
- Ozone (O_3)
- Sulfur dioxide (SO_2)
- Nitrogen dioxide (NO_2)

- Particulate matter (PM)
- Lead (Pb)

The size of the PM determines its potential to cause health problems. For this reason, the USEPA established NAAQS for particles of the following sizes:

- Less than or equal to 10 micrometers for coarse particulate matter, or PM_{10}
- Less than or equal to 2.5 micrometers for fine particulate matter, or $PM_{2.5}$

In accordance with the CAA, all areas in the United States are designated, with respect to the NAAQS, as "attainment," "nonattainment," "maintenance," or "unclassifiable." O'Hare is located within the Illinois counties of Cook and DuPage. These counties are presently designated as attainment for CO, SO_2, NO_2, PM, and Pb and "moderate" nonattainment for the 2008 O_3 NAAQS. In October 2015, the USEPA revised (lowered) the O_3 NAAQS (referred to as the 2015 O_3 NAAQS). On June 4, 2018, the USEPA published a final rule stating that effective August 3, 2018, Cook County and DuPage County are also designated to be within a "marginal" nonattainment area for the 2015 O_3 standard.[8]

To comply with the National Environmental Policy Act (NEPA), this Re-Evaluation evaluates the potential effect of the Proposed Interim Fly Quiet on local/regional emissions of CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$. In order to evaluate the potential effect of the Proposed Interim Fly Quiet on concentrations of O_3, emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x)—precursor emissions to O_3—were evaluated. Emissions of Pb were not evaluated because less than one percent of the total aircraft operations at O'Hare are by piston aircraft that use the aviation fuel that contains Pb (i.e., Avgas/100LL). Because the number of operations by these piston aircraft is minimal (i.e., approximately two dozen operations per year), total O'Hare-related Pb emissions would be minimal (less than 0.1 tons).

Hazardous air pollutant (HAP) and greenhouse gas (GHG) emissions attributable to the Proposed Interim Fly Quiet were also evaluated. Greenhouse gas emissions are documented in **Section 3.3** (Climate) in accordance with the 1050.1F Desk Reference.

Two types of air quality analyses were prepared.

1. **The emissions inventory** documents the total emissions that would result from airport operations associated with the Proposed Interim Fly Quiet. The emission inventory provides an indication of the change in the amount of air pollutant and pollutant precursor emissions that will be produced with the Proposed Interim Fly Quiet.
2. **Dispersion modeling** evaluates the potential for the Proposed Interim Fly Quiet to cause or contribute to an exceedance of ambient air quality standards. The dispersion modeling provides predicted concentrations of ambient pollutant levels that can be directly compared to NAAQS.

Section 176(c) of the CAA prohibits FAA from taking an action in a nonattainment area unless the emissions from the action conform to a State Implementation Plan (SIP). The General Conformity Determination in the EIS states that because the OMP-related emissions were included in an approved SIP, the OMP conformed to a SIP. With regard to a re-evaluation of General Conformity, the CAA General Conformity Regulations (40 CFR Part

[8] *Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards*, 83 FR 25776 (final rule June 4, 2018) (to be codified to 40 CFR 81).

93) state the following (§93.157 Reevaluation of Conformity), once a conformity determination is completed by a federal agency (as was done for the OMP), that determination is not required to be re-evaluated if:

1. The agency has maintained a continuous program to implement the action,
2. The determination has not lapsed as specified in paragraph (b), or
3. Any modification to the action does not result in an increase in emissions above the de minimus thresholds in §93.153(b).

All three elements have been met, therefore a re-evaluation of the OMP General Conformity Determination is not required (see **Appendix E, Section 5.2** for further details).

3.2.2 Air Quality for Existing Fly Quiet

The following two sections of this Re-Evaluation summarize the data sources used to prepare the air quality analyses and present the results of the emissions inventory for the Existing Fly Quiet. Because an incremental approach, that focused on the change in emissions, was used to evaluate the impact of the Proposed Interim Fly Quiet on air pollutant concentrations, there are no dispersion modeling results for the Existing Fly Quiet.

3.2.2.1 Data Sources

Unlike the analysis presented in the EIS and the 2015 Re-Evaluation, the air quality analysis for the Existing Fly Quiet was performed with FAA's AEDT.[9] As of May 29, 2015, use of the AEDT is required in preparing emissions inventories, and in conjunction with USEPA's approved dispersion model AERMOD (16216r),[10,11] when conducting dispersion modeling for FAA-related actions.

For this Re-Evaluation, air pollutant and pollutant precursor emissions were evaluated only for emissions from nighttime (10:00 p.m. to 6:59 a.m.) aircraft activities; the Proposed Interim Fly Quiet would not affect emissions from any other airport-related source of air pollutants/pollutant precursors. The aircraft operational level, aircraft fleet mix, runway use, designated taxiways, and taxi times were obtained from TAAM to evaluate the Existing Fly Quiet. This data is provided in **Appendix A** and **Appendix E**.

Aircraft engine assignments were made using published data summarizing the fleet of airline-owned and/or operated aircraft, grouped by make and model for each major airframe type (e.g., jet-powered aircraft, turboprop-powered aircraft). Aircraft stage length (i.e., arrival and departure weight) were assigned as default values per the EIS and 2015 Re-Evaluation. The air pollutant and pollutant precursor emission factors and aircraft engine operating times were the default AEDT values for the aircraft operational modes of take-off, climb-out, and approach. The aircraft taxi/ground travel times were based on information from TAAM and information developed by the CDA. This data is provided in **Appendix E**.

Background concentrations from 2014–16 were obtained from the Illinois Environmental Protection Agency (IEPA); meteorological data for the same time frame was obtained from the National Climatic Data Center. Temporal (i.e., operational) factors were used to describe the relationship between two periods of time (i.e., the relationship of the activity during one hour to the activity during a 24-hour period). In AEDT, temporal factors

[9] FAA, Aviation Environmental Design Tool (AEDT) Users Guide, September 2017, https://aedt.faa.gov/
[10] USEPA Preferred/Recommended Models, AERMOD Modeling System, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models
[11] Title 40 CFR Part 51, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule, http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

are applied to represent varying levels of activity as a fraction of a peak hour. The quarter-hourly, daily, and monthly temporal factors for air quality analysis, developed from data used in TAAM and FAA's Operations Network (OPSNET), are presented in **Appendix E**.

3.2.2.2 Analysis and Results

No construction activities are part of the Existing Fly Quiet and thus, the emissions inventory includes operational emissions only. As previously stated, the operational emissions inventory only includes nighttime aircraft taxi activity (as these are the only activities affected by the Proposed Interim Fly Quiet). For the Existing Fly Quiet, the estimated emissions are 260 tons of CO, 35 tons of VOC, 425 tons of NO_x, 32 tons of SO_x, and 2 tons of PM_{10} and $PM_{2.5}$.

3.2.3 Air Quality for Proposed Interim Fly Quiet

The following two sections of this Re-Evaluation summarize the data sources used to prepare the air quality analysis for the Proposed Interim Fly Quiet and present the results of the nighttime emissions inventory and dispersion modeling.

3.2.3.1 Data Sources

With the exception of runway use and taxi times, the data sources used to evaluate the Proposed Interim Fly Quiet were the same as described and used for the Existing Fly Quiet. The runway use and taxi time data used to evaluate the Existing Fly Quiet were adjusted by the CDA to account for the Proposed Interim Fly Quiet, and calculated taxi times differ as a result (see **Appendix A**). Differing runway use results in different concentrations between the Existing Fly Quiet and the Proposed Interim Fly Quiet, while variations in taxi times result in differences in emissions.

3.2.3.2 Analysis and Results

No construction activities are required to implement the Proposed Interim Fly Quiet. Therefore, the emissions inventory includes operational emissions only. For the Proposed Interim Fly Quiet, the estimated emissions associated with nighttime aircraft taxi operations are 269 tons of CO, 36 tons of VOC, 427 tons of NO_X, 33 tons of SO_X, and 2 tons of PM_{10} and $PM_{2.5}$. **Table 3-8** presents the difference in aircraft emissions inventory between the Proposed Interim Fly Quiet and the Existing Fly Quiet. As shown, emissions would increase slightly with the Proposed Interim Fly Quiet due to slightly higher aircraft ground travel time.

TABLE 3-8
CHANGE IN EMISSIONS WITH PROPOSED INTERIM FLY QUIET

Pollutant/Pollutant Precursor	Existing Fly Quiet (tons)	Proposed Interim Fly Quiet (tons)	Project-Related Change (tons)
CO	260	269	9
VOC	35	36	1
NO_x	425	427	2
SO_x	32	33	1

PM_{10}	2	2	<1
$PM_{2.5}$	2	2	<1
Values reflect rounding. Sources: The RCH Group and KB Environmental Sciences, Inc.			

Implementation of the Proposed Interim Fly Quiet would slightly increase criteria air pollutant emissions compared to the Existing Fly Quiet. For all pollutants, these increases would be well below de minimis levels and would therefore conform to the SIP. Implementation of the Proposed Interim Fly Quiet is unlikely to contribute to significant cumulative air quality impacts when considered in combination with the OMP because both projects would conform to the SIP and because the pollutant concentrations for the Proposed Interim Fly Quiet are well below the NAAQS for any pollutant. A dispersion analysis was performed to evaluate the effect of the Proposed Interim Fly Quiet on ambient (i.e., outdoor) concentrations of pollutants for which there are NAAQS. The dispersion analysis provides concentrations for CO and SO_2 (assuming full conversion of SO_x emissions to SO_2 emissions) and for PM_{10} and $PM_{2.5}$. Concentrations of NO_2 are also estimated using methods that convert the NO_x emissions estimated by the AERMOD to NO_2. See **Appendix E** for details.

Modeling to determine the effects of an individual project on regional levels of O_3 is not recommended because computer models used to assess this pollutant do not support comparisons between model results at specific locations and the NAAQS. A more detailed description of the methodologies and assumptions used to perform the dispersion analysis for CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ is provided in **Appendix E**. Concentrations were predicted at receptor locations on and in the vicinity of O'Hare. An illustration of the evaluated receptor locations is provided in **Appendix E**.

For dispersion modeling, the incremental project-related concentrations were determined to represent the difference between concentrations with the Proposed Interim Fly Quiet and concentrations with the Existing Fly Quiet. The incremental concentrations represent project-related airport sources (i.e., nighttime aircraft activities), while the background concentrations represent non-project-related airport sources (e.g., ground support equipment, airport-related surface traffic that would be present with or without the Proposed Interim Fly Quiet) and all non-airport emission sources. The maximum incremental concentrations by receptor were added to the background concentration and the total concentrations compared to the NAAQS.

Table 3-9 lists the incremental difference between the concentrations resulting from the Existing Fly Quiet and Proposed Interim Fly Quiet. As shown, total concentrations (incremental plus background concentrations) are less than the NAAQS for all pollutants at all receptors. Therefore, the Proposed Interim Fly Quiet would not have a significant impact on air quality. Concentrations of NO_2 are typcially highest at the ends of departure runways. With the Proposed Interim Fly Quiet, the maximum predicted total one-hour NO_2 concentration is predicted to occur at Receptor 13, at which the predicted concentration is 167 $\mu g/m^3$. Receptor 13, located at the intersection of Mannheim Road and Lawrence Avenue, is the Schiller Park IEPA Monitoring Station, and is in close proximity to the eastern ends of Runway 10L/28R and Runway 4R/22L.

TABLE 3-9
DISPERSION MODELING RESULTS FOR PROPOSED INTERIM FLY QUIET

	Maximum Predicted Pollutant Concentrations (µg/m³)								
	CO		NO_2		SO_2		PM_{10}	$PM_{2.5}$	
Criteria	**1-Hour**	**8-Hour**	**1-Hour**	**Annual**	**1-Hour**	**3-Hour**	**24-Hour**	**24-Hour**	**Annual**
Predicted Incremental Concentration	569	73	84	<1	24	15	<1	<1	<1
Background Concentration	1,394	867	83	34	16	13	18	22	11
Total Concentration	1,963	940	167	35	40	28	18	22	11
Receptor ID	03	03	13	13	13	R02A	13	R02A	R06A
NAAQS	40,000	10,000	188	100	196	1,300	150	35	12
Exceeds NAAQS?	No	No	No	No	No	No	No	No	No

Values reflect rounding.
Values represent difference between Proposed Interim Fly Quiet and Existing Fly Quiet plus background concentration.
Sources: The RCH Group and KB Environmental Sciences, Inc.

