Akron-Canton Airport (CAK) Part 150 Update Study
PROJECT MEMORANDUM

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HARRIS MILLER MILLER & HANSON INC.

To:	Part 150 Advisory Committee
From:	Ted Baldwin and Justin Divens, HMMH
Subject:	Background for the Sixth Advisory Committee Meeting – September 17, 2014
Date:	August 12, 2014
Reference:	HMMH Project Number 305231.004

1. INTRODUCTION

This memorandum presents material for discussion at the sixth meeting of the Akron-Canton Airport (CAK) Part 150 Advisory Committee, planned for September 17, 2014.

At the fourth and fifth meetings (on March 5 and May 29) the committee considered the first and second rounds of Noise Compatibility Program analyses, including noise abatement and compatible land use alternatives. Memoranda distributed prior to – and discussed at – those meetings presented information on three primary categories of alternatives: (1) existing measures, (2) alternatives that Part 150 requires airports to consider, and (3) alternatives that Advisory Committee members or other interested parties proposed for consideration.[1] The study's second public workshop was held on the evening of May 29, which provided an opportunity for residents and other stakeholders to be briefed on and provide input to the alternatives analyses.

After the second workshop, two letters were received from residents of neighborhoods to the northeast of the airport. Those letters are appended to this memorandum and addressed in Section 3.

This memorandum presents the final round of noise abatement analyses, to address four primary topics:

- Additional abatement analyses recommended at the fifth committee meeting.[2]
- Additional abatement alternatives recommended for analysis in written comments.
- Promising combinations of alternatives, based on committee and other public input.
- Summary of noise abatement alternative results.

2. ADDITIONAL ABATEMENT ANALYSES REQUESTED AT THE FIFTH COMMITTEE MEETING

Input at the fifth committee meeting led to requests for two additional abatement analyses. These two analyses are not new "alternatives;" rather, they represent another method of evaluating two alternatives discussed at the fifth committee meeting:[3]

- Alternative 1A: South-Flow Night Runway Use Changed to Shift Departures from Runway 23 to 19
- Alternative 5A: All South-Flow Runway Use Changed to Shift Departures from Runway 23 to 19

These two alternatives respond to public interest in minimizing departures on Runway 23, which overfly the most affected area southwest of the airport. In both cases, runway use is changed to shift departures from

[1] Those memoranda are available for review on the study website at http://www.akroncantonairport.com/files/noise/first-roundnoiseanalyses.pdf and http://www.akroncantonairport.com/files/noise/second-roundnoiseanalyses4-25-2014.pdf.

[2] No specific abatement alternative requests were received at the second workshop. The summary of that meeting is available for review on the study website at http://www.akroncantonairport.com/files/noise/140529workshop2summary.pdf.

[3] The April 25, 2014 project memorandum that provided background for the fifth committee meeting discussed these two alternatives in detail, including their purpose, modeling assumptions, contours, noise benefits (i.e., reduced population within the contours), and operational implications.

Runway 23 to 19, without increasing departures on either Runway 1 or 5. In Alternative 1A, the adjustment is made only to nighttime (10 p.m. to 7 a.m.) runway use; in Alternative 5A, the adjustment is made on a 24-hour basis. Consistent with Part 150 requirements, the previously presented analyses addressed the noise benefits in terms of changes in the Day-Night Average Sound Level (DNL) on the average annual day.[4]

Committee members requested that further analyses be conducted to assess the benefits of these two alternatives on a day when all operations were in the south flow; i.e., when all arrivals and departures were on Runways 19 and 23. The committee members recognize that these analyses could not be used as a formal basis under Part 150 for justifying the adoption of these alternatives. However, they felt that the analyses could help to illustrate the benefits to non-technical stakeholders in particular. The following two subsections present these analyses.

2.1.1 Alternative 1A on a "South-Flow Day": Night Runway Use Changed to Shift Departures from Runway 23 to 19, Analyzed for a Day When All Operations Are in the South Flow

The figure on the following page presents the contours for Alternative 1A under the 24-hour south-flow runway use modeling assumptions, compared to those for a "baseline" south-flow day of operations in 2014.[5] Table 1 compares the residential land uses within the 60-65 decibel (dB) DNL contour – by runway end – for these two contour sets. Table 2 and Table 3 following the figure present the runway use assumptions incorporated in these two cases (with the existing conditions south flow day assumptions presented first).

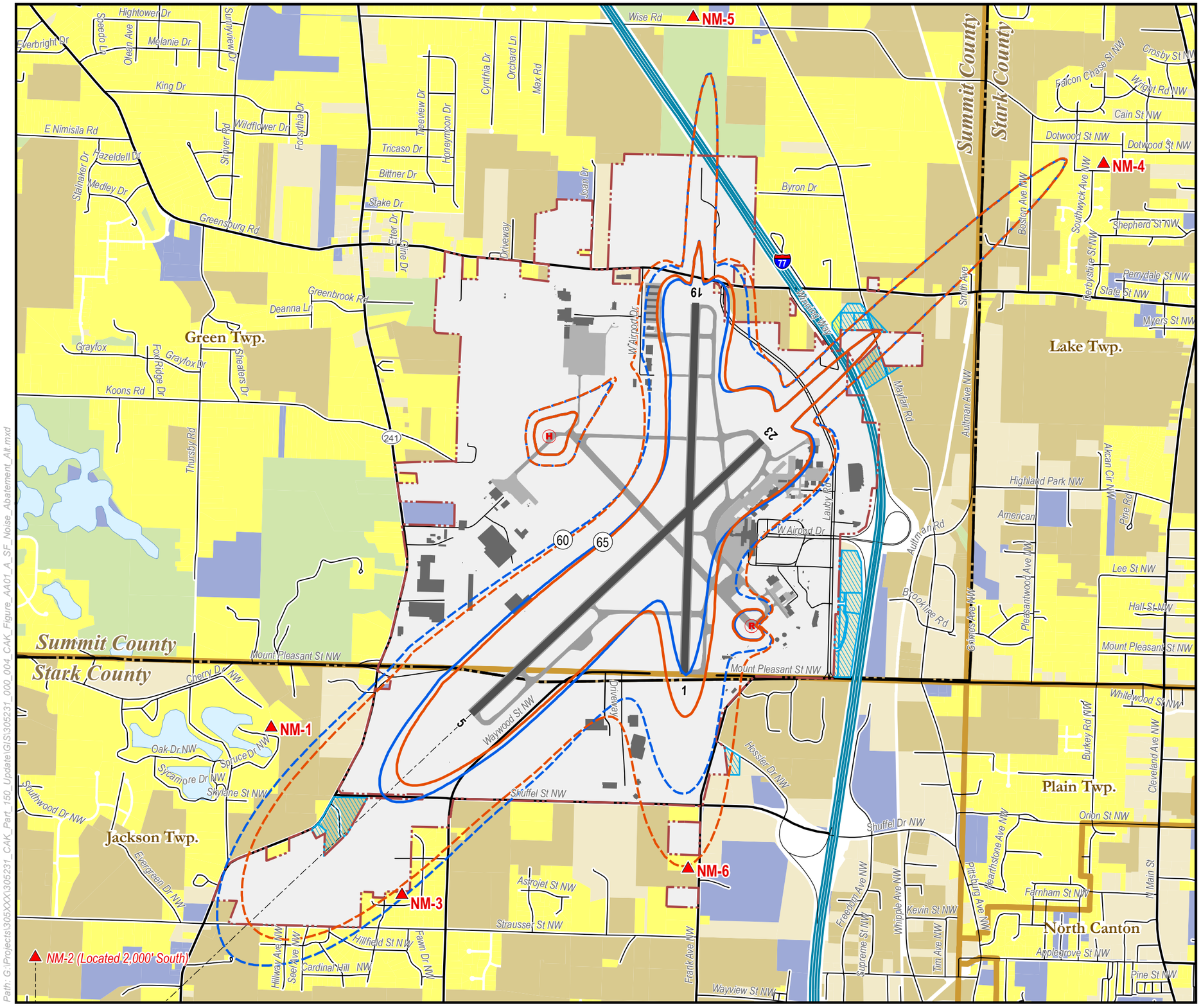
Table 1 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 1A, Analyzed for a Day When All Operations Are in the South Flow
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Alternative 1A South-Flow Day	Residents	0	50	4	75	129
	Dwelling Units	0	18	2	33	53
2014 Existing South-Flow Day	Residents	0	50	0	157	207
	Dwelling Units	0	18	0	68	86

This analysis reveals that Alternative 1A on a south-flow day provides a significant improvement over the existing conditions on a south-flow day.

[4] Alternative 1A uses the DNL definition of "night" for the same purpose of consistency with Part 150 requirements.

[5] These baseline contours reflect the noise exposure on a full day of south-flow operations based on data collected for the development of the 2014 "existing conditions" Noise Exposure Map (NEM) contours. As in the previous abatement analyses, 2014 is used as the analysis year because it has higher population impacts than the more speculative 2019 forecast conditions NEM.



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Alternative 1A "South-Flow": 2014 DNL for a Day of South-Flow Operations with and without Night Departures Shifted from Runway 23 to 19

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual or zoned. Draft subject to verification.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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Table 2 2014 Existing Conditions Runway Use for a Day When All Operations Are in the South Flow
Source: HMMH, 2014

Air Carrier Jets (≥ 90 seats) and All Military Fixed-Wing	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	35%	39%	36%	15%	12%	14%				24%	27%	24%
Runway 23	65%	61%	64%	85%	88%	86%				76%	73%	76%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Regional Jets (< 90 seats)	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	41%	32%	39%	18%	14%	17%				27%	21%	26%
Runway 23	59%	68%	61%	82%	86%	83%				73%	79%	74%
Total	0%	0%	0%	0%	0%	0%				0%	0%	0%

General Aviation Jets	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	37%	40%	37%	22%	15%	22%				28%	22%	28%
Runway 23	63%	60%	63%	78%	85%	78%				72%	78%	72%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Turbo-Propeller Aircraft	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	38%	23%	30%	25%	16%	24%				29%	22%	27%
Runway 23	63%	77%	70%	75%	84%	76%				71%	78%	73%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Piston-Propeller Aircraft	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Runway 19	63%	54%	62%	28%	23%	27%	75%	0%	75%	43%	33%	42%
Runway 23	37%	46%	38%	72%	77%	73%	25%	0%	25%	57%	67%	58%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Table 3 Alternative 1A "South-Flow" Runway Use Changed to Shift Night Departures from Runway 23 to 19 on a Day When All Operations Are in the South Flow
Source: HMMH, 2014

Air Carrier Jets (≥ 90 seats) and All Military Fixed-Wing	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	35%	39%	36%	15%	39%	19%				24%	39%	27%
Runway 23	65%	61%	64%	85%	61%	81%				76%	61%	73%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Regional Jets (< 90 seats)	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	41%	32%	39%	18%	32%	20%				27%	32%	28%
Runway 23	59%	68%	61%	82%	68%	80%				73%	68%	72%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

General Aviation Jets	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	37%	40%	37%	22%	40%	24%				28%	40%	29%
Runway 23	63%	60%	63%	78%	60%	76%				72%	60%	71%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Turbo-Propeller Aircraft	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	38%	23%	30%	25%	23%	25%				29%	23%	27%
Runway 23	63%	77%	70%	75%	77%	75%				71%	77%	73%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Piston-Propeller Aircraft	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Runway 19	63%	54%	62%	28%	54%	32%	75%	0%	75%	43%	54%	45%
Runway 23	37%	46%	38%	72%	46%	68%	25%	0%	25%	57%	46%	55%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

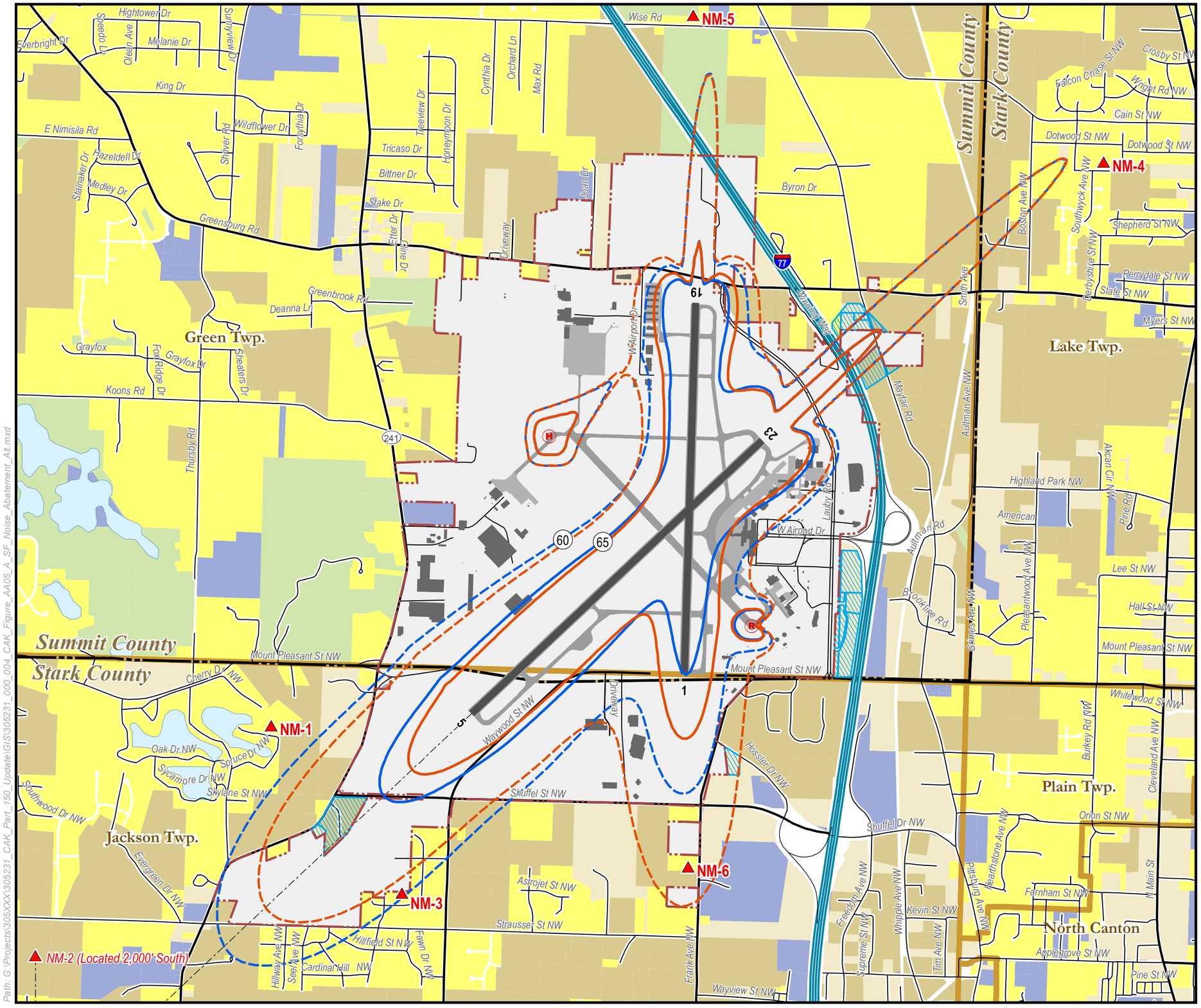
2.1.2 Alternative 5A on a "South-Flow Day": Runway Use Changed on a 24-Hour Basis to Shift Departures from Runway 23 to 19, for a Day When All Operations Are in the South Flow

The figure on the following page presents the contours for Alternative 5A under the 24-hour south-flow runway use modeling assumptions, compared to those for a "baseline" south-flow day of operations in 2014. Table 4 compares the residential land uses within the 60-65 dB DNL contour – by runway end – for these two contour sets. Table 5 following the figure present the runway use assumptions incorporated in the Alternative 5A "South-Flow Day" case. (Table 2 presented the existing conditions south-flow runway use assumptions.)

Table 4 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 5A, Analyzed for a Day When All Operations Are in the South Flow
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Alternative 5A South-Flow Day	Residents	0	52	6	37	95
	Dwelling Units	0	18	3	16	37
2014 Existing South-Flow Day	Residents	0	50	0	157	207
	Dwelling Units	0	18	0	68	86

This analysis reveals that Alternative 5A on a south-flow day provides a significant improvement over the existing conditions on a south-flow day. The reductions are even greater than Alternative 1A, which is logical, since Alternative 1A only affects nighttime south-flow runway use, whereas Alternative 5A affects south-flow runway use on a 24-hour basis.



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Alternative 5A "South-Flow": 2014 DNL for a Day of South-Flow Operations with and without Departures Shifted from Runway 23 to 19

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual or zoned. Draft subject to verification.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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Table 5 Alternative 5A Runway Use Changed to Shift Departures from Runway 23 to 19 on a 24-Hour Basis on a Day When All Operations Are in the South Flow
Source: HMMH, 2014

Air Carrier Jets (≥ 90 seats) and All Military Fixed-Wing	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	35%	39%	36%	35%	39%	36%				35%	39%	36%
Runway 23	65%	61%	64%	65%	61%	64%				65%	61%	64%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Regional Jets (< 90 seats)	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	41%	32%	39%	41%	32%	39%				41%	32%	39%
Runway 23	59%	68%	61%	59%	68%	61%				59%	68%	61%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

General Aviation Jets	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	37%	40%	37%	37%	40%	37%				37%	40%	37%
Runway 23	63%	60%	63%	63%	60%	63%				63%	60%	63%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Turbo-Propeller Aircraft	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	Not applicable			0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%				0%	0%	0%
Runway 19	38%	23%	30%	38%	23%	36%				38%	23%	34%
Runway 23	63%	77%	70%	63%	77%	64%				63%	77%	66%
Total	100%	100%	100%	100%	100%	100%				100%	100%	100%

Piston-Propeller Aircraft	Arrival			Departure			Touch-and-Go			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total
Runway 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Runway 5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Runway 19	63%	54%	62%	63%	54%	62%	75%	0%	75%	63%	54%	62%
Runway 23	37%	46%	38%	37%	46%	38%	25%	0%	25%	37%	46%	38%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

3. ABATEMENT ALTERNATIVES RECOMMENDED FOR ANALYSIS IN WRITTEN COMMENTS

After the second workshop, two letters were received from residents of neighborhoods to the northeast of the airport. Appendix A presents full copies of these two letters from:

- Mr. David A. Mucklow, June 3, 2014
- Mr. Ronnie and Ms. Cynthia Anderson, June 12, 2014 (addressed to Mr. Mucklow and forwarded by him)

Input from Mr. David A. Mucklow

Mr. Mucklow's input included the following specific suggestions for alternatives analyses (paraphrased):

- Have aircraft maintain runway heading on departure from Runway 1 until after crossing Wise Road, and be stabilized on runway heading on final approach for Runway 19 before crossing Wise Road, to avoid overflight of neighborhoods to the east of the extended runway centerline in particular.
- Consider constructing noise walls or planting rows of evergreens along I-77 north of the airport to Wise Road, to mitigate aircraft noise on residences to the east of the highway, north of the airport.[6]
- Military aircraft sometimes travel low over houses in his neighborhood (north of the airport and to the east of I-77 and the Runway 1/19 extended centerline). He suggests cautioning them to stay at higher altitudes for noise abatement and safety.

Input from Mr. Ronnie and Ms. Cynthia Anderson

The Andersons' input included the following specific suggestions for alternatives analyses (paraphrased):

- Consider constructing noise walls or planting rows of evergreens along I-77 to mitigate aircraft noise on residences east of the highway, north of the airport (i.e., Mr. Mucklow's second suggestion).
- Consider stricter regulations on flight times and patterns.
- Consider sound-insulation treatment to reduce aircraft noise inside homes most near the airport.

3.1 Discussion of Recommended Alternatives

Based on the preceding input, the following sections address the suggestions in a consolidated fashion:

- Reduce flight track dispersion for Runway 1 departures and Runway 19 arrivals (see Section 3.2)
- Consider noise barriers along I-77 north of the airport to Wise Road (see Section 3.3)
- Consider requesting military aircraft to fly higher over residences (see Section 3.4)
- Consider stricter regulations on flight times and patterns (see Section 3.5)
- Consider sound-insulation treatment of homes most near the airport (see Section 3.6)

3.2 Reduce Flight Track Dispersion for Runway 1 Departures and Runway 19 Arrivals

This request lends itself to analysis through preparation of an additional set of DNL noise abatement contours. Following the numbering from the previous analyses, these contours are for "Alternative 10."