3.3 CLIMATE

Research has shown that increased atmospheric GHG emissions are significantly affecting the Earth's climate. These conclusions are based on a scientific record that includes substantial contributions from the United States Global Change Research Program (USGCRP), a program mandated by Congress in the Global Change Research Act to "assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change."[12]

In 2009, based primarily on the scientific assessments of the USGCRP, the National Research Council, and the Intergovernmental Panel on Climate Change (IPCC), the USEPA issued a finding deeming it reasonable to assume that changes in climate caused by elevated concentrations of GHG in the atmosphere endanger the health and welfare of current and future generations.[13] By the summer of 2016, the USEPA acknowledged that scientific assessments by that time "highlight the urgency of addressing the rising concentration of carbon dioxide (CO_2) in the atmosphere" and formally announced that GHG emissions from certain classes of aircraft engines contribute to climate change.[14,15]

Worldwide emissions of GHG in 2014 were 45.7 billion tons of carbon dioxide equivalent (CO_{2e}) per year.[16] This value includes ongoing emissions from industrial and agricultural sources. In 2016, the United States

[12] Global Change Research Act of 1990, Pub. L. 101–606, Sec. 103 (November 16, 1990), http://www.globalchange.gov
[13] Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496 (December 15, 2009).
[14] USEPA, Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units, 80 Fed. Reg. 64661, 64677 (October 23, 2015).
[15] USEPA finalized findings that GHG emissions from certain classes of engines used in aircraft contribute to the air pollution that causes climate change endangering public health and welfare under section 231(a) of the Clean Air Act.
[16] Climate Analysis Indicator Tool. Accessed July 20, 2018, at http://cait.wri.org/

emitted about 6,511 million metric tons of CO_{2e}. Total U.S. emissions have increased by 2.4 percent from 1990 to 2016, and emissions decreased from 2015 to 2016 by 1.9 percent (126.8 million metric tons of CO_{2e}). The decrease in total GHG emissions between 2015 and 2016 was driven in large part by a decrease in CO_{2e} emissions from fossil fuel combustion. The decrease in CO_{2e} emissions from fossil fuel combustion was a result of multiple factors, including substitution from coal to natural gas and other non-fossil energy sources in the electric power sector; and warmer winter conditions in 2016 resulting in a decreased demand for heating fuel in the residential and commercial sectors.[17]

Of the five major sectors nationwide—residential and commercial, industrial, agriculture, transportation, and electricity—electricity accounts for the highest fraction of GHG emissions (approximately 28 percent), closely followed by transportation (approximately 28 percent) and by industry (approximately 22 percent).[18] The most recent USEPA data indicate that in 2016, aircraft accounted for 9.1 percent of U.S. transportation GHG emissions and 2.6 percent of total U.S. GHG emissions.[19]

3.3.1 Regulatory Context

Although no federal standards exist for aviation-related GHG emissions, it is accepted that GHG emissions can affect climate.[20] Following procedures detailed in FAA's 1050.1F Desk Reference, FAA's policy is that GHG emissions should be quantified in a NEPA document when there is a reason to quantify emissions for air quality purposes or when changes in the amount of aircraft fuel used are computed/reported. Because air pollutant/pollutant precursor emissions and fuel burn were estimated for the Existing Fly Quiet, Proposed Interim Fly Quiet, and Revised Interim Fly Quiet 1 and 2, GHG inventories were prepared.

3.3.2 Climate for Existing Fly Quiet

The following two sections of this Re-Evaluation summarize the data sources used to determine an estimate of fuel burn and GHG emissions associated with the Existing Fly Quiet.

3.3.2.1 Data Sources

The same data sources and assumptions described in **Section 3.2.2** were used to obtain fuel burn rates and GHG emissions associated with the Existing Fly Quiet.

3.3.2.2 Analysis and Results

For the EIS and the 2015 Re-Evaluation, estimates of aircraft-related GHG emissions were calculated using fuel use rates obtained from FAA's Emissions Dispersion Modeling System (EDMS), which has been replaced with the AEDT. As stated in **Section 3.2** of this Re-Evaluation, use of AEDT is required when preparing emissions modeling for FAA-related actions. In addition to providing estimates of criteria pollutant/pollutant precursor emissions, the AEDT also provides corresponding estimates of aircraft-related fuel burn and CO_2. The fuel burn estimates for the Existing Fly Quiet were used to estimate metric tons of CO_2. Using this methodology, the estimated level of GHG emissions with the Existing Fly Quiet is

[17] USEPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016, April 2018, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2016

[18] USEPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016, April 2018, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2016

[19] USEPA, Regulations for Greenhouse Gas Emissions from Aircraft, June 2018, https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-aircraft.

[20] FAA Order 1050.1F and Desk Reference.

117,456 metric tons of CO_2; again, this only includes nighttime aircraft operations within the aircraft operational mode of ground travel taxi/queue.

3.3.3 Climate for Proposed Interim Fly Quiet

The next two sections of this Re-Evaluation summarize the data sources used to determine fuel burn and GHG emissions for the Proposed Interim Fly Quiet.

3.3.3.1 Data Sources

The same data sources and assumptions described in **Section 3.2.3** were used to obtain fuel burn rates and GHG emissions associated with the Proposed Interim Fly Quiet.

3.3.3.2 Analysis and Results

Using the methodology from the Existing Fly Quiet, the estimated level of GHG emissions for the Proposed Interim Fly Quiet is 118,584 metric tons of CO_2.

3.3.4 Change in GHG Emissions

Based on estimates of GHG emissions for the Existing Fly Quiet and the Proposed Interim Fly Quiet, the latter would result in an increase of 1,129 metric tons of CO_{2e}. This level of emissions, compared to the 6,511 million metric tons of CO_2 within the U.S. during 2016, indicates that the Proposed Interim Fly Quiet GHG emissions would represent approximately 0.00002 percent of total GHG emissions generated in the U.S.

3.4 CUMULATIVE IMPACTS

The purpose of cumulative impacts analysis is to disclose the potential of the Proposed Interim Fly Quiet to contribute to significant cumulative impacts when considered in combination with the effects of other past, present, and reasonably foreseeable future actions. Council on Environmental Quality (CEQ) regulations implementing the NEPA, 40 CFR §1508.7, define cumulative effects as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." This section summarizes the analysis of cumulative impacts as follows:

- Potentially Affected Resources – describes the resources that could be affected by the interim conditions.
- Past, Present, and Reasonably Foreseeable Projects – identifies other projects that could contribute to cumulative impacts.
- Conclusions – summarizes the findings of the cumulative impacts analysis.

3.4.1 Potentially Affected Resources

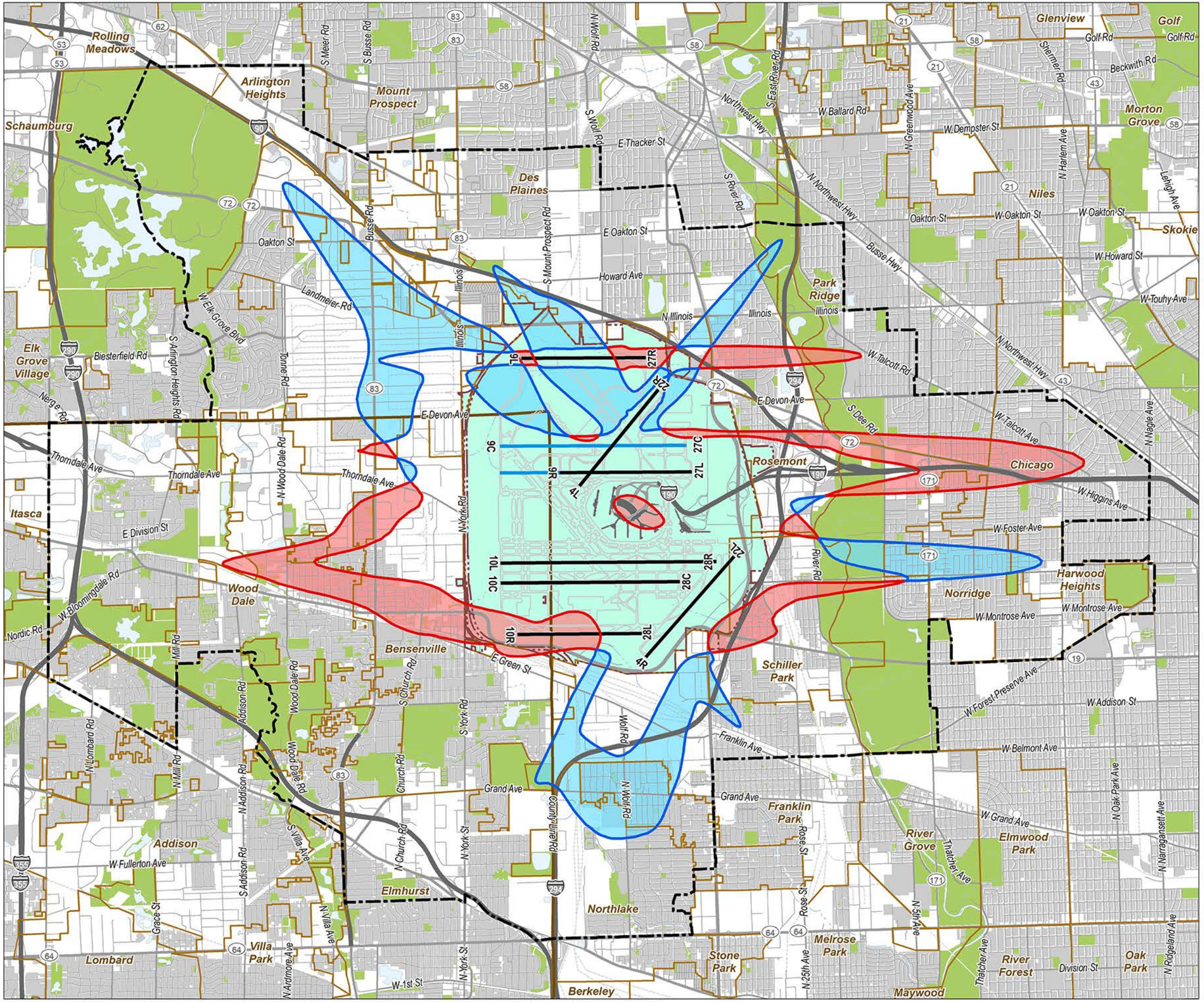
To contribute to cumulative impacts, implementation of the Proposed Interim Fly Quiet must itself affect an environmental resource when compared to the Existing Fly Quiet, described in **Section 2.2.1**. Implementation of the Proposed Interim Fly Quiet would not entail physical development; therefore, all potential effects of implementation are related to the changes in the nighttime preferential runway use suggested by the Proposed Interim Fly Quiet. As described in **Section 1.2**, the Proposed Interim Fly Quiet

has the potential to affect noise and noise compatible land use, air quality, and climate. Impacts to these resources might also disproportionately affect minority and low-income populations.

3.4.1.1 Noise and Land Use

Exhibit 3-9 shows noise contours for Build Out compared to the same time period in the future if the OMP did not occur. **Exhibit 3-10** shows noise contours for the Proposed Interim Fly Quiet compared to the Existing Fly Quiet. The Proposed Interim Fly Quiet would increase noise exposure, compared to the Existing Fly Quiet, in four areas described below.

- Northeast of Runway 4R/22L in the vicinity of Des Plaines and Park Ridge
- East of Runway 10C/28C in the vicinity of Norridge and Harwood Heights
- South of Runway 4R/22L roughly between Bensenville, Northlake, and Franklin Park
- West of Runway 10L/28R in the vicinity of Itasca, Wood Dale, and Bensenville



Source: HMMH, Landrum & Brown, Ricondo & Associates, NearMap US Inc., Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Areas No Longer Exposed to 65 DNL
Areas Newly Exposed to 65 DNL

Project Area
Airport Boundary

Existing Runways
Runway 9C/27C - Opens Nov. 2020

Land Use

Noise Sensitive Land Use
Parks and Forest Preserves
Compatible
Water

County Boundary
Community Boundary

Highway
Primary Roads
Secondary Roads
Local Roads
Railroad Lines

0 1 2
Miles

Change in Noise Exposure Following Implementation of the OMP (Build Out)

▶ Exhibit 3-9

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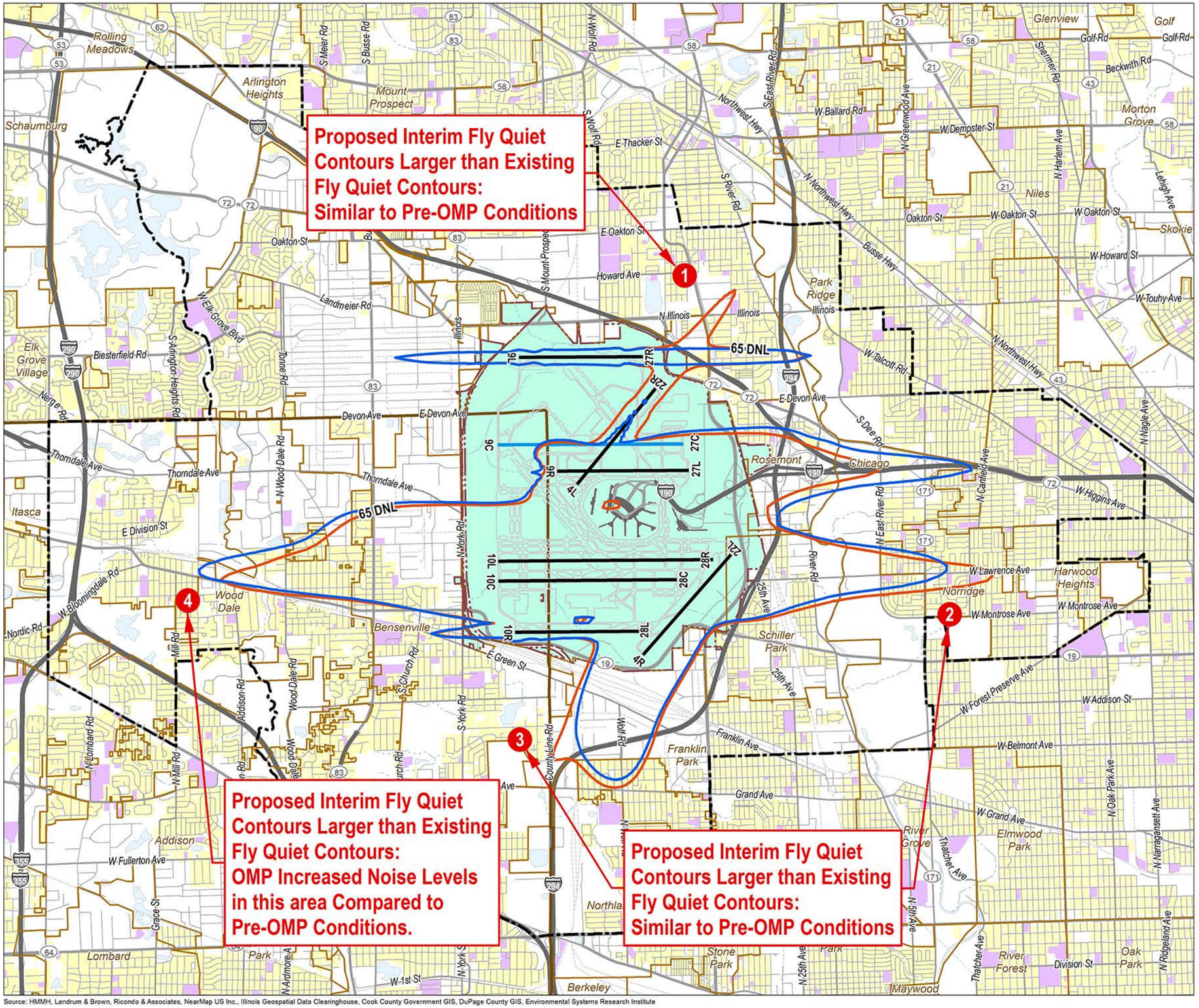

Source: HMMH, Landrum & Brown, Ricondo & Associates, NearMap US Inc., Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Existing Fly Quiet 65 DNL Noise Contour
- Proposed Interim Fly Quiet 65 DNL Noise Contour
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020

Land Use

- Residential
- Public, Hospital, Institutional
- Compatible
- Water
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1 2 Miles

Existing Fly Quiet and Proposed Interim Fly Quiet Noise Contour Comparison

▶ Exhibit 3-10

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For purposes of NEPA, a significant noise impact occurs if a proposed action causes noise-sensitive areas to experience an increase in noise of 1.5 dB or more at or above 65 DNL when compared to a no action alternative for the same timeframe.[21] Actions affecting aircraft activity in those areas would have the greatest potential to contribute to cumulative noise impacts.