To evaluate this proposal, noise contours were prepared that assumed procedures were implemented that reduced the currently observed dispersion of departure and arrival flight tracks modeled in the 2014 Existing Conditions Noise Exposure Map by 50%. The existing conditions departure and arrival flight tracks are

[6] Mr. Mucklow notes that the barrier might also mitigate noise from I-77 and help contain the smell of burnt jet fuel that he has noticed in the winter months. Neither of these matters is within the scope of a Part 150.

depicted in Figures 32 and 33, respectively, of the September 2013 "Project Introduction and Inventory Report."[7] It would be unrealistic to assume that all dispersion would be eliminated, since crosswinds, aircraft performance, and other operational considerations inevitably lead to variation in flight tracks, even this close to a runway end.

The hypothetical reduction in dispersion that this alternative tests is generally consistent with the precision observed when aircraft are following the most precise types of FAA-published navigation procedures; i.e., "Area Navigation" (RNAV) procedures employing satellite-based (global positioning system, GPS) guidance. The FAA is in the process of introducing such procedures nationwide, as part of the implementation of the "NextGen" air traffic control system.[8] The most critical components of NextGen implementation are scheduled to be in place by 2020 or shortly thereafter.[9] Those implementation components require FAA and aircraft operator investments. Until that time, this type of reduced dispersion would be extremely difficult – or impossible – to achieve.

The figure on the following page presents the contours for Alternative 10 compared to those for the 2014 existing conditions Noise Exposure Map. The figure includes insets that illustrate the hypothetical reduction in dispersion assumed in the analysis. As the figure shows, the reduced dispersion lengthens the 60 dB DNL noise contour to the north, across Wise Road.

Table 6 compares the residential land uses within the 60-65 dB DNL contour – by runway end – for these two contour sets.

Table 6 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 10, "Reduced Flight Track Dispersion for Runway 1 Departures and Runway 19 Arrivals," Compared to 2014 Existing Conditions
Source: HMMH, 2014

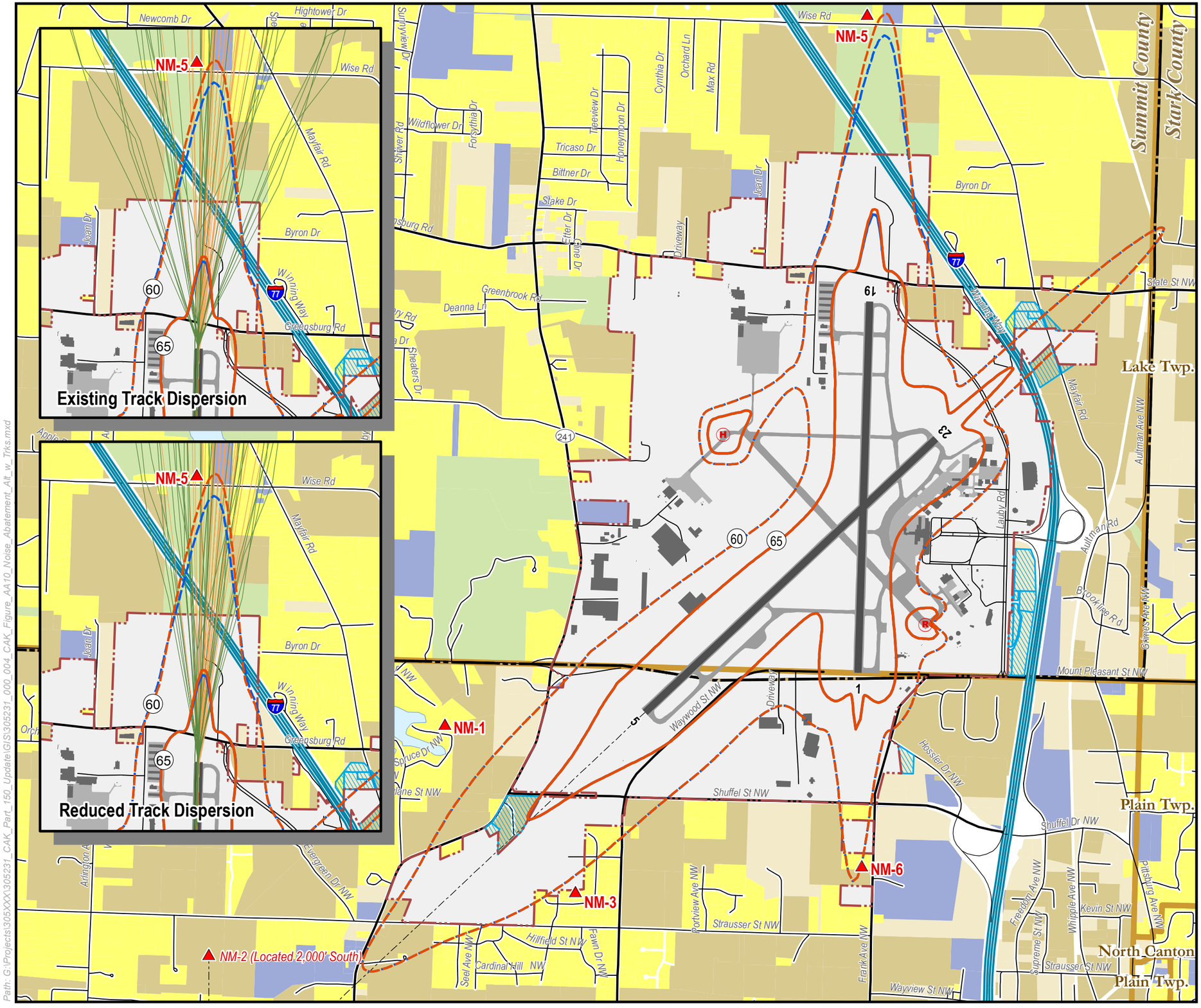
Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Alternative 10	Residents	1	2	4	56	63
	Dwelling Units	0	1	2	24	27
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This analysis reveals that the slight extension of the 60 dB DNL contour across Wise Road may actually increase the encompassed population, although from a practical perspective the change is insignificant when considered in the context of the likely accuracy limits of the modeling, graphics, and population analysis. However, the residents of the dwelling units near the runway centerline along Wise Road (in the vicinity of noise monitoring location #5) would likely notice the increased concentration of direct overflights.

[7] The report is on the study website at http://www.akroncantonairport.com/files/noise/september172013draftprojectintroductionandinventoryreport.pdf. The ROA is presented separately at http://www.akroncantonairport.com/files/noise/april41998cakncproa.pdf.

[8] See: http://www.faa.gov/nextgen/

[9] This date is based on FAA's current schedule for full implementation of a NextGen component called "Automatic Dependent Surveillance-Broadcast" (ADS-B), the NextGen successor to radar for tracking aircraft.



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AKRON-CANTON AIRPORT

Alternative 10: 2014 DNL with Reduced Dispersion of Runway 1 Departures and Runway 19 Arrivals, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
- Arrival Track
- Departure Track
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual or zoned. Draft subject to verification.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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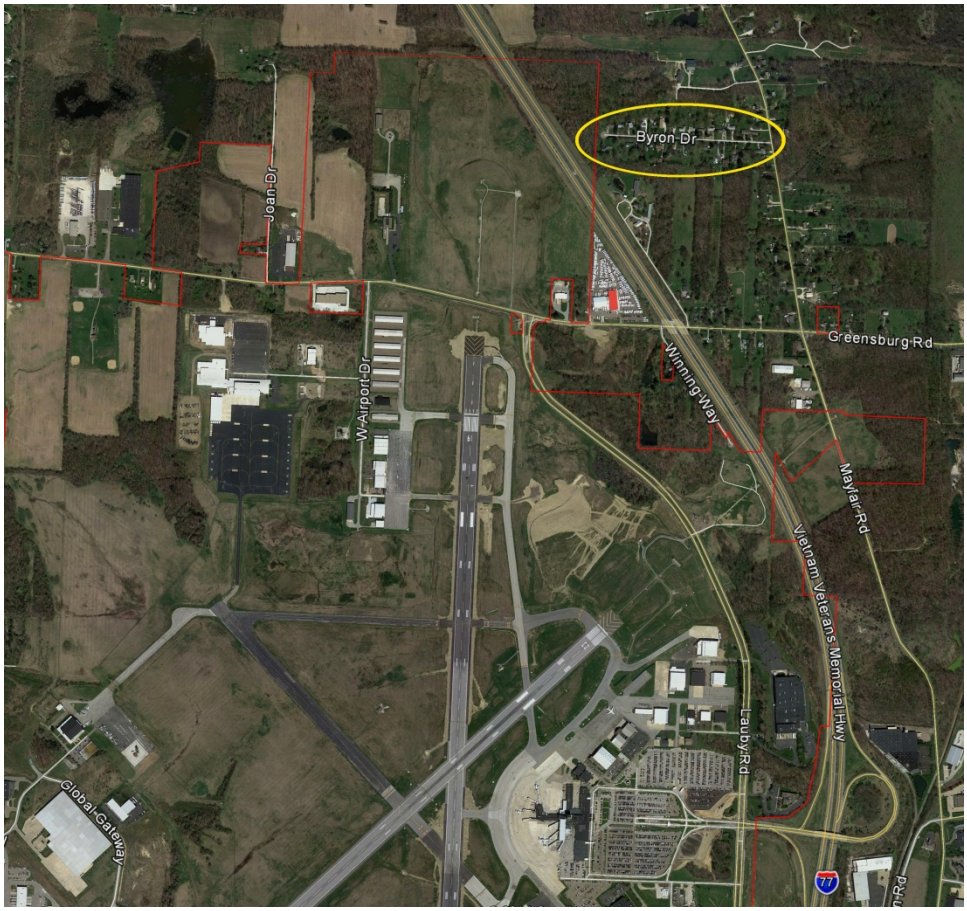
3.3 Consider Noise Barriers along I-77 North of the Airport to Wise Road

This section discusses exploring the feasibility and design requirements of a sound barrier intended to reduce ground-based aircraft noise for Byron Drive residents, in the general location shown in Figure 1.