3.4.1.2 Air Quality

As noted above, the Proposed Interim Fly Quiet would slightly increase air pollutants emissions compared to the Existing Fly Quiet. The number of aircraft operations, aircraft fleet mix, support equipment activities, surface traffic volumes, or traffic operating conditions would not change. Changes would be limited to the nighttime runway use during the 11 months of the Proposed Interim Fly Quiet. The resulting change in aircraft taxi times would not materially affect aircraft-related emissions, as 10 percent of total airport operations occur during the nighttime hours when the Proposed Interim Fly Quiet would be used.

As noted in **Section 2.5**, neither an air quality dispersion analysis nor geographic evaluation is warranted for EJ because the change in the nighttime use of the airfield is expected to have a minimal impact on total air pollutant emissions and is not expected to cause an exceedance of the NAAQS at receptors outside O'Hare property. The fact that concentrations of pollutants tend to be the greatest near taxiways and aircraft queues, or on major roadways adjacent to O'Hare in non-residential areas, also limits the potential for disproportionate impacts to minority or low-income populations.

3.4.1.3 Climate

As noted previously, the Proposed Interim Fly Quiet could affect the amount of time required for aircraft to land, take off, and taxi on the ground at O'Hare. These changes would also affect aircraft GHG emissions, which contribute to climate change. The analysis described in **Section 3.3.4** estimated that the Proposed Interim Fly Quiet would increase GHG emissions by 1,129 metric tons of CO_2 per year compared to the Existing Fly Quiet.

FAA has not established a threshold of significance for climate change impacts.[22] In the absence of a significance criterion, it is not possible to determine if project-related climate change impacts could contribute to a potentially significant cumulative impact to the climate.

3.4.1.4 Environmental Justice

Noise and air quality impacts could disproportionately affect minority and/or low-income populations, a topic that is addressed in Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

A significant noise or air quality impact in an area with a high proportion of minority and/or low-income populations could contribute to cumulative impacts in this area if other past, present, or reasonably foreseeable actions have also increased noise and/or air quality impacts in those areas.

Noise. As shown in **Exhibit 3-10**, implementation of the Proposed Interim Fly Quiet would increase noise in the following areas compared to the Existing Fly Quiet.

[21] FAA Order 1050.1F Exhibit 4-1.
[22] Ibid.

- Northeast of Runway 4R/22L in the vicinity of Des Plaines and Park Ridge
- East of Runway 10C/28C in the vicinity of Norridge and Harwood Heights
- South of Runway 4R/22L roughly between Bensenville, Northlake, and Franklin Park
- West of Runway 10L/28R in the vicinity of Itasca, Wood Dale, and Bensenville

Air Quality. As noted above, while the Proposed Interim Fly Quiet would slightly increase air pollutants emissions compared to the Existing Fly Quiet, these emissions would affect regional rather than local air quality and would not disproportionately affect any individual area in the vicinity of O'Hare. The emissions dispersion analysis summarized in **Section 3.2.3.2** determined that total pollutant concentrations (including background) due to the Proposed Interim Fly Quiet would be less than the NAAQS for all pollutants at all receptors. The fact that concentrations of pollutants tend to be the greatest near taxiways and aircraft queues, or on major roadways adjacent to O'Hare in non-residential areas, limits the potential for disproportionate impacts to minority or low-income populations.

3.4.2 Past, Present, and Reasonably Foreseeable Future Projects

The Proposed Interim Fly Quiet could begin in November 2019 and continue through January 2021. To contribute to cumulative impacts, other actions must affect the environment during this period. This analysis defines past, present, and reasonably foreseeable future actions as follows:

- Past actions include the OMP and other actions completed after the ROD was issued in 2005. To contribute to a potential cumulative effect, the operational effects of any past actions must continue past November 2019. Although the impacts of the Proposed Interim Fly Quiet are defined as changes from the Existing Fly Quiet, the consideration of cumulative impacts must consider the effects of past actions that are reflected in the Existing Fly Quiet.
- Present actions are currently being implemented and will affect the environment through construction and/or operation during the period between November 2019 and January 2021.
- Future actions have not yet been implemented, but implementation and the associated construction and/or operation effects are expected to occur during the period between November 2019 and January 2021.

O'Hare operations have produced both positive and negative environmental impacts, which have changed and will continue to change over time. An analysis of 73 past, present, and reasonably foreseeable projects indicates that no significant cumulative impacts beyond those previously disclosed in the EIS would occur as a result of the Proposed Interim Fly Quiet (see **Appendix G**).

3.4.2.1 FAA Air Airspace and/or Air Traffic Control Actions

The 2015 Re-Evaluation investigated cumulative impacts of 17 FAA Air Traffic Control procedural changes proposed or implemented following the OMP ROD. Another two received separate NEPA approvals and do not have the potential to contribute to cumulative impacts in combination with the Proposed Interim Fly Quiet. This analysis of cumulative impacts reexamines the effects of those procedural changes to assess their potential to contribute to cumulative impacts when considered in combination with the Proposed Interim Fly Quiet.

3.4.2.2 Chicago Department of Aviation Projects

The EIS examined the potential for 101 past, present, and reasonably foreseeable future actions to contribute to cumulative impacts. The 2015 Re-Evaluation re-examined these and other projects to determine whether changes in the OMP runway phasing would contribute to cumulative impacts that were not disclosed in the EIS. The 2015 Re-Evaluation found that many of those projects no longer had the potential to contribute to potentially significant cumulative impacts because their construction-related effects had ended with the completion of construction.

This cumulative impact analysis includes the effects of the OMP and 36 CDA projects approved or planned after the ROD was issued. Most of these projects were planned following the 2015 Re-Evaluation. The post-OMP projects include eight airfield projects for runway and taxiway reconstruction, taxiway modifications, and terminal ramp improvements. The remaining projects consist of three surface transportation and parking projects, seven drainage and/or utility projects, four commercial or tenant developments, six terminal area projects, and eight other projects of various types.

3.4.2.3 Projects by Others

The EIS examined the potential contributions to cumulative impacts from 26 projects by state and local agencies. The 2015 Re-Evaluation re-examined these projects to determine whether changes in the OMP runway phasing would alter the previous cumulative impacts analysis. That analysis concluded that those projects would have little potential to contribute to significant impacts in combination with the revised runway construction phasing.

This cumulative impact analysis includes 19 projects by other agencies that were approved after the ROD was issued. Most of these projects are transportation projects undertaken by the Illinois Department of Transportation (IDOT), the Illinois State Toll Highway Authority, or the Chicago Region Environmental and Transportation Efficiency (CREATE) Program. These projects include six projects reviewed in the 2015 Re-Evaluation and an additional 13 projects not identified at that time. These additional projects are located within five miles of the center of O'Hare, an area that contains the 65 DNL contours for Proposed Interim Fly Quiet and Existing Fly Quiet and all modeled air quality pollutant concentration analysis points.

3.4.3 Conclusions

The following evaluation of the past, present, and reasonably foreseeable future actions described in the previous section assesses the potential for these projects to contribute to potentially significant cumulative impacts when considered in combination with the effects of the Proposed Interim Fly Quiet. **Appendix G** summarizes and offers conclusions about the effects of the past, present, and reasonably foreseeable actions included in this investigation.

3.4.3.1 FAA Air Airspace and/or Air Traffic Control Actions

None of the 19 FAA procedural changes included in this analysis have the potential to contribute to cumulative impacts when considered in combination with the Proposed Interim Fly Quiet. In some cases, the action has been completed without ongoing effects. In other cases, the Air Traffic Control actions have been superseded by other procedures reflected in the Existing Fly Quiet. No other FAA airspace and/or Air Traffic Control actions with the potential to contribute to cumulative noise, air quality, environmental justice, or climate impacts when considered in combination with the Proposed Interim Fly Quiet have been identified.

3.4.3.2 Chicago Department of Aviation Projects

CDA projects approved or planned after the ROD was issued were reviewed to determine if they were consistent with the ROD or if they required new NEPA approvals. Of the 36 CDA projects included in this analysis, 17 were determined to conform to the assumptions of the EIS and would not contribute to cumulative impacts. Another 11 received separate NEPA approvals, four were past actions that no longer have the potential to contribute to cumulative impacts in combination with the Proposed Interim Fly Quiet, and four are not considered to be reasonably foreseeable.

Potential Cumulative Noise Impacts. As previously shown in **Exhibit 3-9**, implementation of the OMP increased noise in areas aligned with the east/west runways at O'Hare. The intent of both the Existing Fly Quiet and the Proposed Interim Fly Quiet is to reduce noise exposure in some of the areas experiencing increased noise as a result of the OMP. The following analysis discloses the potential for the Proposed Interim Fly Quiet to contribute to cumulative impacts when considered in combination with the effects of the OMP. As shown in **Exhibit 3-10**, the Proposed Interim Fly Quiet would increase noise compared to the Existing Fly Quiet in four areas.

1. Northeast of Runway 4R/22L in the vicinity of Des Plaines and Park Ridge. The Proposed Interim Fly Quiet would increase noise exposure in this area compared to the Existing Fly Quiet. As shown in **Exhibit 3-9**, the OMP decreased noise exposure in this area; the Proposed Interim Fly Quiet would result in conditions similar to pre-OMP conditions for the duration of the Proposed Interim Fly Quiet.
2. East of Runway 10C/28C in the vicinity of Norridge and Harwood Heights. The Proposed Interim Fly Quiet would increase noise exposure in this area compared to the Existing Fly Quiet. As shown in **Exhibit 3-9**, the OMP decreased noise exposure in this area; the Proposed Interim Fly Quiet would result in conditions similar to pre-OMP conditions for the duration of the Proposed Interim Fly Quiet.
3. South of Runway 4R/22L roughly between Bensenville, Northlake, and Franklin Park. As in the previous two areas, the Proposed Interim Fly Quiet would increase noise exposure compared to the Existing Fly Quiet. As shown in **Exhibit 3-9**, the OMP decreased noise exposure in this area; the Proposed Interim Fly Quiet would result in conditions similar to pre-OMP conditions for the duration of the Proposed Interim Fly Quiet.
4. West of Runway 10L/28R in the vicinity of Itasca, Wood Dale, and Bensenville. The Proposed Interim Fly Quiet would increase noise exposure in a thin corridor compared to the Existing Fly Quiet. That area falls along the rail corridor in the vicinity of Wood Dale. As shown in **Exhibit 3-9**, the OMP increased noise exposure in this area, indicating that the Proposed Interim Fly Quiet could contribute to cumulative noise impacts when considered in combination with the OMP. **Exhibit 3-10** shows that land use in this area is compatible with noise levels of 65 DNL.

CDA projects would need to be located very close to the areas noted above to contribute to significant cumulative noise impacts. To illustrate the relatively narrow scope for cumulative noise impacts, a project that increased noise levels at a specific location would need to generate noise levels within 4 dB of the aircraft noise levels to cause a 1.5 dB increase in cumulative DNL.[23] Such projects would therefore need to be located within 4 dB of the Proposed Interim Fly Quiet 65 DNL contour, and also in areas where

[23] Due to the logarithmic nature of decibel addition, adding two equal sound levels increases cumulative level by 3 db. The greater the difference in sound levels, the smaller the increase. Adding two levels differing by 1 db increases the total by 2.5 db over the louder source; adding levels that differ by 2 db increases the total by 2.1 db; adding levels that differ by 3 db increases the total by 1.8 db; and adding levels that differ by 4 db increases the total by 1.5 db. To cause a cumulative increase of 1.5 db, annual average project related sound levels would need to be no more than 4 db lower than the annual average aircraft noise levels at the project location.

implementation of the Proposed Interim Fly Quiet would increase noise compared to the Existing Fly Quiet (see **Exhibit 3-10**). Given the rapid attenuation of noise from ground-based sources, the area in which a 1.5 dB increase could result in a cumulative noise level of 65 DNL or greater is very small.