Figure 1 Barrier Analysis Vicinity Map
Source: HMMH and Google Earth Professional, 2014



3.3.1 Noise Barrier Location Considerations

"A sound barrier is any large object that blocks the line of sight between source and receiver."[10] The best description of barrier performance is its "insertion loss" (IL), which is the difference in the noise environment before and after the barrier is constructed.[11]

Barriers are often used to reduce noise from transportation noise sources, in particular highway and rail sources. In limited situations, a barrier can be effective in reducing noise from aircraft activities on the ground, including start-of-takeoff-roll, thrust-reverse, and run-up operations. However, "the smallest insertion loss [of these three transportation sources] is obtained in the case of ground-based airport operations due to the larger source/receiver distances and greater source height [that are typical for aircraft sources]."[12]

[10] Beranek, L. L., & Vér, I. L. (1992). Noise and Vibration Control Engineering. John Wiley & Sons, Inc.

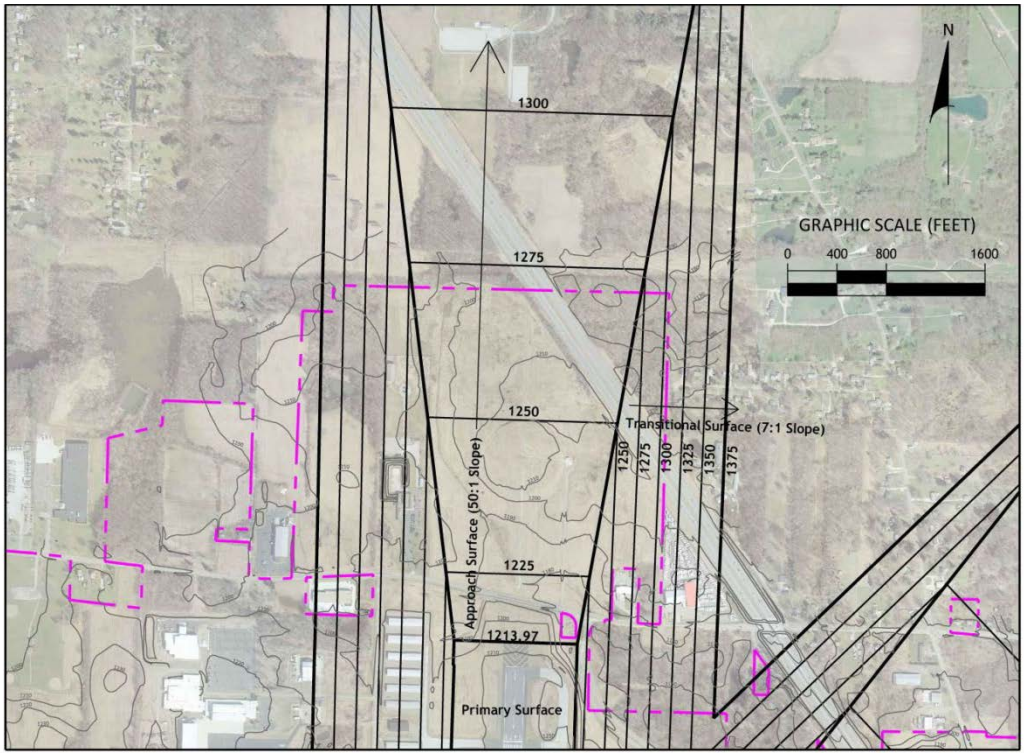
[11] I-INCE. (1999). Technical Assessment of the Effectiveness of Noise Walls. Retrieved from http://ince.org

[12] *Ibid.*

Barriers are most effective when they are close to either the source (the aircraft on the ground) or the receiver (the target residences). Safety factors preclude constructing barriers or other "obstructions" near runways. Specifically, the FAA "runway safety area" and "runway protection zone" restrictions prevent construction of barriers within approximately 200 to 1,000 ft. of a runway edge.[13] This means that barriers generally must be constructed near the target residences to be effective.[14]

Federal Aviation Regulation (FAR) Part 77, "Safe, Efficient Use, and Preservation of the Navigable Airspace,"[15] places further limits on the height of barriers farther from the runway, as shown in Figure 2.

Figure 2 Part 77 Height Limits
Source: CHA, 2014



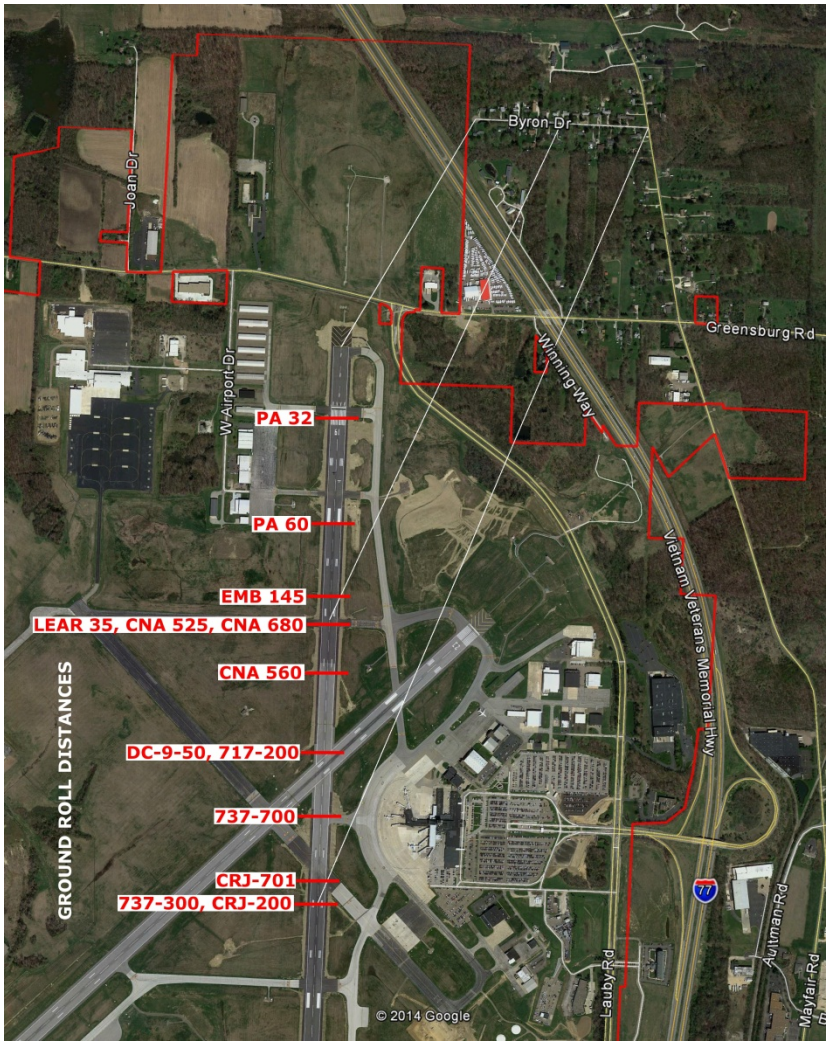
Part 77 requires the areas around the north end of Runway 01/19 runway end to be free of obstruction up to the elevations shown in the figure, in feet above mean sea level (msl). Along the eastern border of airport-owned property running from the runway end to the northern border of the property line (on the northeast side of I-77), the maximum elevations are approximately 1,300 msl, or approximately 86 ft. above the 1,214 msl runway end elevation. This includes the triangle of airport-owned property east of I-77, that is immediately west of the Byron Drive neighborhood. Local land use restrictions also may limit the height of a structure to 60 ft. in an industrial district and 36 ft. in a residential district.

Barrier length is just as important as height. For a barrier to be effective acoustically, it must break the line-of-sight from the source to the receiver by a relatively sharp angle, to prevent sound from passing around ("flanking") the ends of the barrier. In fact, "it is recommended that the minimum angle of view that should be screened to avoid flanking is 160°. This means that to effectively reduce the noise coming around its ends, a

[13] See: FAA Advisory Circular (AC) 150/5300-13A, "Airport Design," http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5300_13A.pdf
[14] I-INCE. (1999). *Op. cit.*
[15] See: http://www.ecfr.gov/cgi-bin/text-idx?SID=245f80b495d49a25c5cf57b2a6b3e697&node=14:2.0.1.2.9&rgn=div5

barrier should be at least eight times as long as the distance from the home or receiver to the barrier."[16] The barrier also must not have any openings in it. To illustrate barrier length issues applicable to the area of concern at CAK, Figure 3 depicts the line-of-sight from each end of Byron Drive to the runway end on the north and ground-roll distances for a range of aircraft types, modeled in the 2014 existing conditions contours.[17]

Figure 3 Line-of-Sight Paths from Runway 19 Aircraft Ground Roll Segments to the Byron Dive Residences
Source: HMMH and Google Earth Professional, 2014



The 13 ground-roll distances are shown for the same 13 aircraft types considered in the arrival-departure contour comparisons presented in Section 3.2 of the second-round noise abatement analyses, including:[18]

- Two propeller-driven general-aviation aircraft (PA32 and PA60)
- Four corporate jets (Lear35, CNA525, CNA560, and CNA680)
- Seven commercial jets (EMB145, DC-9-50, 717-200, 737-300, 737-700, CRJ-200, and CRJ-701)

[16] Crocker, M. J. (2007). Handbook of Noise and Vibration Control. Hoboken, NJ: John Wiley & Sons, Inc.

[17] The ground roll distances were calculated by INM for CAK-specific conditions.

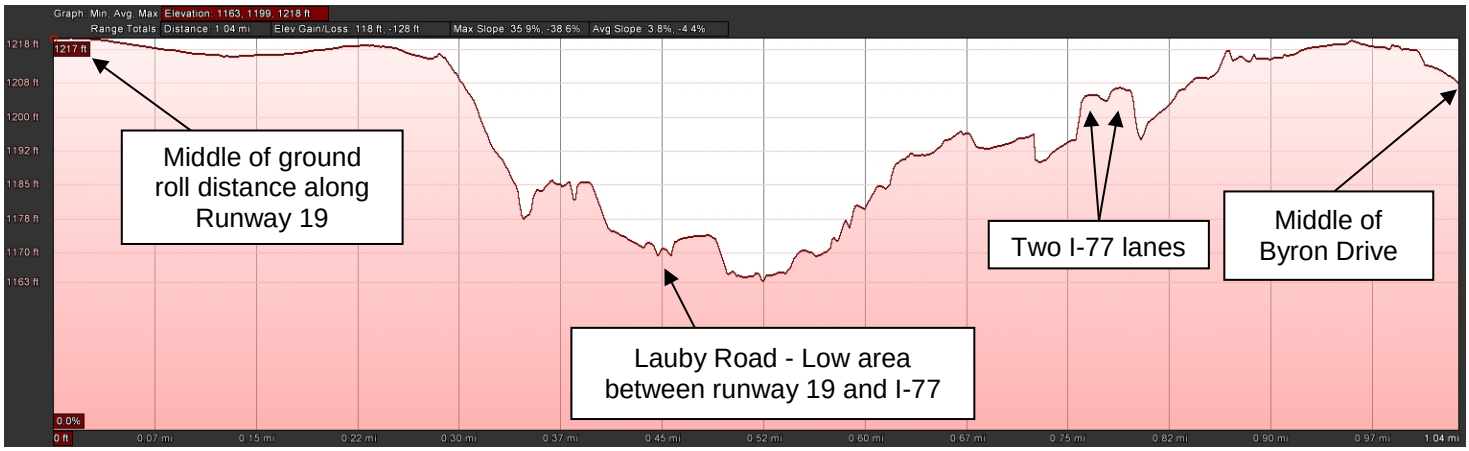
[18] These aircraft types are described in that report, at: http://www.akroncantonairport.com/files/noise/second-roundnoiseanalyses4-25-2014.pdf.

The ground-roll distances are shown because they are the portion of the takeoff for which a barrier would provide the greatest benefit to the Byron Drive neighborhood, for two reasons: (1) they are the portion of the takeoff that is closest to the barrier and community, which will maximize insertion loss, and (2) after liftoff, the barrier will no longer block the line-of-sight path from the aircraft to the residences, eliminating any benefit.

As the figure shows, most Byron Drive residences have line-of-sight exposure to aircraft ground roll over a long distance. An airport property line barrier north of Greensburg Road would block only a portion of the exposure path and where it would block the path it would largely be by far less than the optimal 160° angle of view.

A barrier along Lauby Road (mostly, but not wholly on airport property), or off airport on the east side of I-77 might be suggested. The latter option would potentially address noise from the interstate, as suggested by the commenters. However, even ignoring land-ownership issues, the terrain in this area would make these barrier locations infeasible, as illustrated by Figure 4, which depicts the terrain along the center of the three line-of-sight paths depicted on Figure 3.

Figure 4 Elevation Profile along a Line from the Middle of Runway 19 Takeoff Ground Roll to the Middle of Byron Drive
Source: HMMH and Google Earth Professional, 2014



As the figure shows, there is a drop in the terrain on the airport side of I-77, in the vicinity of Lauby Road, which would require a barrier height of approximately 35 to even 50 ft. to simply to break the line-of-sight from the runway to the residences; an effective barrier would have to be impractically high. With regard to an off-airport barrier east of I-77, it is significant to note that Byron Drive is approximately 15 ft. below the raised terrain between it and the highway, which already acts as a barrier. A barrier along the east side of the highway would have to be substantially higher than that terrain to add any benefit for aircraft operations.

3.3.2 Other Considerations

There are also operational, acoustic, and financial considerations to take into account.

Operational

First, as noted previously, barriers only affect ground-based airport operations. Due to the location of Byron Drive relative to Runway 19, the greatest potential benefit would come from start-of-takeoff roll noise from Runway 19 departures. As discussed in the "Project Introduction and Inventory Report,"[19] Runway 19 departures make up only 13% of departures and only 8% of the total operations at CAK.

[19] http://www.akroncantonairport.com/files/noise/september172013draftprojectintroductionandinventoryreport.pdf. *Op. cit.* Table 8, page 79.

Acoustical

Soft ground (such as grass field) under a sound propagation path between a source and receiver results in some noise reduction due to "ground absorption." [20] By adding a barrier between the source and receiver, the sound path is elevated over the barrier and above the ground, resulting in loss of some ground effect. Consequently, the height of a barrier must be increased to make up for the loss of ground absorption.

Wind blowing from source-to-receiver can reduce barrier effectiveness, especially for barriers located midway between source and receiver.[21] Because aircraft generally use runways so that they take off into the wind, there is frequently a wind component in the source-to-receiver direction during takeoff. "It is generally recognized that downward-curving sound paths, as in propagation downwind or during the temperature inversions that are common at night, do reduce the insertion loss of a barrier."[22] To the extent that the Byron Drive neighborhood is downwind of the runway, the barrier effectiveness would be further reduced.

Financial

The cost of installation of a sound barrier usually exceeds $500,000 per mile.[23] FAA gives priority for funding under the federal Airport Improvement Program (AIP) to projects benefiting residences within the 65 dB DNL contour. The competition for funding within that contour means that projects rarely are located in areas where noise exposure levels are below 65 dB DNL. The exposures of the estimated 28 residences on Byron Drive range from approximately 54 to 58 dB DNL for both the 2014 and 2019 Noise Exposure Maps. It would be extremely unusual for the FAA to approve noise mitigation funding at such low levels of exposure. Moreover, the airport could not use other revenue from airport sources, because that would violate contractual commitments ("grant assurances") it makes to the FAA when it accepts AIP grants, which obligate it to use all airport revenue for federally approved, airport-related purposes. The same grant assurances prohibit the airport from using airport revenue or AIP funding to address non-airport environmental matters; e.g., noise from I-77.

3.3.3 Tree Line Sound Barrier

One comment suggested that a line of trees be planted along I-77 to reduce the noise impact at Byron Drive. In order for a wooded area to provide sound attenuation, several conditions must be met. In particular, the wooded area must be dense with trees, have sufficient underbrush to block direct view of the source from the receiver and to produce acoustically soft ground, and the trees must generally protrude above the line-of-sight by 16 ft. or more.[24] Furthermore, an appropriately wooded area is most beneficial in reducing for high frequency sound propagation, due to the diffraction of sound from leaves. However, aircraft noise (especially start of takeoff noise) tends to be low frequency, and thus less susceptible to being reduced by the wooded area. A simple row of trees would not be effective.

3.3.4 Conclusion

For a broad spectrum of geographical, regulatory, operational, acoustic, and financial considerations, a sound barrier or a tree line is not a feasible solution to reduce ground-based aircraft noise at Byron Drive.

3.4 Consider Requesting Military Aircraft to Fly Higher Over Residences

This proposal calls for FAA and military operators to adjust air traffic control (ATC) and aircraft operating procedures. Current ATC procedures are in place to maintain safe separation of aircraft operating in the

[20] Crocker, M. J. (2007). *Op. Cit.* and Beranek, L. L., & Vér, I. L. (1992). Noise and Vibration Control Engineering. John Wiley & Sons, Inc.

[21] Beranek & Vér (1992). *Op Cit.*

[22] I-INCE. (1999). *Op. cit.*

[23] *Ibid.*

[24] Beranek & Vér (1992). *Op Cit.*

airspace under the control of the CAK airport traffic control tower (within a five-mile radius circle centered on the airport, from the ground to 4,000' above airport elevation). Current aircraft operating procedures are in place to ensure the safe operation of aircraft. Given that there are no noncompatible land uses within the noise contours in the area of concern to these commenters, there is no basis under Part 150 for requesting changes to existing procedures designed to maximize safe aircraft operation.

3.5 Consider Stricter Regulations on Flight Times and Patterns

3.5.1 Stricter Regulation of Flight Times

Strict regulation of flight times falls under the category of "use restrictions," as discussed in Section 5.2, item b.5, of the second-round noise abatement analysis memorandum.[25] These types of restrictions are governed by a separate federal regulation, 14 C.F.R. Part 161, "Notice and Approval of Airport Noise and Access Restrictions."[26] Part 161 sets forth a set of very rigorous analysis, notice, documentation, application, and approval processes. Obtaining FAA approval of a use restriction would require demonstrating that the noise-related benefits of the restriction would exceed the costs to all potentially affected parties (e.g., aircraft operators, the airport, aircraft passengers, businesses benefiting from the operations, etc.). FAA only considers noise benefit within the 65 dB DNL contour.

As discussed in the first-round noise abatement analysis memorandum, there is no noncompatible land use within the Noise Exposure Map contours for either 2014 or 2019. Therefore, a Part 161 application would be an unproductive effort from the outset, due to the absence of any benefit recognized by the FAA.[27]

3.5.2 Stricter Regulation of Flight Patterns

The second-round noise abatement memorandum analyzed numerous flight-pattern alternatives (in terms of both flight track and runway use), i.e., Alternatives 1- 9 (including 1A and 5A). Alternative 10 presented in Section 3.2 of this memorandum addresses an additional flight track option, proposed by these same commenters. Section 4 presents noise contours for promising combinations of these alternatives.

3.6 Consider Sound-Insulation Treatment of Homes Most Near the Airport

FAA supports sound insulation of residences or other noise-sensitive uses under very strict conditions, as set forth in "Program Guidance Letter 12-09, Eligibility and Justification Requirements for Noise Insulation Projects," revised November 7, 2012.[28] The "PGL" defines three primary conditions: (1) the residence or other structure under consideration must be within the 65 dB DNL contour, (2) existing interior levels must be in excess of 45 dB DNL, and (3) the noncompatible development must have existed as of October 1, 1998.

Since no land uses in the CAK environs meet even the first of these conditions, sound insulation is not a viable option for consideration under Part 150 or any other federal funding under the Airport Improvement Program.

4. PROMISING COMBINATIONS OF ALTERNATIVES BASED ON PUBLIC INPUT

The noise abatement alternative analyses prepared to date have resulted in the identification of several that result in reduction of the number of residents within the 60 dB DNL contour. While this contour is five decibels outside the FAA's normal area for considering approval of new noise abatement measures, the

[25] See http://www.akroncantonairport.com/files/noise/second-roundnoiseanalyses4-25-2014.pdf.

[26] See http://www.faa.gov/airports/environmental/airport_noise/, "Airport Noise and Access Restrictions (14 CFR Part 161)" heading.

[27] It is worth noting that since FAA promulgated Part 161 in 1991 (at the direction of the U.S. Congress in the "Airport Noise and Capacity Act of 1990," ANCA), only two airports have received FAA approval for a new noise or access restriction. In one of those cases, the airport had to sue the FAA to obtain that approval. In both cases, the budget for the effort was in excess of $2 million.