Potential Cumulative Air Quality Impacts. The air quality analysis documented in **Section 3.2.3.2** calculated that implementation of the Proposed Interim Fly Quiet would increase criteria air pollutant emissions slightly compared to the Existing Fly Quiet. As noted in the previous section, O'Hare is in Cook and DuPage counties, which are listed as being marginal nonattainment for the 2015 O_3 standard. The Proposed Interim Fly Quiet would increase emissions of O_3 precursors by one ton/year of VOC and two tons/year of NOx. Both of these increases are well below the de minimis level of 100 tons/year that would trigger the need for a determination under the General Conformity Rule. All other CDA past, present, and reasonably foreseeable future projects included in this analysis were found to be consistent with the OMP or to have no potential to contribute to cumulative impacts. The analysis of pollutant concentrations documented in **Section 3.2.3.2** determined that Proposed Interim Fly Quiet-related pollutant concentrations would be less than the NAAQS at all modeling points. These points are located on or in the vicinity of O'Hare and would not affect sensitive receptors. These areas are not likely to be the sites of projects that would generate ongoing operational emissions.

Potential Cumulative Climate Impacts. In the absence of an established significance threshold, it is not possible to determine if project-related climate change impacts could contribute to a potentially significant cumulative impact to the climate.

3.4.3.3 Projects by Others

This analysis examined the potential contributions of 18 transportation projects undertaken by the IDOT,[24] the Illinois State Toll Highway Authority, or the CREATE Program located within five miles of O'Hare. This radius encompasses the Proposed Interim Fly Quiet noise contours shown in **Exhibit 3-10** and also includes areas most likely to experience high concentrations of criteria pollutants. This analysis also considers whether ongoing community development in the area could contribute to cumulative impacts when considered in combination with the Proposed Interim Fly Quiet.

Potential Cumulative Noise Impacts. The possibility that these projects would contribute to significant cumulative noise impacts is remote. As noted previously for the CDA projects, a surface transportation project that increased or introduced traffic in a given location would need to generate noise levels within 4 dB of the aircraft noise levels to cause a 1.5 dB increase in cumulative noise. The rapid attenuation of noise from ground-based sources limits the area in which a 1.5 dB increase could result in a cumulative noise level of 65 DNL (or greater).

Potential Cumulative Air Quality Impacts. Transportation projects are not likely to contribute to significant air quality impacts because their intention was to reduce congestion and delay, thus reducing air pollutant emissions. In addition, the small increase in emissions resulting from implementation of the Proposed Interim Fly Quiet, compared to the Existing Fly Quiet, means that any contributing source would need to generate very high levels of air pollutant emissions to exceed the de minimis levels that would trigger the need for a Conformity Determination. Similarly, emissions from ongoing community development would need to be much greater than those of the Proposed Interim Fly Quiet to contribute to significant cumulative air quality impacts.

[24] Does not includes IDOT projects within five miles of O'Hare not planned for construction at some unspecified time after 2019.

Potential Cumulative Climate Impacts. As noted above, transportation projects are intended to maintain existing infrastructure or to reduce congestion and delay and would likely reduce GHG emissions. Also, in the absence of an established significance threshold, it is not useful to attempt to determine the significance of cumulative climate change impacts.

3.5 ENVIRONMENTAL JUSTICE

This section summarizes the selection process for areas of EJ concern associated with implementation of Proposed Interim Fly Quiet and provides estimates of the EJ populations potentially affected. **Section 2.5** presented the methodology and data sources; this section presents the results. The full analysis is presented in **Appendix D**.

3.5.1 Identification and Selection of Reference Community

To identify specific census blocks and block groups that would be areas of EJ concern, a particular reference community is first chosen. For this Re-Evaluation, the combined Cook and DuPage County area is the reference community; it specifically consists of the aggregated population of those census blocks and block groups that lie within Cook and DuPage Counties in northeastern Illinois. The project area (**Figure 3-1**) lies partially within Cook and DuPage Counties.

Exhibit 3-11 presents the geographical extent of the project area along with census tracts, blocks, and block groups. **Table 3-10** presents the demographic data of the population residing within the reference community with respect to race and ethnicity. **Table 3-11** presents demographic data of the same population with respect to income and poverty. The data in **Table 3-10** is from the 2010 Census, for which the smallest geographical unit of measure is the census block. For **Table 3-11**, the data is from the 2012–16 Five Year American Community Survey (ACS), for which the smallest unit of measure is the census block group (which is larger than the census block). Since these two datasets are from different time periods and employ different geographical units, the population counts in **Tables 3-10** and **3-11** do not match.[25] **Exhibits 3-12**, **3-13**, and **3-14** indicate whether a census block or block group lying within the project area is an area of EJ concern with respect to race/ethnicity (**Exhibit 3-12**), income/poverty level (**Exhibit 3-13**), or either (**Exhibit 3-14**).

To allow for context, **Tables 3-10** and **3-11** provide selected demographic characteristics, in a descending hierarchy of geographical units, from the United States down to the area within the 65 DNL contour for Existing Fly Quiet and Proposed Interim Fly Quiet. The reference community for this analysis is shown as a highlighted band on the tables. Within the project area, census blocks, and block groups whose minority percentage either exceeded 50 percent, or exceeded the percentage in the reference community, were identified for further analysis. **Tables 3-10** and **3-11** also show the community of comparison, for which a more detailed description is provided in the next section.

[25] Additionally, the population counts for persons residing within the 65 DNL contours for Existing Fly Quiet and Proposed Interim Fly Quiet, would not match between Tables 3-10 and 3-11. This is because the counts are based on blocks or block groups that intersect with a contour. No attempt was made to "clip" the block or block groups to the contours or otherwise adjust the population within a block or block group to reflect the proportion of the block or block group actually contained in the contour.

3.5.2 Identification and Selection of the Community of Comparison

Once specific EJ areas of concern were identified by comparison to the reference community, the next step was to compare potential impacts experienced by specific EJ areas of concern with an identified community of comparison. For this analysis, the community of comparison was the area within the 65 DNL contour for Existing Fly Quiet. This area serves as a baseline for comparing noise impacts that would result from Proposed Interim Fly Quiet. A comparison of the characteristics of those census blocks/block groups where a 1.5 dB change of noise exposure would occur with Proposed Interim Fly Quiet was made to the combined characteristics of the area within the 65 DNL contour of Existing Fly Quiet. That comparison was made to determine whether impacts would be disproportionately borne by areas of EJ concern.

A census block or block group whose EJ population that either exceeded 50 percent ("predominately borne by" test) or exceeded by greater than 10 percent ("meaningfully greater"analysis) the EJ population of the community of comparison would be considered to have a minority and/or low-income population bearing disproportionately high and adverse environmental effects. No authoritative guidance defines the magnitude at which an EJ population is meaningfully greater than that of the community of comparison. This choice of 10 percent as the margin for identifying when an exceedance is meaningfully greater is a matter of agency discretion and application of professional judgement. Guidance from the Federal Interagency Working Group on Environmental Justice & NEPA Committee indicates a benchmark exceedance of between 10 to 20 percent would an appropriate indicator of meaningfully greater.[26]

3.5.3 Identification of Specific EJ Communities Experiencing Potentially Significant Impacts

Tables 3-12 and **3-13** and **Exhibits 3-15** through **3-18** present in tabular and graphical form those census blocks and block groups where a potentially significant impact may occur (i.e., within the Existing Fly Quiet or Proposed Interim Fly Quiet 65 DNL noise contour and experiencing a 1.5 dB change in exposure) whose EJ populations equal or exceed that of the community of comparison.

For each table, the presence of a census block or block group with associated population counts within the 65 DNL contour indicates that a census block or block group has one or more points for which change of noise exposure of 1.5 dB or greater is anticipated (i.e., a signficant impact). However, the population counts in the tables are for the entire block or block group, not just the portion exposed to 65 DNL or a 1.5 dB change. See **Section 3.5.4** for detailed estimates of populations (based on CDA Residential Sound Insulation Program (RSIP) dwelling unit data, applying the demographic characteristics of the entire census block or block group) within these particular geographic units that are anticipated to experience a 1.5 dB change of exposure.

[26] *Promising Practices for EJ Methodologies in NEPA Reviews: Report of the Federal Interagency Working Group on Environmental Justice & NEPA Committee*, March 2016, page 25.

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Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

2010 Census Blocks
2010 Census Block Groups
Project Area
Airport Boundary
Existing Runways
Runway 9C/27C - Opens Nov. 2020
County Boundary
Community Boundary
Highway
Primary Roads
Secondary Roads
Local Roads
Railroad Lines

0 1 2
Miles

Census Blocks and Census Block Groups within Cook and DuPage Counties, Illinois

▶ Exhibit 3-11

Source: HMMH 2018, USCB 2016, USCB 2010

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TABLE 3-10
RACE/ETHNICITY DEMOGRAPHIC CHARACTERISTICS FOR THE PROPOSED INTERIM FLY QUIET REFERENCE COMMUNITY (COOK AND DUPAGE COUNTIES, ILLINOIS), THE PROJECT AREA, AND COMMUNITIES OF COMPARISON

Census Geography	Total Population	White	% White	All Other Races	% All Other Races	Hispanic	% Hispanic	Non-Hispanic	% Non-Hispanic
United States	308,745,538	196,817,552	63.75%	111,927,986	36.25%	50,477,594	16.35%	258,267,944	83.65%
Illinois	12,830,632	8,167,753	63.66%	4,662,879	36.34%	2,027,578	15.80%	10,803,054	84.20%
Combined Cook /DuPage County[1]	6,111,599	2,924,488	47.85%	3,187,111	52.15%	1,366,268	22.36%	4,745,331	77.64%
Cook County	5,194,675	2,278,358	43.86%	2,916,317	56.14%	1,244,762	23.96%	3,949,913	76.04%
DuPage County	916,924	646,130	70.47%	270,794	29.53%	121,506	13.25%	795,418	86.75%
Project Area	228,149	151,917	66.59%	76,232	33.41%	53,964	23.65%	174,185	76.35%
Existing Fly Quiet (65 DNL Contour)[2]	21,159	12,994	61.41%	8,165	38.59%	6,711	31.72%[3]	14,448	68.28%
Proposed Interim Fly Quiet (65 DNL Contour)	24,246	15,289	63.06%	8,957	36.94%	7,275	30.00%[3]	16,971	70.00%

Source: U.S. Census Bureau 2010 Decennial Census, Census Blocks

Notes:
[1] Reference community. Threshold values are enclosed in a bold outlined box.
[2] Community of comparison.
[3] Indicates value is greater than threshold (% all other races or % Hispanic) established by reference community or exceeds 50%.

Additionally, the population counts would not match between Tables 3-10 and 3-11. This is because the counts for Table 3-10 are based on census blocks and the counts for Table 3-11 are based on block groups that intersect with a contour. No attempt was made to "clip" the block or block groups to the contours or otherwise adjust the population within a block or block group to reflect the proportion of the block or block group actually contained in the contour.

TABLE 3-11
INCOME/POVERTY DEMOGRAPHIC CHARACTERISTICS FOR THE PROPOSED INTERIM FLY QUIET REFERENCE COMMUNITY (COOK AND DUPAGE COUNTIES, ILLINOIS), THE PROJECT AREA, AND COMMUNITIES OF COMPARISON

Census Geography	Total Population	Total Population in Occupied Housing Units	Number of House-holds	Average House-hold Size	Median House-hold Income	2016 HHS Poverty Guideline	IFQ Poverty Guideline (150%)	# House-holds Below Poverty Level	% House-holds Below Poverty Level
United States	318,558,162	310,482,947	117,716,237	2.64	$55,322	$18,670	$28,004	32,069,412	27.24%
Illinois	12,851,684	12,551,035	4,802,124	2.61	$59,196	$18,545	$27,818	1,232,396	25.66%
Combined Cook / DuPage County[1]	6,158,089	6,055,217	2,290,593	2.64	$60,545	$18,684	$28,026	596,953	26.06%[3]
Cook County	5,227,575	5,137,167	1,951,606	2.63	$56,902	$18,628	$27,942	544,303	27.89%
DuPage County	930,514	918,050	338,987	2.71	$81,521	$18,959	$28,439	52,650	15.53%
Project Area	214,437	212,462	78,225	2.72	$66,797	$19,208	$28,812	17,575	22.47%
Existing Fly Quiet (65 DNL Contour)[2]	50,530	50,492	18,669	2.70	$62,263	$19,253	$28,880	4,550	24.37%
Proposed Interim Fly Quiet (65 DNL Contour)	48,288	48,124	17,572	2.74	$63,000	$19,325	$28,988	4,351	24.76%

Source: U.S. Census Bureau 2012-2016 American Community Survey, Census Block Groups

Notes

[1] Reference community. Threshold value is enclosed in a bold outlined box.

[2] Community of comparison.

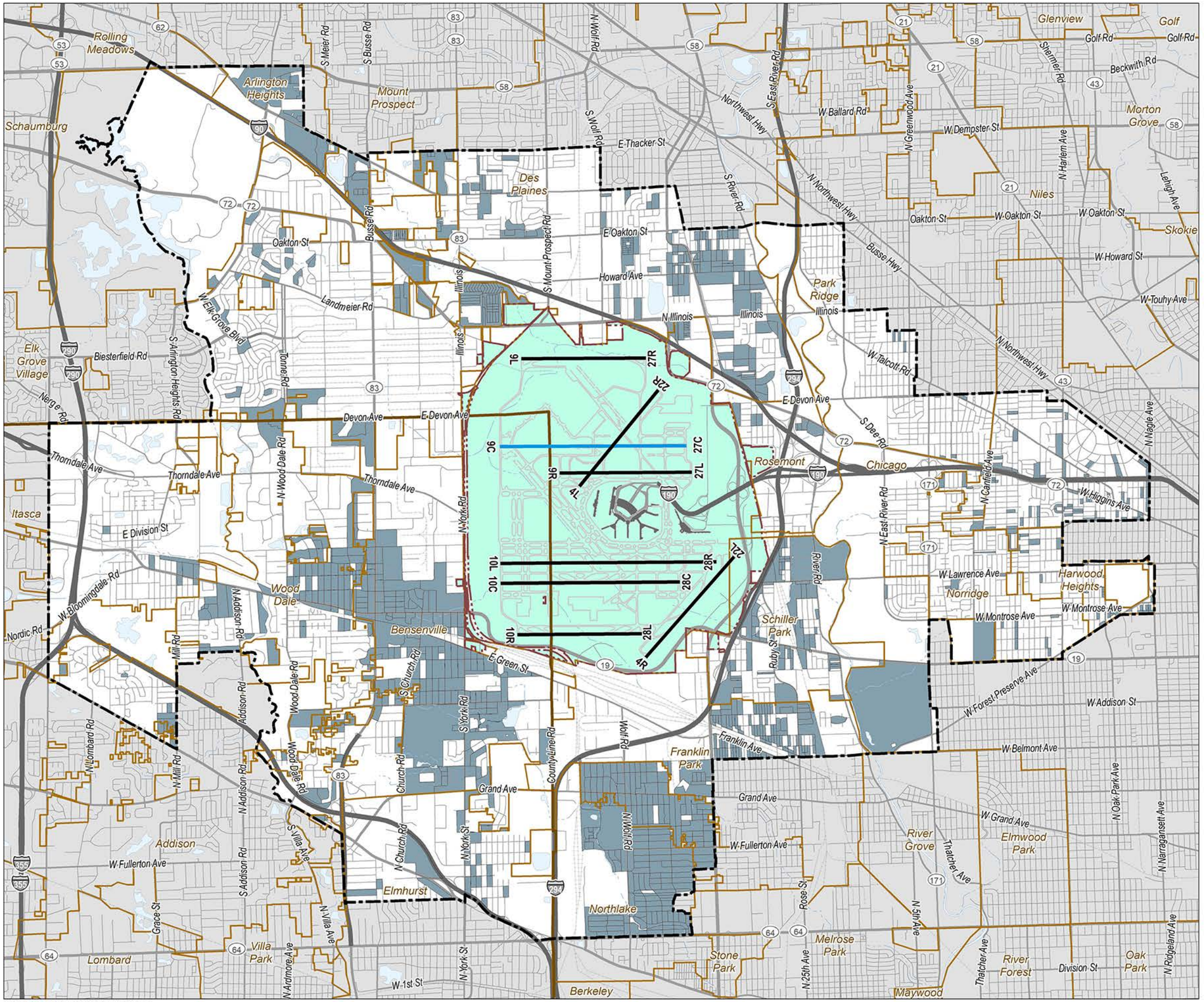
[3] Indicates value is greater than threshold (% all other races or % Hispanic) established by reference community or exceeds 50%.

[I] Within the Proposed Interim Fly Quiet project area there are 155 census block groups, of which 13 have a population, the percent of which is low-income, that exceeds the threshold of the reference community.

[II] Poverty guidelines for a census block group are adjusted from the HHS Guidelines by multiplying them by 150%, consistent with the EIS, to reflect the cost of living in Chicago.

[III] Poverty guidelines are rounded up to the nearest interval (income band) in the census data (e.g., $29,999 or $34,999) at which household income is reported in order to estimate number of households below the poverty level.

Additionally, the population counts would not match between Tables 3-10 and 3-11. This is because the counts for Table 3-10 are based on census blocks and the counts for Table 3-11 are based on block groups that intersect with a contour. No attempt was made to "clip" the block or block groups to the contours or otherwise adjust the population within a block or block group to reflect the proportion of the block or block group actually contained in the contour.



Source: HMMH 2018, USCB 2016, USCB 2010

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Census Blocks with > 50% All Other Races or > 22.36% Hispanic Population
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

0 1 2 Miles

Areas of Environmental Justice Concern with Respect to Race/Ethnicity within the Project Area

▶ Exhibit 3-12

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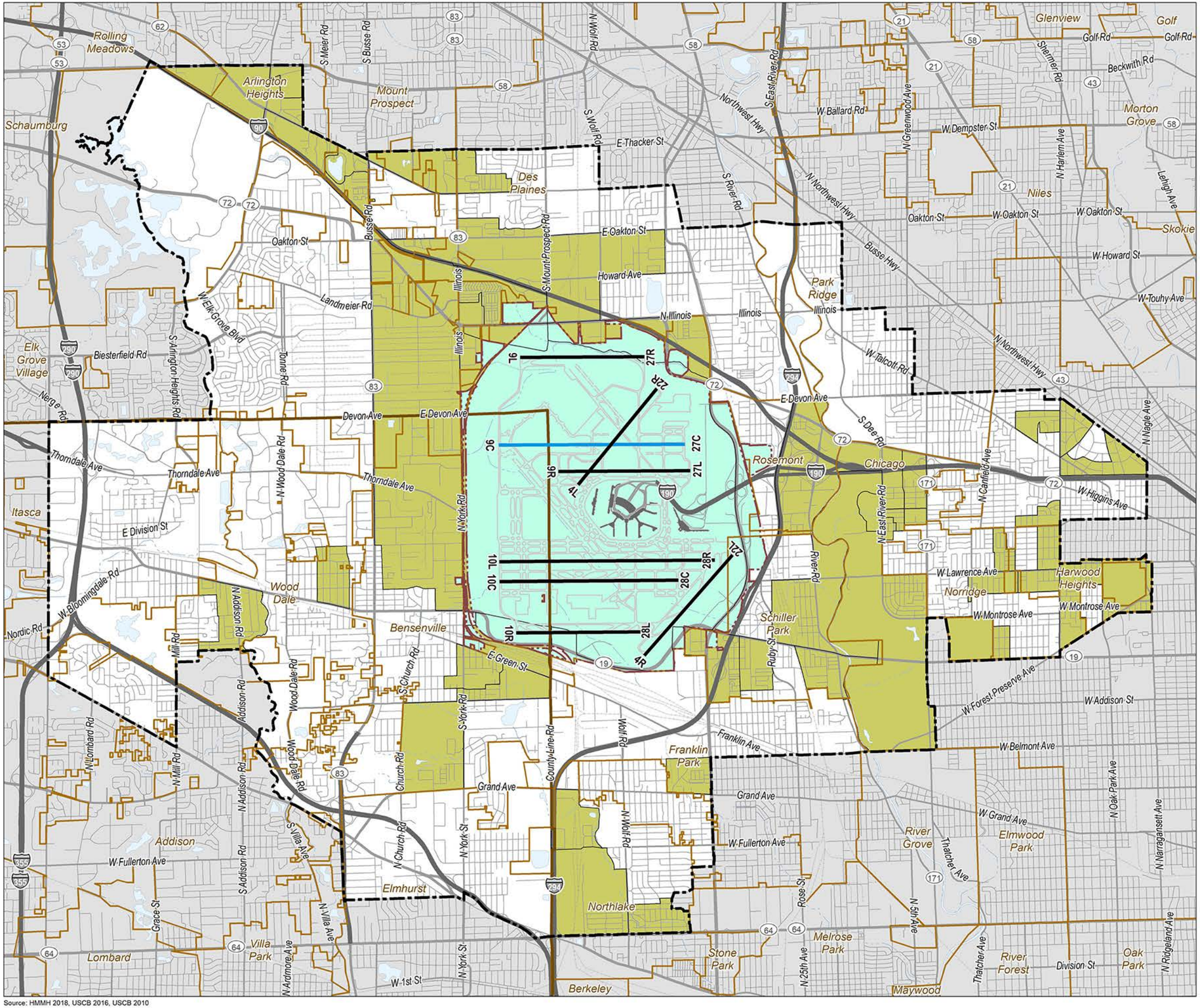

Source: HMMH 2018, USCB 2016, USCB 2010

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Census Blocks Groups of Low Income/Poverty Status
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

0 1 2
Miles

Areas of Environmental Justice Concern with Respect to Income / Poverty Status within the Project Area

▶ Exhibit 3-13

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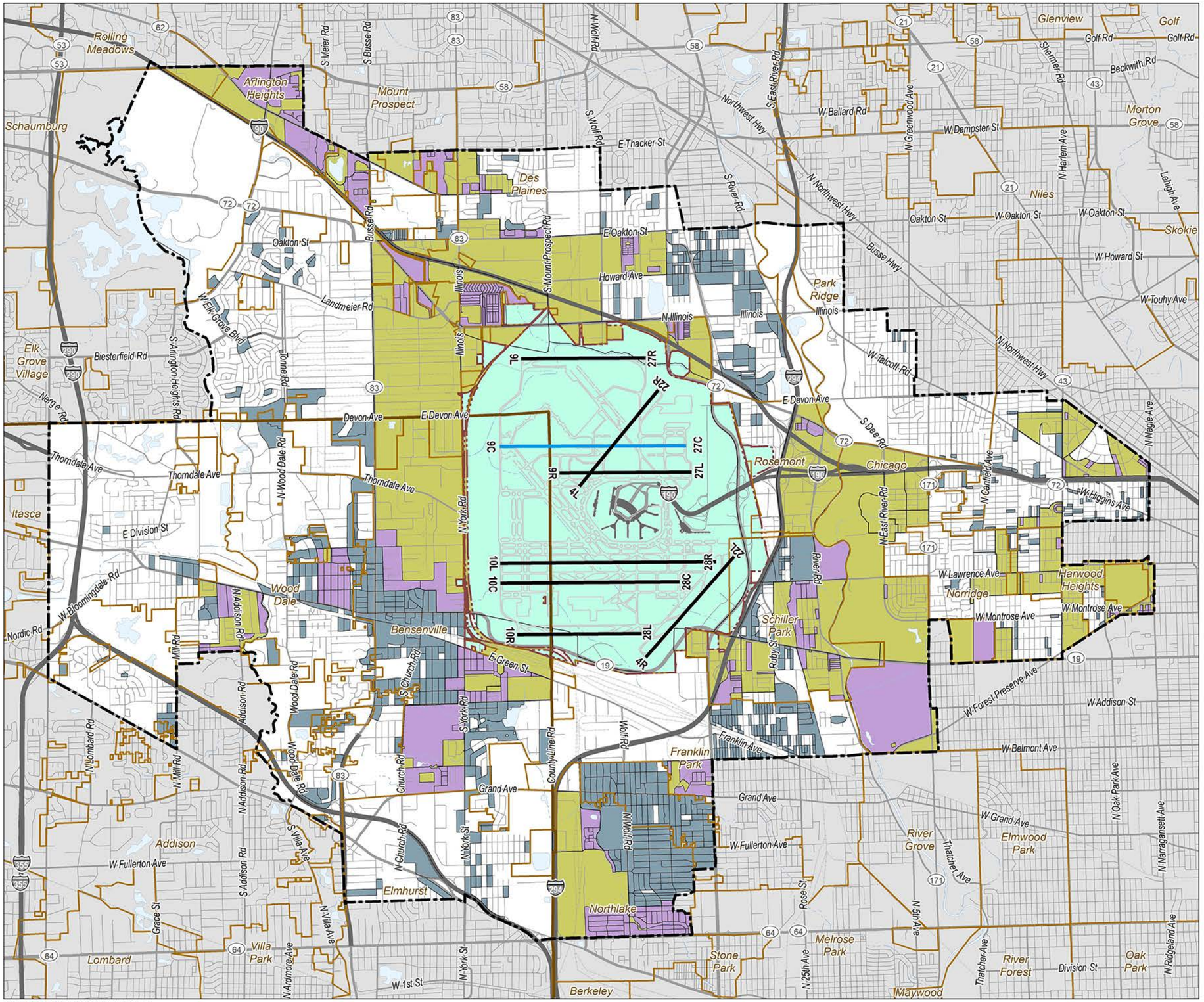

Source: HMMH 2018, USCB 2016, USCB 2010

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

- Census Blocks with > 50% All Other Races or > 22.36% Hispanic Population
- Census Blocks with > 50% All Other Races or > 22.36% Hispanic Population within Census Block Groups of Low income/Poverty Status
- Census Blocks Groups of Low Income/Poverty Status
- Project Area
- Airport Boundary
- Existing Runways
- Runway 9C/27C - Opens Nov. 2020
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines

0 1 2
Miles

Areas of Environmental Justice Concern with Respect to Both Race/Ethnicity and Income/Poverty Status within the Project Area

▶ Exhibit 3-14

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TABLE 3-12
RACE/ETHNICITY DEMOGRAPHIC CHARACTERISTICS FOR AREAS OF EJ CONCERN EXPERIENCING A POTENTIALLY SIGNIFICANT IMPACT FROM PROPOSED INTERIM FLY QUIET COMPARED TO COMMUNITY OF COMPARISON (EXISTING FLY QUIET)

Census Geography	Total Population	White	% White	All Other Races	% All Other Races	Hispanic	% Hispanic	Non-Hispanic	% Non-Hispanic
Existing Fly Quiet (65 DNL Contour) – Community of Comparison	21,159	12,994	61.41%	8,165	38.59%	6,711	31.72%	14,448	68.28%
170317706022005[3]	32	7	21.88%	25	78.13%[2]	25	78.13%[2]	7	21.88%
170317706022042[3]	122	9	7.38%	113	92.62%[2]	113	92.62%[2]	9	7.38%
170317708002027[3]	82	50	60.98%	32	39.02%[1]	21	25.61%	61	74.39%
170317708002038[3]	177	105	59.32%	72	40.68%[1]	44	24.86%	133	75.14%
170317708002043[3]	7	--	-	7	100.00%[2]	7	100.00%[2]	-	-
170318065023020[3]	129	75	58.14%	54	41.86[1]	41	31.78[1]	88	68.22%
170318066001007[3]	110	60	54.55%	50	45.45%[1]	25	22.73%	85	77.27%
170318104003033[4]	62	48	77.42%	14	22.58%	14	22.58%	48	77.42%
170318104003037[4]	3	1	33.33%	2	66.67%[2]	-	0.00%	3	100.00%
170318104003049[4]	52	37	71.15%	15	28.85%	15	28.85%	37	71.15%

Notes
[1] Census blocks that are an area of EJ concern—i.e., where the % all other races or % Hispanic population is greater than the reference community—whose value is also greater than threshold (% all other races or % Hispanic) established by community of comparison or exceeds 50%. The percentages in the community of comparison to which specific areas of EJ concern (race/ethnicity census blocks) are compared are enclosed in a bold outlined box.
[2] Census blocks that are an area of EJ concern whose value is meaningfully greater (>10%) than the threshold established by the community of comparison, or 50%. Meaningfully greater for % all other races would be greater than 48.59% and for %, Hispanic would be greater than 41.72%.
[3] Census blocks exposed to a 1.5 dB increase or greater.
[4] Census blocks exposed to a 1.5 dB decrease or greater.