[28] http://www.faa.gov/airports/aip/guidance_letters/media/pgl_12_09_NoiseInsulation.pdf

Advisory Committee reached consensus that analysis of combinations of four these alternatives merited consideration. The four measures are:

- Alternative 1A: South-Flow Night Runway Use Changed to Shift Departures from Runway 23 to 19
- Alternative 5A: All South-Flow Runway Use Changed to Shift Departures from Runway 23 to 19
- Alternative 7: Eastbound Jet Departures on Runway 23 Fly Runway Heading Until Three Nautical Miles from the Radar
- Alternative 8: All East- and Southbound Jet Departures on Runway 19 Initiate a Turn to 160° at One Nautical Mile from the Radar

Since the first two alternatives are mutually exclusive runway use options, two combinations of alternatives can be considered:

- Combination 1: Alternative 1A Runway Use Combined with Alternatives 7 and 8 Flight Track Use
- Combination 2: Alternative 5A Runway Use Combined with Alternatives 7 and 8 Flight Track Use

These combinations are discussed on the following pages.

4.1 Combination 1: Alternative 1A Runway Use Combined with Alternatives 7 and 8 Flight Track Use

The figures on the following two pages present contours for Combination 1, first on a 2014 annual average day basis and second on a day in 2014 when all operations are in the south flow. Table 7 and Table 8 compare the residential land uses within the 60-65 dB DNL contour – by runway end – for these two contour comparisons.

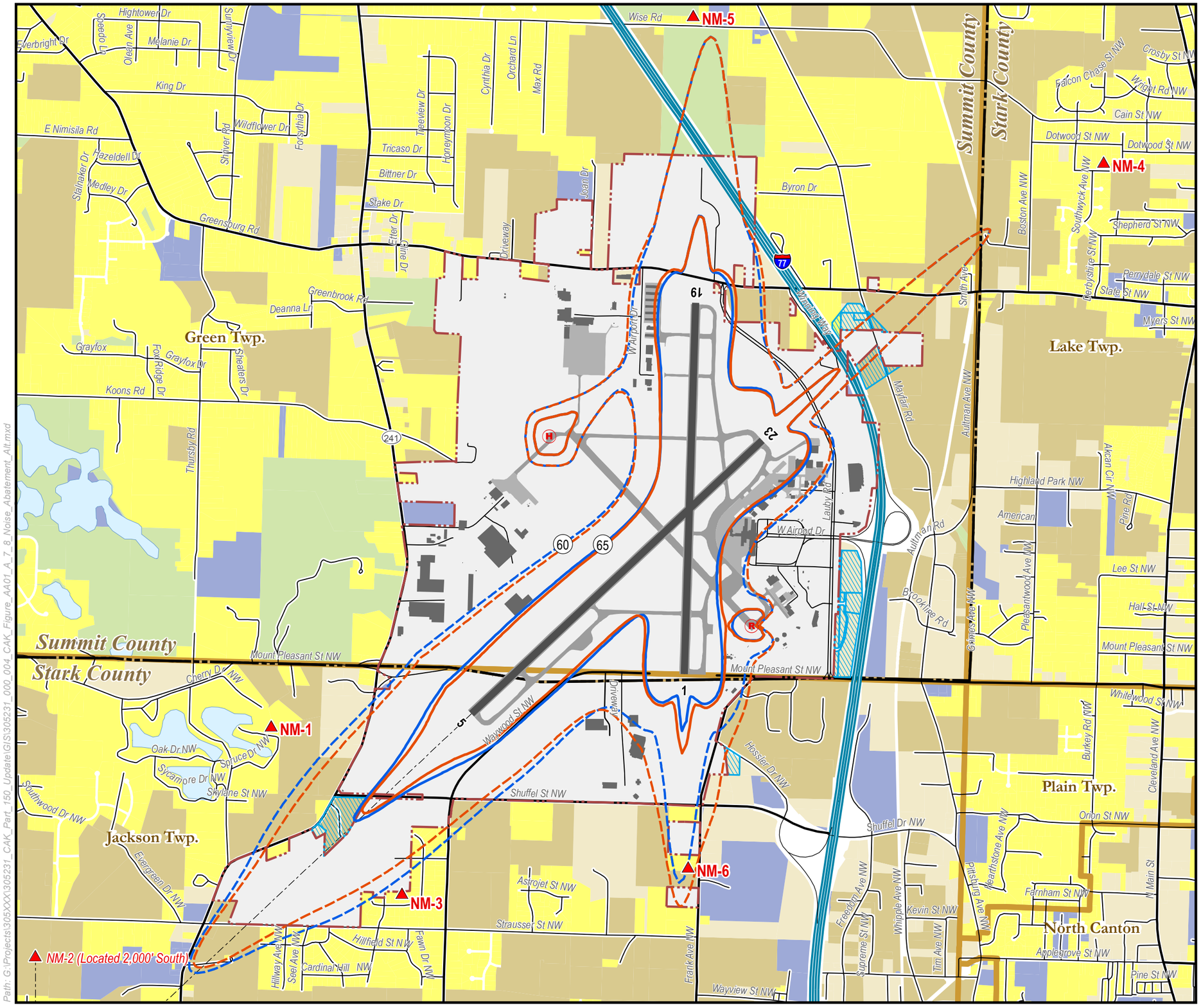
Table 7 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Combination 1: Alt. 1A Runway Use Combined with Alt.s 7 and 8 Flight Track Use on an Average Day in 2014, Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Combination 1	Residents	0	2	5	26	33
	Dwelling Units	0	1	3	12	16
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

Table 8 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Combination 1: Alt. 1A Runway Use Combined with Alt.s 7 and 8 Flight Track Use on a South-Flow Day in 2014, Compared to 2014 South-Flow Day
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Combination 1	Residents	0	50	3	67	120
	Dwelling Units	0	18	2	30	50
2014 Existing South-Flow Day	Residents	0	50	0	157	207
	Dwelling Units	0	18	0	68	86

This analysis reveals that Combination 1 reduces the number of residents within the 60 dB DNL contour substantially on both an annual average day and south-flow day.



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AKRON-CANTON AIRPORT

Combination 1: 2014 DNL for Alt. 1A Runway Use with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual or zoned. Draft subject to verification.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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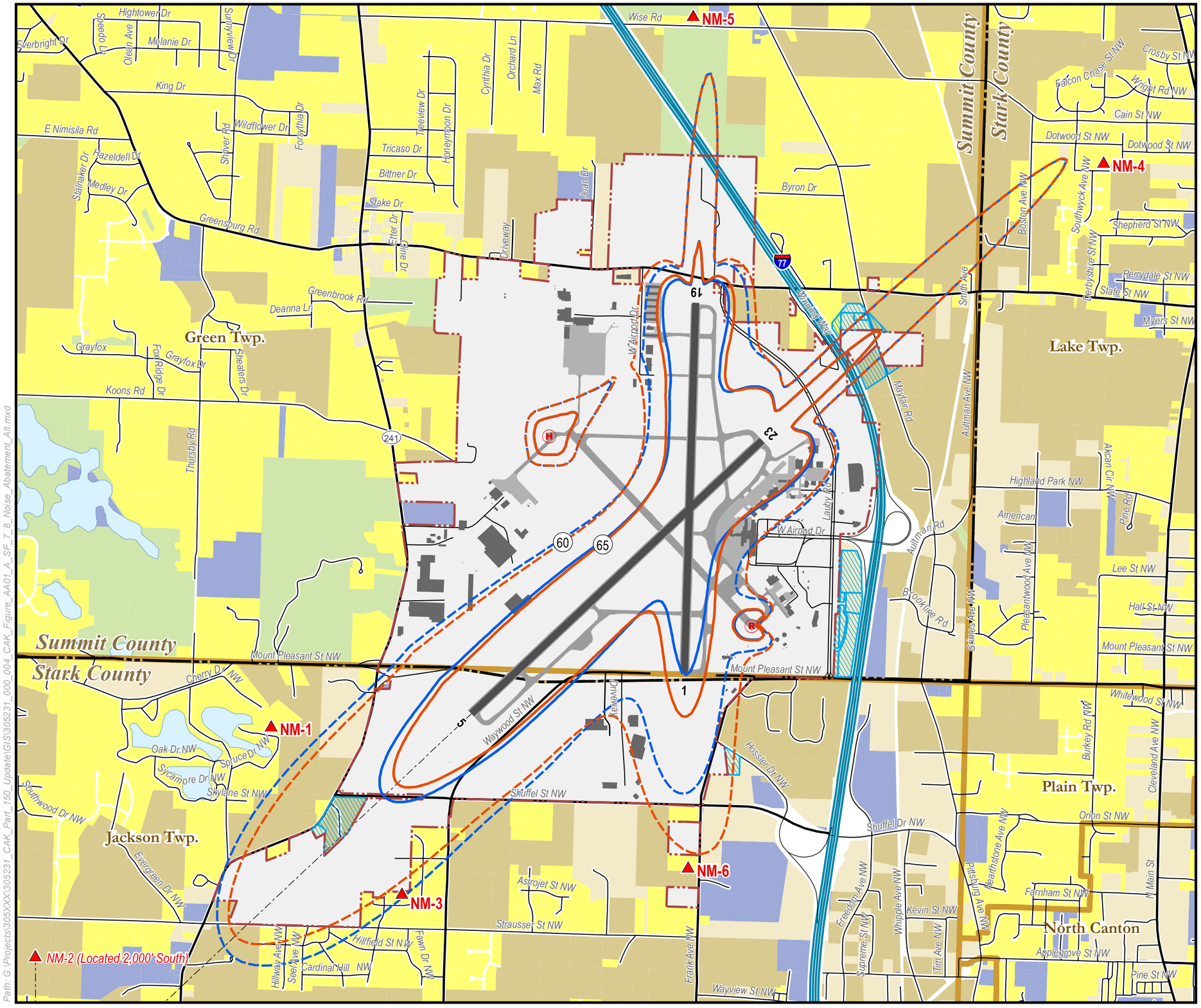

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South-Flow Day DNL for Alt. 1A Runway Use Combined with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
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North

0 2,000 4,000 Feet

HARRIS MILLER MILLER & HANSON INC.