For the Proposed Interim Fly Quiet, the data indicate that seven census blocks (EJ areas of concern for race/ethnicity) would experience a potentially significant increase in noise exposure. Of these, the percentage of population that are all other races (i.e., populations protected under Executive Order 12898) is meaningfully greater than that of the community of comparison in three of the blocks (170317706022005, 1703177006022042, and 170317708002043). These three same blocks also have Hispanic populations meaningfully greater than that of the community of comparison.

There are also three census blocks which would experience a potentially significant decrease in noise exposure. Of those census blocks experiencing a significant decrease, the percentage of all other races population is meaningfully greater than that of the community of comparison in one of the blocks (170318104003037).

TABLE 3-13
INCOME/POVERTY DEMOGRAPHIC CHARACTERISTICS FOR AREAS OF EJ CONCERN EXPERIENCING A POTENTIALLY SIGNIFICANT IMPACT FROM PROPOSED INTERIM FLY QUIET COMPARED TO COMMUNITY OF COMPARISON (EXISTING FLY QUIET)

Census Geography	Total Population	Total Population in Occupied Housing Units	Number of House-holds	Average House-hold Size	Median House-hold Income	2016 HHS Poverty Guide-line	Proposed IFQ Poverty Guide-line (150%)	# House-holds Below Poverty Level	% House-holds Below Proposed IFQ Poverty Level
Existing Fly Quiet (65 DNL Contour) – Community of Comparison	50,530	50,492	18,669	2.70	$62,263	$19,253	$28,880	4,550	24.37%
170317608011[4]	2,509	2,509	1,350	1.86	$58,529	$15,440	$23,161	375	27.78%[1]
170317608012[4]	1,616	1,616	822	1.97	$37,386	$15,896	$23,844	309	37.59%[2]
170317608021[4]	2,503	2,503	1,107	2.26	$55,919	$17,096	$25,645	303	27.37%[1]
170317706022[3]	2,204	2,204	619	3.56	$45,483	$22,478	$33,718	282	45.56%[2]
170317708001[3]	2,012	2,012	763	2.64	$55,787	$18,670	$28,004	257	33.68%[2]
170317707001[4]	689	689	329	2.09	$37,266	$16,393	$24,589	130	39.51%[2]

Source: U.S. Census Bureau 2012-2016 American Community Survey

Notes

(a) Poverty guidelines are rounded up to the nearest interval (income band) in the Census data (e.g., $29,999 or $34,999) at which household income is reported in order to estimate number of households below poverty level

(b) Census Block Group 170317608021 is anomalous in that a portion of this Census Block Group lies within the Proposed Interim Fly Quiet 65 DNL contour that experiences a 1.5 dB increase and a separate portion of it lies within the Proposed Interim Fly Quiet 65 DNL contour that experiences a 1.5 dB decrease.

[1] Census Blocks are an area of EJ concern—i.e., % Households below Proposed Interim Fly Quiet poverty level—whose value is also greater than threshold (% households below Proposed Interim Fly Quiet poverty level) established by the community of comparison or exceeds 50 percent. The percentage in the Community of Comparison to which specific areas of EJ concern – Income/Poverty Level (Census Block Groups) are compared is enclosed in a bold outlined box.

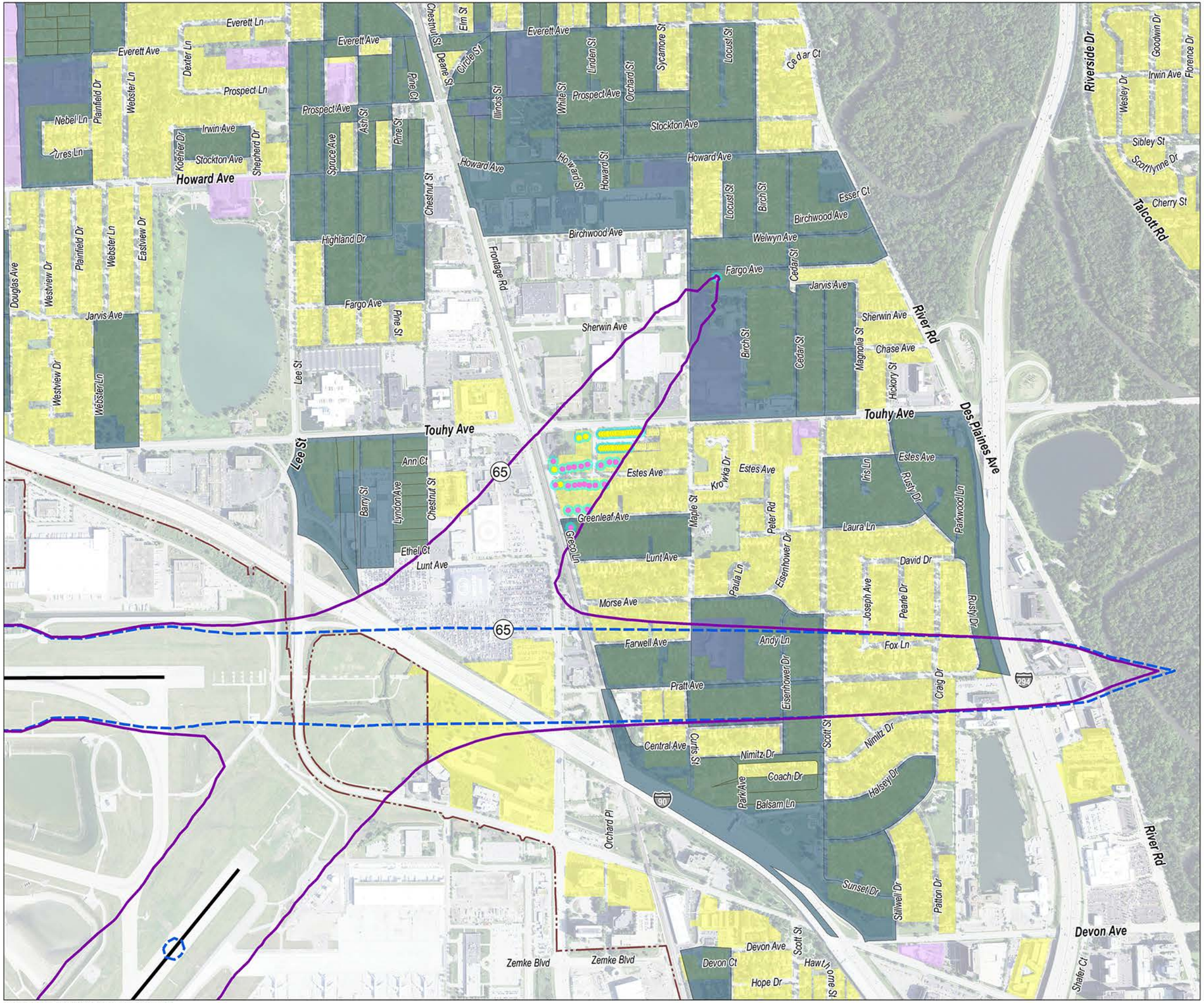
[2] Census blocks are an area of EJ concern—i.e., % households below Proposed Interim Fly Quiet poverty level—whose value is meaningfully greater (>10%) than the threshold established by the Community of Comparison or 50%. "Meaningfully greater" for % households below Proposed Interim Fly Quiet poverty level would be greater than 32.47%.

[3] Census block groups exposed to a 1.5 dB increase or greater.

[4] Census block groups exposed to a 1.5 dB decrease or greater.

For the Proposed Interim Fly Quiet, the data indicate that two census block groups (EJ areas of concern for income/poverty) would experience a potentially significant increase in noise exposure and four would experience a decrease in noise exposure of similar magnitude. In one of these two census block groups experiencing the significant noise increase, the low-income population is also meaningfully greater than that of the community of comparison (170317706022).

For those four census block groups anticipated to experience a significant decrease in noise exposure, the low-income population in two of them (170317608012 and 170317707001) is meaningfully greater than that of the community of comparison.



Source: HMMH, USCB 2010, NearMap US 2010, ESRI

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Existing Fly Quiet 65 DNL Noise Contour

Proposed Interim Fly Quiet 65 DNL Noise Contour

Census Blocks with > 50% All Other Races or > 22.36% Hispanic Population

Sound Insulated Property

Partially Insulated Property

Pending

Not Insulated

Property within 65 DNL Contour with a 1.5 dB Increase

Property within 65 DNL Contour with a 1.5 dB Decrease

Land Use

Residential

Public, Hospital, Institutional

Compatible

Water

Airport Boundary

Project Area

Current Runway Pavement

County Boundary

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1,000 2,000

Feet

Existing Fly Quiet and Proposed Interim Fly Quiet 65 DNL, Points with a Change of Exposure of 1.5 dB, and Areas of EJ Concern (Race/Ethnicity)

▶ Exhibit 3-15

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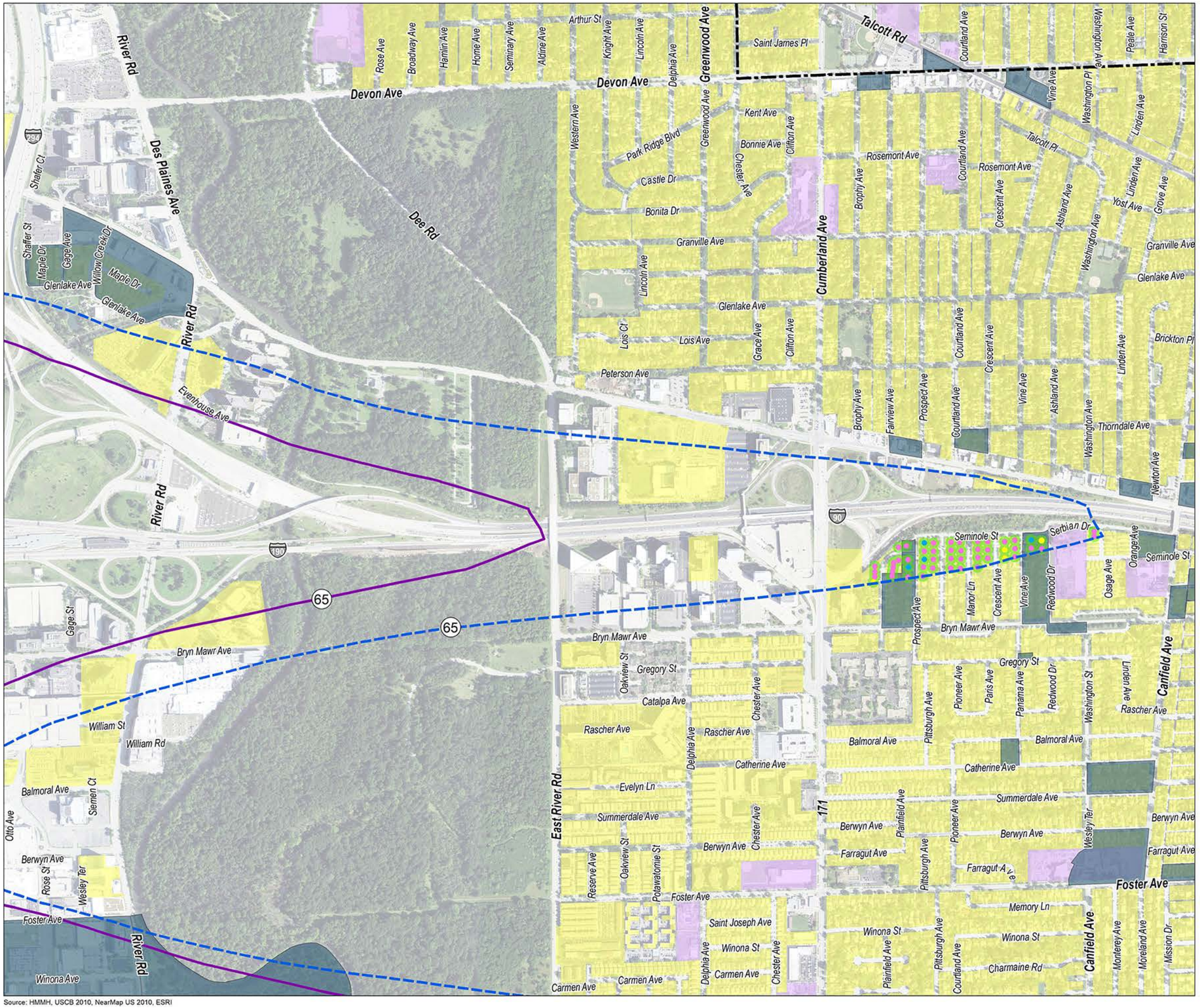

Source: HMMH, USCB 2010, NearMap US 2010, ESRI

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Existing Fly Quiet 65 DNL Noise Contour

Proposed Interim Fly Quiet 65 DNL Noise Contour

Census Blocks with > 50% All Other Races or > 22.36% Hispanic Population

Sound Insulated Property

Partially Insulated Property

Pending

Not Insulated

Property within 65 DNL Contour with a 1.5 dB Increase

Property within 65 DNL Contour with a 1.5 dB Decrease

Land Use

Residential

Public, Hospital, Institutional

Compatible

Water

Airport Boundary

Project Area

Current Runway Pavement

County Boundary

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1,000 2,000

Feet

Existing Fly Quiet and Proposed Interim Fly Quiet 65 DNL, Points with a Change of Exposure of 1.5 dB, and Areas of EJ Concern (Race/Ethnicity)

▶ Exhibit 3-16

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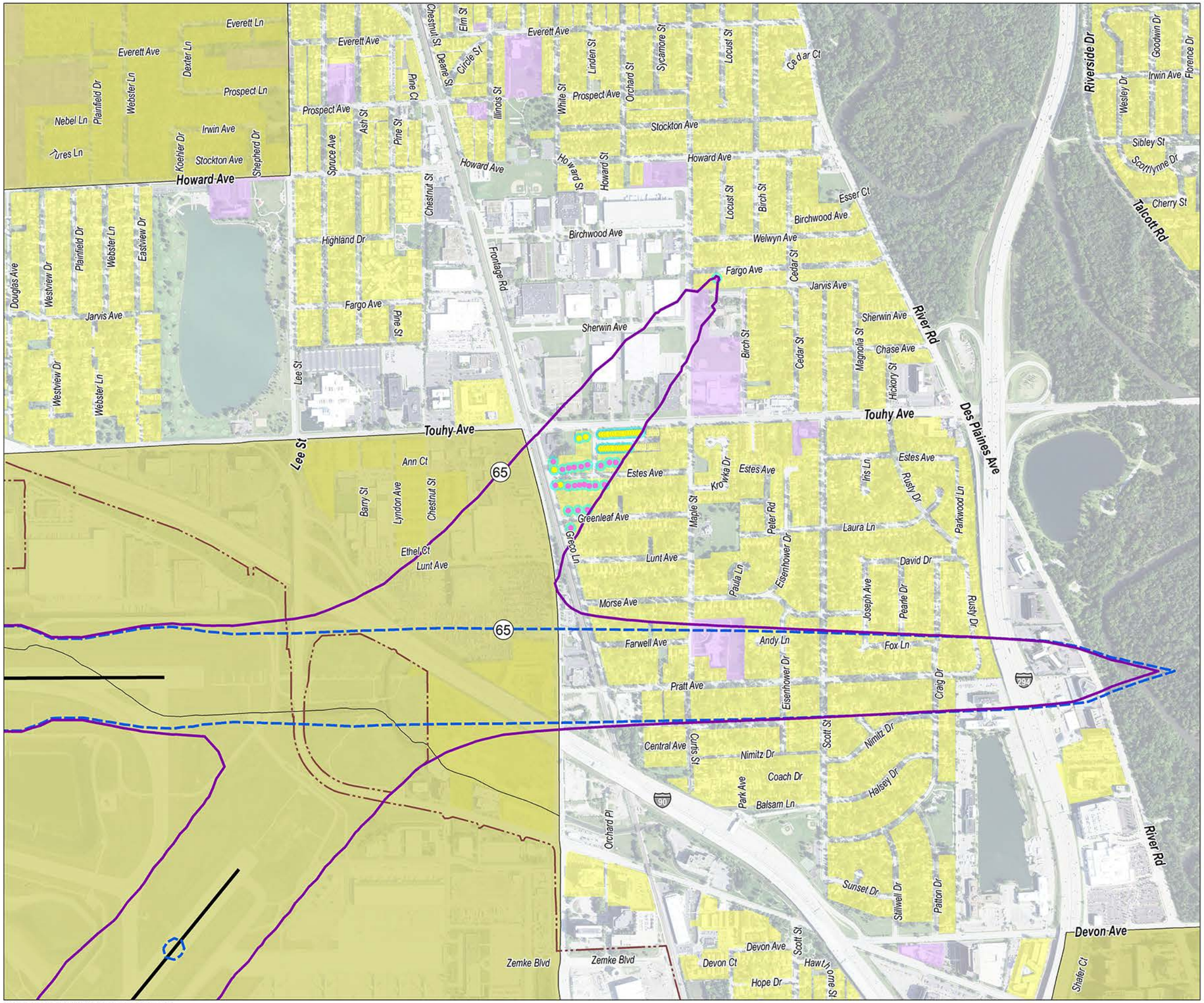

Source: HMMH, USCB 2010, NearMap US 2010, ESRI

Chicago O'Hare International Airport

Written Re-Evaluation of the O'Hare Modernization Environmental Impact Statement for the Interim Fly Quiet Runway Rotation Plan

Existing Fly Quiet 65 DNL Noise Contour

Proposed Interim Fly Quiet 65 DNL Noise Contour

Census Block Groups of Low Income/Poverty Status

Sound Insulated Property

Partially Insulated Property

Pending

Not Insulated

Property within 65 DNL Contour with a 1.5 dB Increase

Property within 65 DNL Contour with a 1.5 dB Decrease

Land Use

Residential

Public, Hospital, Institutional

Compatible

Water

Airport Boundary

Project Area

Current Runway Pavement

County Boundary

Note: DNL contours represent November 2019 to May 2020 and September 2020 to January 2021

0 1,000 2,000

Feet

Existing Fly Quiet and Proposed Interim Fly Quiet 65 DNL, Points with a Change of Exposure of 1.5 dB, and Areas of EJ Concern (Low-Income/Poverty Status)

▶ Exhibit 3-17

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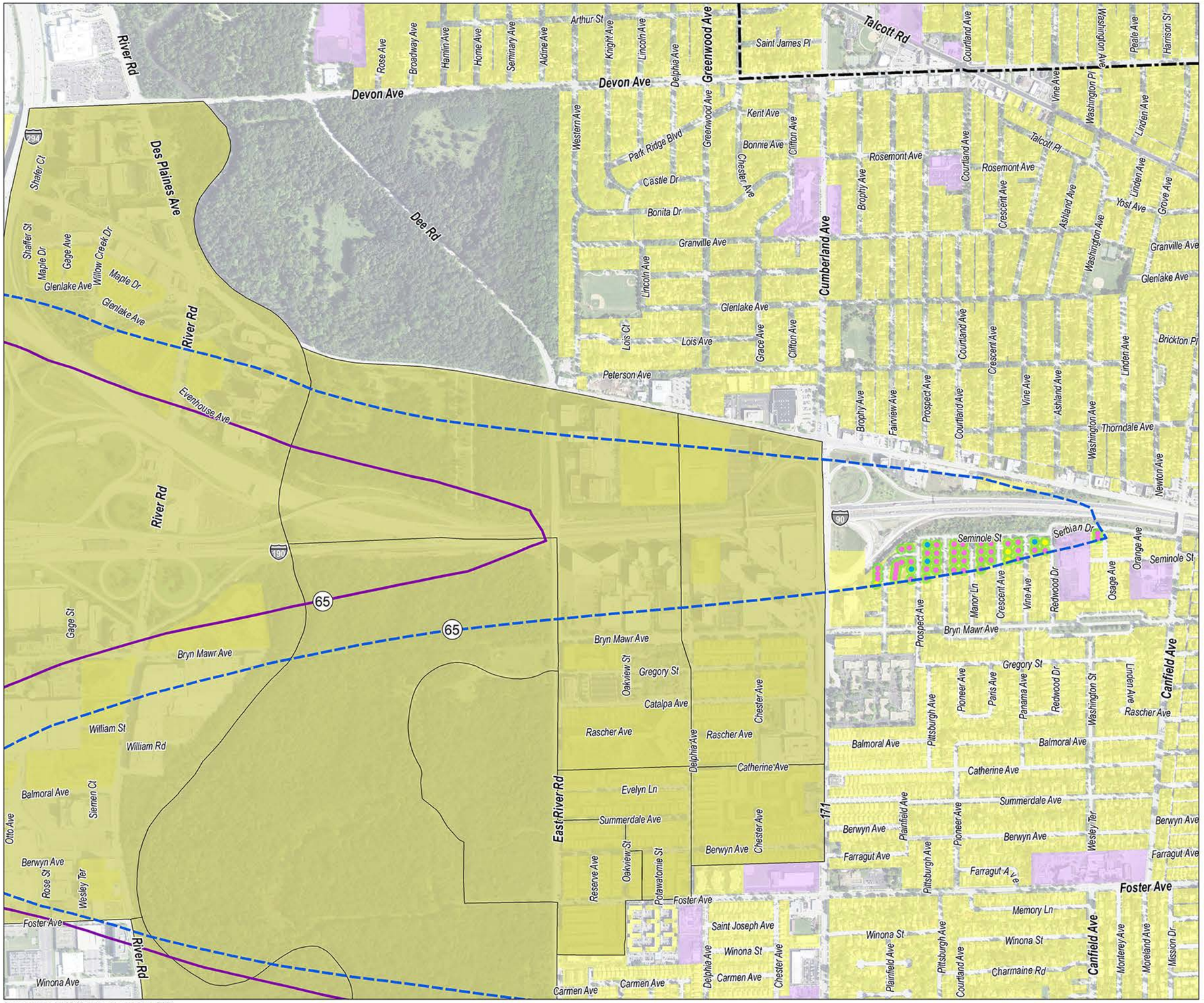

Source: HMMH, USCB 2010, NearMap US 2010, ESRI

Existing Fly Quiet and Proposed Interim Fly Quiet 65 DNL, Points with a Change of Exposure of 1.5 dB, and Areas of EJ Concern (Low-Income/Poverty Status)

▶ Exhibit 3-18

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3.5.4 Estimate of EJ Populations Residing in Areas Experiencing Potentially Significant Impacts

Using the 2010 Decennial Census and the 2016 ACS data, an estimate of the number of persons experiencing a significant impact with respect to aircraft noise was developed. The number of dwelling units experiencing an expected change of 1.5 dB was identified within census blocks in the 65 DNL contour for the Proposed Interim Fly Quiet. The estimated aggregate population residing in these dwelling units was calculated by multiplying the average household size (from the Census data for that block group) by the number of such dwelling units. Then the demographic characteristics of the block (race/ethnicity) or block group (low-income/poverty) where the dwelling is situated were applied to that estimated aggregate population to estimate EJ populations experiencing a significant impact. **Table 3-14** presents this estimate for race/ethnicity and **Table 3-15** presents the estimate for low-income/poverty status.

Estimates for the Proposed Interim Fly Quiet indicate that 20 persons in areas of EJ concern (race/ethnicity) would experience a 1.5 dB increase in noise exposure in the 65 DNL and greater noise exposure area. Of these, it is estimated that four (20 percent) would be white, sixteen (80 percent) would be of all other races, sixteen of whom (80 percent) would also be Hispanic. For those experiencing an anticipated decrease in noise exposure, the estimated number of persons would be 28, 19 of whom would be white (68 percent) and nine would be of all other races (32 percent), seven of whom (25 percent) would also be Hispanic.

Estimates for the Proposed Interim Fly Quiet indicate that no persons in areas of EJ concern (income/poverty) would experience a 1.5 dB increase or decrease in noise exposure.

TABLE 3-14
COMPARISON OF ESTIMATES FOR POPULATIONS EXPERIENCING A POTENTIALLY SIGNIFICANT IMPACT FROM PROPOSED INTERIM FLY QUIET FOR AREAS OF EJ CONCERN (RACE/ETHNICITY)

Census Geography	# of Dwelling Units with 1.5 dB Change	Average # of Persons Per Dwelling Unit	Total # of Persons (Est.)	# White (Est.)	% White	# All Other Races (Est.)	% All Other Races (Est.)	# Hispanic (Est.)	% Hispanic (Est.)	# Non-Hispanic	% Non-Hispanic
Existing Fly Quiet (65 DNL Contour)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Proposed Interim Fly Quiet (65 DNL Contour)	125	2.63	328	230	64.83%	221	35.17%	189	23.83%	262	76.17%
170317706022005[1]	-	2.67	-	-	21.88%	-	78.13%	-	78.13%	-	21.88%
170317706022042[1]	-	3.39	-	-	7.38%	-	92.62%	-	92.62%	-	7.38%
170317708002027[1]	-	2.83	-	-	60.98%	-	39.02%	-	25.61%	-	74.39%
170317708002038[1]	-	2.81	-	-	59.32%	-	40.68%	-	24.86%	-	75.14%
170317708002043[1]	2	7.00	14	-	-	14	100.00 %	14	100.00%	-	-
170318065023020[1]	1	2.58	3	2	58.14%	1	41.86%	1	31.78%	2	68.22%
170318066001007[1]	1	2.97	3	2	54.55%	1	45.45%	1	22.73%	2	77.27%
TOTAL INCREASE[1]	**4**	**N/A**	**20**	**4**	**N/A**	**16**	**N/A**	**16**	**N/A**	**4**	**N/A**
170318104003033[2]	4	3.10	12	9	77.42%	3	22.58%	3	22.58%	9	77.42%
170318104003037[2]	1	3.00	3	1	33.33%	2	66.67%	0	0.00%	3	100.00%
170318104003049[2]	4	3.25	13	9	71.15%	4	28.85%	4	28.85%	9	71.15%
TOTAL DECREASE[2]	**9**	**N/A**	**28**	**19**	**N/A**	**9**	**N/A**	**7**	**N/A**	**21**	**N/A**

Source: U.S. Census Bureau 2010 Decennial Census, ORD_RSIP_August 2018 database: City of Chicago

Notes
[1] Census block groups exposed to a 1.5 dB increase or greater.
[2] Census block groups exposed to a 1.5 dB decrease or greater.

For demographic information on aggregated census blocks and block groups for Existing Fly Quiet, see Table 3-10 (race/ethnicity) and Table 3-11 (income/poverty). No dwelling units or households can experience a change of exposure in the Existing Fly Quiet, as it is essentially the "no-action alternative" against which the other alternatives are compared. Consequently, applying the demographic characteristics to a null set would result in zero persons. Therefore, the entries for Existing Fly Quiet are marked as N/A (Not Applicable).

Numbers of persons are rounded up to the nearest whole number. Percentages are calculated based on unrounded numbers and therefore do not precisely correspond to the whole numbers presented.