4.2 Combination 2: Alternative 5A Runway Use Combined with Alternatives 7 and 8 Flight Track Use

The figures on the following two pages present the contours for Combination 2, first on an annual average day basis and second on a day when all operations are in the south flow. Table 9 and Table 10 compare the residential land uses within the 60-65 dB DNL contour – by runway end – for these two contour comparisons.

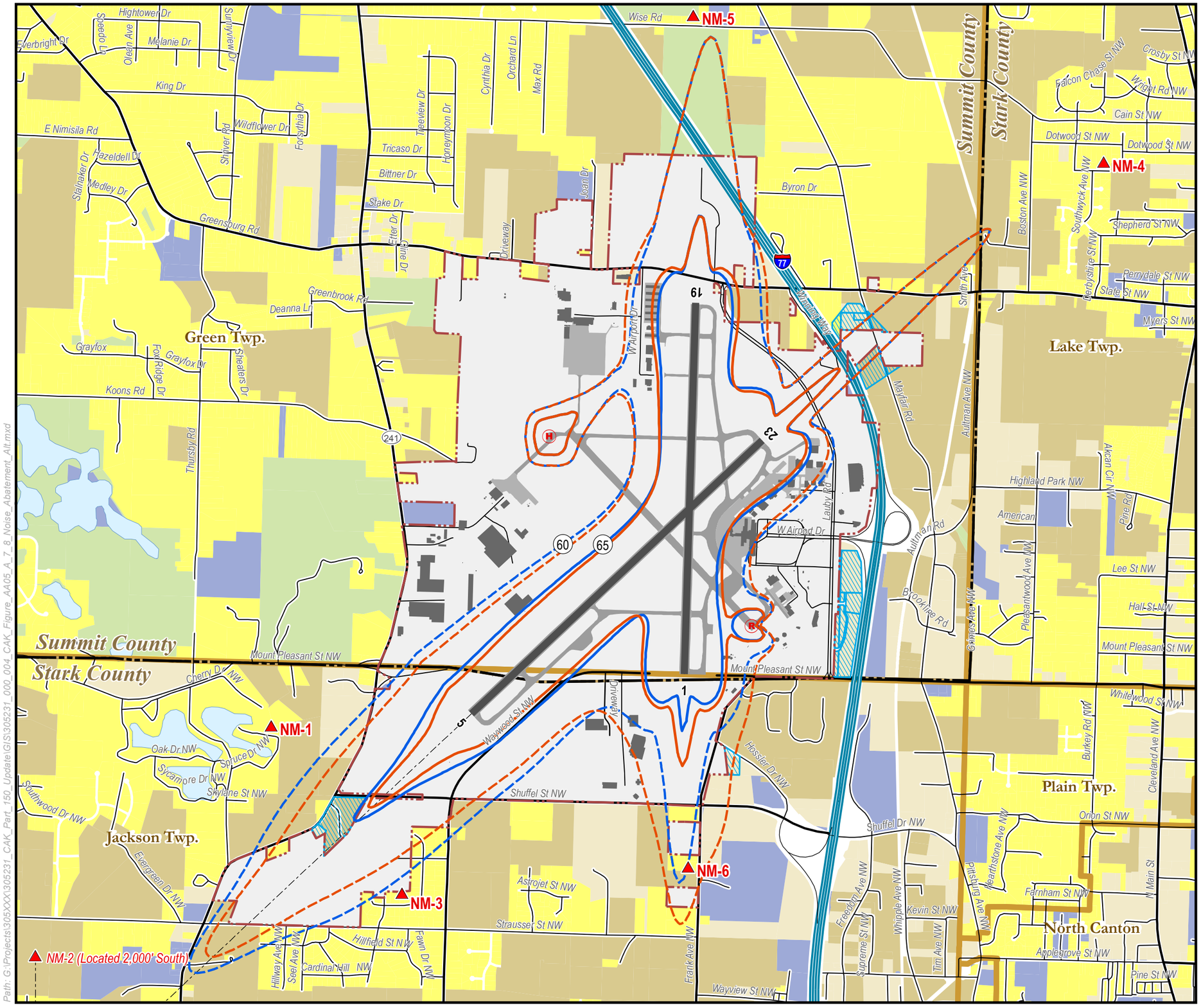
Table 9 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Combination 2: Alt. 5A Runway Use Combined with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Combination 2	Residents	0	2	5	15	22
	Dwelling Units	0	1	3	7	11
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

Table 10 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Combination 2: Alt. 5A Runway Use Combined with Alt.s 7 and 8 Flight Track Use on a South-Flow Day in 2014, Compared to 2014 South-Flow Day
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Rwy 23 approach / Rwy 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Combination 2	Residents	0	52	5	33	36
	Dwelling Units	0	18	3	14	17
2014 Existing South-Flow Day	Residents	0	50	0	157	207
	Dwelling Units	0	18	0	68	86

This analysis reveals that Combination 2 reduces the number of residents within the 60 dB DNL contour substantially on both an annual average day and south-flow day. The reductions are even greater than Combination 1, which is logical, since Combination 1 only affects nighttime south-flow runway use, whereas Combination 2 affects south-flow runway use on a 24-hour basis. The modified flight-track geometry objective applies to all Runway 1 departure and Runway 19 arrivals on a 24-hour basis in both combinations.



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AKRON-CANTON AIRPORT

Combination 2: 2014 DNL for Alt. 5A Runway Use with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
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Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

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North

0 2,000 4,000 Feet

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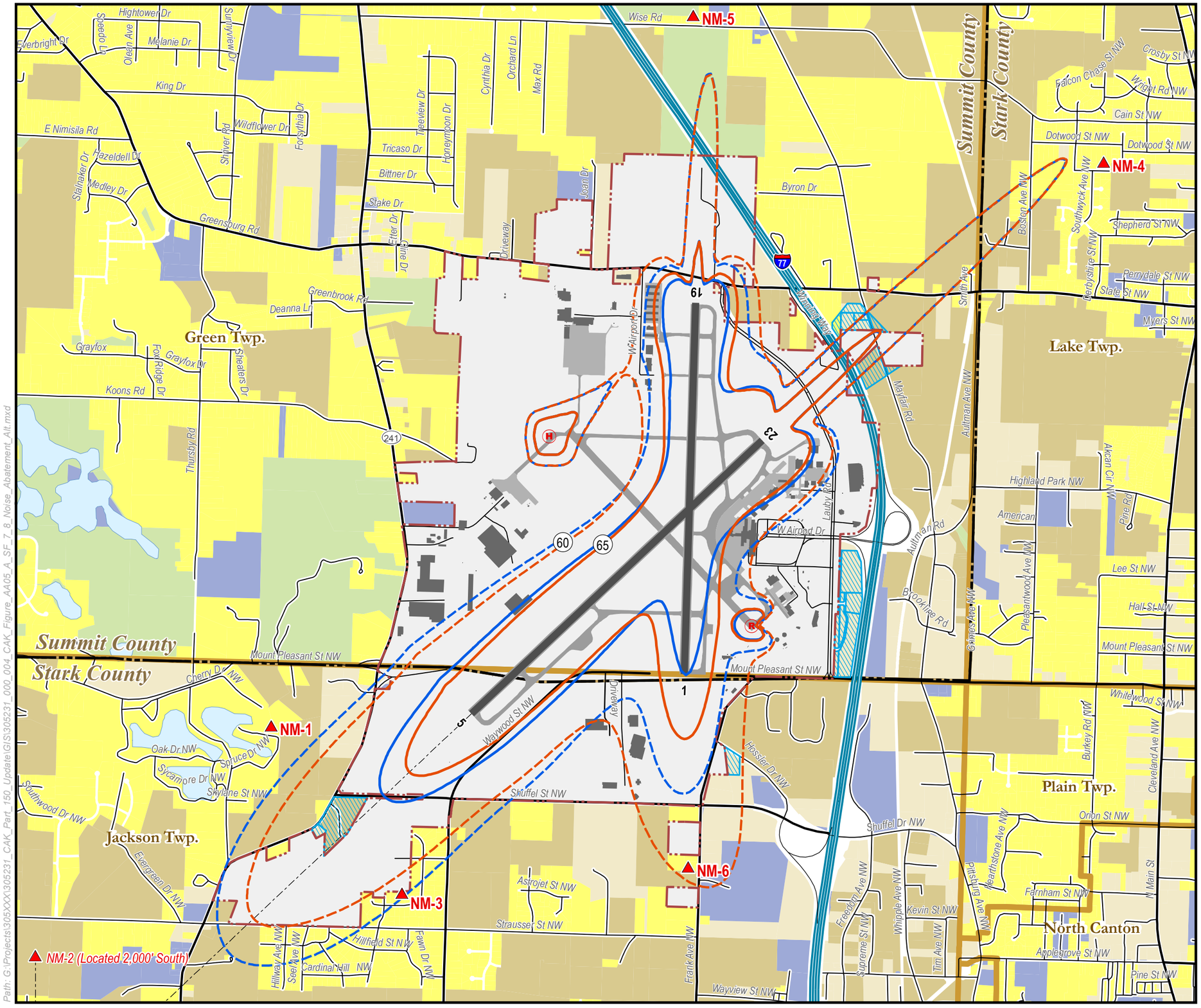

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South-Flow Day DNL for Alt. 5A Runway Use Combined with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB)
- Airport Property Boundary
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- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

HARRIS MILLER MILLER & HANSON INC.

5. SUMMARY OF NOISE ABATEMENT ALTERNATIVE RESULTS

The analyses presented in the three noise abatement memoranda (culminating in this document) have addressed a total of 14 noise abatement alternatives cases, which fall into four major groups, as follow:

- Eight preferential runway use cases; i.e., Alternatives 1- 6 and 1A and 5A. As discussed in Section 2 of this memorandum, the Advisory Committee reached consensus at the last meeting that further consideration was justified for Alternatives 1A and 5A, which reflect adjustment to south-flow runway use to shift departures from Runway 23 to 19 in the nighttime and on a 24-hour basis, respectively.
- Three flight track cases; i.e., Alternatives 7, 8, and 10, which address Runway 23 departure tracks, Runway 19 departure tracks, and a combination of Runway 1 departure and Runway 19 arrival tracks, respectively.
- One case – Alternative 8 – considering a shift in the Runway 5 start-of-takeoff-roll point.
- Two cases that combine promising runway use and flight track alternatives; i.e., Combinations 1 and 2 that merge flight track use adjustments from Alternatives 7 and 8 with runway use adjustments from Alternatives 1A and 5A, respectively.