TABLE 3-15
COMPARISON OF ESTIMATES FOR POPULATIONS EXPERIENCING A POTENTIALLY SIGNIFICANT IMPACT FROM PROPOSED INTERIM FLY QUIET FOR AREAS OF EJ CONCERN (LOW-INCOME/POVERTY)

Census Geography	# of Households with 1.5 dB Change (CDA RSIP)	Median Household Income	# of Households Below Proposed IFQ Poverty Level (Est.)	% Households Below Proposed IFQ Poverty Level (Est.)	Average Household Size (USCB)	# Persons Below Poverty Level (Est.)
Existing Fly Quiet (65 DNL dB Contour)	N/A	N/A	N/A	N/A	N/A	N/A
Proposed Interim Fly Quiet (65 DNL Contour)	112	$63,000	29	24.76%	2.74	79
170317706022[1]	0	$45,483	0	45.56%	3.56	0
170317708001[1]	0	$55,787	0	33.68%	2.64	0
TOTAL INCREASE[1]	**0**	**N/A**	**0**	**N/A**	**N/A**	**0**
170317608011[2]	0	$58,529	0	27.78%	1.86	0
170317608012[2]	0	$37,386	0	37.59%	1.97	0
170317608021[2]	0	$55,919	0	27.37%	2.26	0
170317707001[2]	0	$37,266	0	39.51%	2.09	0
TOTAL DECREASE[2]	**0**	**N/A**	**0**	**N/A**	**N/A**	**0**

Source: U.S. Census Bureau 2012-2016 American Community Survey, Chicago Department of Aviation ORD Residential Sound Insulation Program August 2018 database

Notes
[1] Census block groups exposed to a 1.5 dB increase or greater.
[2] Census block groups exposed to a 1.5 dB decrease or greater.

For demographic information on aggregated census blocks and block groups for Existing Fly Quiet, see Table 3-10 (race/ethnicity) and Table 3-11 (income/poverty). No dwelling units or households can experience a change of exposure in the Existing Fly Quiet as it is essentially the "no-action alternative" against which the other alternatives are compared. Consequently, applying the demographic characteristics to a null set would result in zero persons. Therefore, the entries for Existing Fly Quiet are marked as N/A (Not Applicable).

Numbers of persons are rounded up to the nearest whole number. Percentages are calculated based on unrounded numbers and therefore do not precisely correspond to the whole numbers presented.

3.6 VALIDITY OF PRIOR EIS DATA AND ANALYSES

FAA has determined that the analysis in the EIS remains substantially valid, with no significant new circumstances or information that would paint a dramatically different picture of the impacts previously assessed and disclosed.

FAA Order 1050.1F, paragraph 9-2.c. indicates that a Written Re-Evaluation (as opposed to a new or Supplemental EIS) is appropriate when the:

> "(1) Proposed action conforms to plans or projects for which a prior EA and FONSI have been issued or a prior EIS has been filed and there are no substantial changes in the proposed action that are relevant to environmental concerns;

> (2) Data and analyses contained in the previous EA and FONSI or EIS are still substantially valid and there are no significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts; and
>
> (3) Pertinent conditions and requirements of the prior approval have, or will be, met in the current action."

Order 5050.4B, paragraph 1401c(2) elaborates further:

> "If substantial changes in an action occur, the responsible FAA official should determine if the changes are relevant to environmental concerns. That determination should focus on the affected environment and anticipated impacts due to changes in the proposed action or proposed mitigation. The official must decide if the resultant environmental impacts present significant new circumstances or information relevant to those environmental concerns bearing on the proposed action or impacts. The official should use his or her professional judgment to determine if a written re-evaluation is needed."

As described in **Section 2.3**, the Build Out associated with the OMP has not changed. The interim nighttime preferential runway use modifications and correponding taxi route selections associated with Proposed Interim Fly Quiet do not affect the final airfield layout of the OMP or the anticipated environmental consequences as originally envisioned in the EIS at Build Out. As explained below, Proposed Interim Fly Quiet would result in temporary changes in environmental impacts prior to Build Out. Because the Build Out is not affected by the Proposed Interim Fly Quiet, the impacts associated with Build Out are also not affected. All pertinent conditions and requirements of the prior approval have, or will be, met. Therefore, the Proposed Interim Fly Quiet substantially conforms with the OMP as addressed in the EIS, the ROD, and the 2015 Re-Evaluation. Based on this Re-Evaluation, FAA preliminarily concludes that the preparation of a new or supplemental EIS is not necessary.

FAA is committed to public involvement and agency input throughout the Re-Evaluation process. The Draft Re-Evaluation document and supporting data, analyses, and tentative conclusions were made available through a variety of distribution channels. A series of four public workshops were held on February 4-7, 2019 in neighborhoods surrounding O'Hare. Comments and supporting documentation submitted by the public have been considered prior to making a final decision on the Re-Evaluation and are included in **Appendix I**.

No other federal approvals are required, per FAA Order 5050.4B, Paragraph 1401c(3).

As shown in **Chapter 2**, the Proposed Interim Fly Quiet modifications to the Existing Fly Quiet do not affect impacts anticipated on completion of the Build Out. Many environmental resources do not need to be re-evaluated because the temporary changes in interim nighttime preferential runway use would not materially alter the project effects and other conditions disclosed in the EIS. Four environmental impact categories from Chapter 5 of the EIS were re-evaluated with the analytical methodology presented in **Chapter 2** of this Re-Evaluation and the results presented in prior sections in this chapter. Additionally, climate was not examined in the EIS, but subsequent FAA guidance indicates it should be presented separately. Therefore, climate was presented in the 2015 Re-Evaluation and also in this chapter.

The potential environmental impacts expected to result from the Proposed Interim Fly Quiet differ from those previously assessed and disclosed in the EIS and the 2015 Re-Evaluation. These impacts would be temporary, because the Proposed Interim Fly Quiet would end in January 2021. Therefore, these changes would not be substantial. The data and analysis contained in the EIS and the 2015 Re-Evaluation remain substantially valid. All pertinent conditions and requirements of the prior approval have been, or will be, met in the Proposed Interim Fly Quiet.

The results for these environmental categories are summarized below.

3.6.1 Noise and Land Use

The Re-Evaluation indicates that:

- The O'Hare Noise Compatability Commission (ONCC) and the CDA designed the Proposed Interim Fly Quiet to achieve certain goals, including noise relief and predictability.[27] The Proposed Interim Fly Quiet would result in overall greater noise exposure acreage compared to Existing Fly Quiet with increases in some areas and decreases in others.
- The Proposed Interim Fly Quiet would expose 167 people and 57 housing units across nearly 18 acres to a significant noise increase, and would expose 3,256 people and 1,094 housing units across nearly 166 acres to a reportable noise increase.
- The Proposed Interim Fly Quiet would expose 147 people and 56 housing units across nearly 35 acres to a significant noise decrease, and would expose no one to a reportable noise decrease.
- The CDA continues to sound-insulate noise-sensitive facilities located within the 65 DNL contour for the Build Out following federal guidelines and in accordance with the ROD. Residential land use is compatible with noise exposure levels lower than 65 DNL. Other noise-sensitive land uses such as hospitals, nursing homes, and places of worship are considered compatible at levels higher than 65 DNL, but only if sound-insulated (see **Appendix C**).
    - Approximately 14,232 individuals in 5,054 housing units are located within the 65 DNL contour for the Existing Fly Quiet. In accordance with the ROD, 4,124 of these homes have been sound-insulated to date (**Table 3-6**).
    - Approximately 15,680 individuals in 5,623 housing units are located within the 65 DNL contour for the Proposed Interim Fly Quiet. Of these homes, in accordance with the ROD, 4,120 have been sound-insulated to date (**Table 3-6**). There would be 961 housing units newly included within the area of the 65 DNL contour for Proposed Interim Fly Quiet, and 392 housing units newly excluded from the area of the 65 DNL contour for Existing Fly Quiet (see **Appendix C**, **Table C-28**). As explained in **Section 2.2.2**, the Proposed Interim Fly Quiet would be temporary. Therefore, this difference in noise exposure would not be substantial. The data and analyses contained in the EIS and 2015 Re-Evaluation remain substantially valid. All pertinent conditions and requirements of the prior approval have been met or would be met before Build Out.
    - As noted above and consistent with the EIS and ROD, the CDA continues to sound-insulate potentially eligible residences located within the 65 DNL contour for the Build Out. Neither the Existing Fly Quiet nor the Proposed Interim Fly Quiet 65 DNL contour establishes eligibility for sound insulation.
- All four schools within the 65 DNL contours for the Existing Fly Quiet and Proposed Interim Fly Quiet have been sound-insulated and are identified individually in **Table C-21**.

The data and analyses contained in the EIS and 2015 Re-Evaluation remain substantially valid. All pertinent conditions and requirements of the prior approval have been met or would be met before Build Out.

[27] See Section 2.2.2.

3.6.2 Air Quality

No exceedances of the NAAQS were identified. While expected effects of the Existing Fly Quiet and the Proposed Interim Fly Quiet differ from those previously assessed and disclosed in the EIS and 2015 Re-Evaluation, they are not signficant. Therefore, changes in air quality would not be substantial.

3.6.3 Climate

The effects of a proposed action on climate were not assessed or disclosed in the EIS, as at the time DOT and FAA lacked guidance for the consideration of GHG emissions and climate. Since the completion of the EIS, FAA has issued guidance for the consideration of GHG emissions and climate in NEPA documents.

The effects of a proposed action on climate were assessed or disclosed in the 2015 Re-Evaluation based on available guidance at the time of publication. While the Proposed Interim Fly Quiet fuel use differs from those previously assessed and disclosed in the EIS and 2015 Re-Evaluation, this difference is not substantial. The data and analyses contained in the EIS and 2015 Re-Evaluation remain substantially valid. All pertinent conditions and requirements of the prior approval have been met or would be met before Build Out.

3.6.4 Cumulative Impacts

The cumulative impact analysis from the EIS remains substantially valid, with no significant new circumstances or information. While the cumulative impacts under the Proposed Interim Fly Quiet would differ from those previously assessed and disclosed in the EIS, this difference is not substantial. The data and analyses contained in the EIS and 2015 Re-Evaluation remain substantially valid. All pertinent conditions and requirements of the prior approval have been met or would be met before Build Out.

3.6.5 Environmental Justice

The Re-Evaluation of the temporary Proposed Interim Fly Quiet indicates that:

- Portions of seven census blocks which would constitute areas of EJ concern with respect to race/ethnicity would be exposed to a 1.5 dB increase in aicraft noise exposure compared to current conditions.
    - In three of these census blocks, the percentage of population that are all other races (i.e., populations protected under Executive Order 12898) is meaningfully greater than that of the community of comparison.
    - These same three blocks also have a percentage of Hispanic population meaningfully greater than that of the community of comparison.
- Portions of three census blocks which would constitute areas of EJ concern with respect to race/ethnicity would be exposed to a 1.5 dB decrease in aircraft noise exposure compared to current conditions.
    - In one of these census blocks, the percentage of population that are all other races (i.e., populations protected under Executive Order 12898) is meaningfully greater than that of the community of comparison.
    - None of these three census blocks have a Hispanic population meaningfully greater than that of the community of comparison.

- Detailed estimates indicate that four dwelling units, with an estimated population of 20 persons, would experience a 1.5 dB increase and nine dwelling units, with an estimated population of 28 persons, would experience a 1.5 dB decrease.
- Portions of two census block groups which would constitute areas of EJ concern with respect to low-income/poverty would be exposed to a 1.5 dB increase in aircraft noise exposure.
- Portions of four census block groups which would constitute areas of EJ concern with respect to low-income/poverty would be exposed to a 1.5 dB decrease in aircraft noise exposure.
- Detailed estimates indicate that no persons in areas of EJ concern with respect to low-income/poverty would experience a 1.5 dB increase or decrease in aircraft noise exposure.

While the aircraft noise exposure, and consequently the impacts to EJ populations, under the Proposed Interim Fly Quiet would differ from those previously assessed and disclosed in the EIS, this difference is temporary and is not substantial. The analysis contained in the EIS, when updated with more current demographic data, remains substantially valid. All pertinent conditions and requirements of the prior approval have been met or would be met before Build Out.

3.6.6 Conclusion

FAA Order 1050.1E, paragraph 515a states that a Written Re-Evaluation (as opposed to a new or Supplemental EIS) is appropriate when the:

> "(1) Proposed action conforms to plans or projects for which a prior EIS has been filed and there are no substantial changes in the proposed action that are relevant to environmental concerns;
>
> (2) Data and analyses contained in the previous EIS are still substantially valid and there are no significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts; and
>
> (3) Pertinent conditions and requirements (all) of the prior approval have, or will be, met in the current action."

Order 5050.4B, paragraph 1401c(2) elaborates further:

> "If substantial changes in an action occur, the responsible FAA official should determine if the changes are relevant to environmental concerns. That determination should focus on the affected environment and anticipated impacts due to changes in the proposed action or proposed mitigation. The official must decide if the resultant environmental impacts present significant new circumstances or information relevant to those environmental concerns bearing on the proposed action or impacts. The official should use his or her professional judgment to determine if a written re-evaluation is needed."

The Proposed Interim Fly Quiet will not change the Build Out associated with the OMP. The Proposed Interim Fly Quiet is associated with interim conditions; therefore, it will not affect the final airfield layout of the OMP as originally envisioned in the EIS. Because the Build Out is not affected by the Proposed Interim Fly Quiet, the impacts associated with Build Out disclosed in the EIS are also not affected. Pertinant conditions and requirements (all) of the prior approvals have, or will be, met. Based on this Final Re-Evaluation, including responses to comments and supporting documention, and review of all applicable sections of FAA Orders 1050.1E and 5050.4B, FAA concludes that the preparation of a new EIS is not necessary. Further, no other federal approvals are required, per FAA Order 5050.4B, Paragraph 1401c(3).

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