Table 11 summarizes the "benefits" in terms of the number of residents removed from the 2014 annual average day 60 dB DNL contour for these 14 cases.

Table 11 Summary of the Benefits and Costs of Eight Preferential Runway Use Alternatives Considered
Source: HMMH, 2014

Case	Component(s)	Residents within 2014 Annual Average Day 60 dB DNL					Population Reduction (Increase)
		North	Northeast	South	Southwest	Total	
2014 Existing	Status Quo	0	2	4	56	62	n.a.
Alternative 1	Night departure runway use revised to match night arrivals	0	10	5	17	32	30
Alternative 1A	South-flow departures shifted from Rwy. 23 to 19 at night	0	2	5	25	32	30
Alternative 2	Night arrival runway use revised to match night departures	0	38	5	37	80	(18)
Alternative 3	Day departure runway use revised to match day arrival use	0	2	5	34	41	21
Alternative 4	Day arrival runway use revised to match day departure use	0	2	4	51	57	5
Alternative 5	All departure runway use revised to match all arrival use	0	29	7	9	45	17
Alternative 5A	South-flow departures shifted from 23 to 19 day and night	0	2	7	8	17	45
Alternative 6	All arrival runway use revised to match all departure use	0	58	5	35	98	(36)
Alternative 7	Eastbound Runway 23 jet departures fly runway heading until three nautical miles from the radar	0	2	4	54	60	2
Alternative 8	All east- and southbound jet departures on Runway 19 initiate a turn to 160° one nautical mile from the radar	0	2	3	56	61	1
Alternative 9	Runway 5 start-of-takeoff displaced 1,250' to the northeast	0	2	4	56	62	0
Alternative 10	Reduce Runway 1 departure and 19 arrival track dispersion	1	2	4	56	63	(1)
Combination 1	Alternatives 1A, 7, and 8	0	2	5	26	33	29
Combination 2	Alternatives 5A, 7, and 8	0	2	5	15	22	40

5.1 Conclusions

These analyses primarily support pursuing preferential runway use Alternative 1A or 5A. Combinations 1 and 2, which add the flight track refinements, provide slightly *less* benefit, because the combined effect of preferential runway use and tightened flight corridors tend to extend the contours into populated areas.

5.1.1 Runway Use Alternative 1A versus 5A

Section 3.19 of the last noise abatement memorandum discussed the benefits and costs of the full range of preferential runway analyses considered in this study.[29] Those analyses were discussed at the fifth committee meeting and second workshop. The further analyses of Alternatives 1A and 5A on a "south-flow day" basis presented in this memorandum respond to questions raised at those two meetings.

The additional analyses do not change any of the previous conclusions regarding the most productive preferential runway alternative, including the following major points:

- No alternative reduces noise exposure within the annual average day 65 dB DNL contour, which FAA nearly universally considers a prerequisite for approval of Part 150 Noise Compatibility Program measures.
- Alternative 5A provides the greatest reduction in population within the annual average day 60 dB DNL contour of all preferential runway cases (45 residents).
- Alternative 1A provides the second greatest reduction in population within the annual average day 60 dB DNL contour of all preferential runway cases (30 residents).
- Alternative 5A would require changes in south flow departure runway use on a 24-hour basis and potentially affect 17 operations on an annual average day.
- Alternative 1A would require changes in south flow departure runway use only during nine nighttime hours (10 p.m. – 7 a.m.) and potentially affect only three operations on an annual average day.
- Alternative 1A would reduce the population within the annual average day 60 dB DNL contour by 10 residents per operation affected, roughly four times 5A's 2.6 resident reduction per operation.
- FAA Airport Traffic Control Tower staff in attendance at the fifth committee meeting provided initial feedback that they believed Alternative 1A would be feasible from an operational perspective, but that Alternative 5A would not.
- Aircraft operators in attendance at the fifth committee meeting also provided initial feedback that they felt Alternative 5A would likely be considered an onerous burden, but that Alternative 1A would not.

5.1.2 FAA Runway Use Program Criteria

As also noted in Section 3.19 of the preceding noise abatement memorandum, since none of the alternatives considered will reduce population within the 65 dB DNL contour, which FAA considers the outer limit of land use compatibility concerns, any alternatives could only be proposed on a "voluntary" basis, as an "informal runway use program" in FAA terminology, as defined under FAA Order 8400.9, "National Safety and Operational Criteria for Runway Use Programs," (issued November 09, 1981).[30]

6. RELEVANCE OF EXISTING PROGRAM MANAGEMENT MEASURES

To this date, presentations and materials provided to the Advisory Committee have focused on two categories of Noise Compatibility Program measures; i.e., noise abatement and compatible land use. The FAA's Record of Approval (ROA) for the prior (1998) Noise Compatibility Program submission also included seven "program management" measures.[31] Those measures, and their relevance to the current results, are summarized below.

[29] See http://www.akroncantonairport.com/files/noise/second-roundnoiseanalyses4-25-2014.pdf.

[30] A copy of that order was provided in Appendix A of the second noise abatement memorandum, to which the preceding footnote points.

[31] The ROA is presented on the Part 150 Update website at http://www.akroncantonairport.com/files/noise/april41998cakncproa.pdf.

6.1 Update Noise Complaint Receipt and Response Procedures

The ROA approved updating complaint receipt and response procedures using paper forms. The Authority has taken advantage of technological advances not anticipated in the late 1990s to implement an internet-based process, whereby complaints and inquiries are received via the CAK website. The complaints are forwarded to the CAK President and CEO, who either responds personally or delegates the responsibility to another airport staff member. This process provides a much higher level of service than that proposed in the last study.

6.2 Establish Noise Monitoring System

The ROA approved acquisition of a portable noise monitor. The FAA's Airport Improvement Program (AIP) Handbook, Order 5100.38C[32] sets forth conditions under which airports may use federal funding. With regard to noise monitoring, paragraph 813(c) states that "fixed noise monitoring equipment is ineligible where the Part 150 noise exposure maps (existing and forecast) show no noncompatible land uses," which is the case at CAK. Paragraph 813(d) notes that portable monitors are eligible under certain conditions, as follow:

> A noise-monitoring proposal should not be an end in itself, nor an instrument for enforcement of a noise rule or procedure. Rather, noise monitors should provide an ongoing stream of useful products and data in support of the overall noise compatibility program. A primary justification should be to provide information necessary to carry out other noise compatibility projects in the approved NCP, or to monitor progress in achieving noise compatibility objectives. Some sample uses of noise monitoring data include:
>
> (1) Selection of dwelling units or other structures for noise insulation;
>
> (2) Pre- and post-insulation interior/exterior noise measurement;
>
> (3) Compliance with a monitoring requirement of State noise law;
>
> (4) Aiding implementation of other noise compatibility projects; or
>
> (5) Providing noise data for future revision of the NCP.

The key condition is: "A primary justification should be to provide information necessary to carry out other noise compatibility projects in the approved NCP, or to monitor progress in achieving noise compatibility objectives." Noise monitoring at CAK would not meet either of these criteria, since no projects require monitoring for implementation and the absence of noncompatible land within 65 dB DNL means CAK has met its noise compatibility objectives. Portable measurements conducted for this study confirm this situation.[33]

6.3 Public Information and Pilot Outreach

The ROA approved continuing public information on aircraft noise, impacts, and compatible land use. This is another area where the airport has used technology – the CAK website – that was unanticipated when the last Part 150 was undertaken. Today, airport websites are the most common mechanism for public information and pilot outreach. The Part 150 section of the CAK website is an excellent example of this trend. It would be most effective for CAK to transition that section of the website over to a continuing resource. The material on the website already addresses "information on aircraft noise, impacts, and compatible land use." As this study progresses through completion, the website will include complete documentation. When the FAA provides its ROA, the airport can update the website with relatively little effort, to reflect the final approved program.

Most airports include sections that present information focused on residents and pilots. The pilot outreach material could be prepared in a manner that permits it to be distributed (in either electronic or printed format) to pilots, airlines, airport tenants, etc. Many examples of such materials are available on the internet. The airport also might consider taking advantage of the free "whispertrack" web resource that many airports use find to be

[32] See http://www.faa.gov/airports/aip/aip_handbook/

[33] See Section 3 of http://www.akroncantonairport.com/files/noise/september172013draftprojectintroductionandinventoryreport.pdf.

an effective pilot outreach mechanism.[34] That site includes many examples of pilot informational handouts of the type that CAK might develop once the FAA has identified the approved measures in the ROA.

In the course of meeting with local land use control jurisdictions (including all jurisdictions containing any land within the 60 dB DNL contour) CAK staff determined that it would be valuable to meet with land use officials and staff from those municipalities and counties on a regular (at least annual) basis to ensure a two-way flow of information regarding airport operations, on-and off-airport development proposals, and other matters that might affect land use compatibility. The representatives of each jurisdiction strongly supported this idea.

It is anticipated that CAK staff also will continue to provide regular updates on noise and compatible land use issues to the Authority at its meetings, and to external organizations as requested.

6.4 Noise Abatement Contact

The ROA approved identification of a noise abatement contact at CAK. This is another area where technological advances have permitted the CAK website to fulfill this role. For all intents and purposes, this measure has been integrated with Program Management Measure 1, "Update Noise Complaint Receipt and Response Procedures." It would make sense for the updated NCP to reflect that situation.

6.5 Air Terminal Information Service (ATIS) Advisory

The ROA approved inclusion of a short message, such as "noise abatement measures in effect," in the ATIS recording. This measure merits continued application, subject to FAA approval in the ROA.

6.6 Airside Informational Signs

The ROA approved working with local air traffic personnel to establish mutually acceptable signage, including location(s) and content. This measure merits continued application, subject to FAA approval in the ROA. To avoid distractions on the airfield, in most situations, the FAA generally approves only simple signage, such as the example shown below from Seattle Washington:

Figure 5 Noise Abatement Sign Example from Seattle-Tacoma International Airport
Source: www.portseattle.org (last visited August 6, 2014)

6.7 Noise Exposure Map and Noise Compatibility Program Review and Revision

The ROA approved a measure to undertake NEM updates every five years or as required by changed conditions." Given the absence of any noncompatible land uses within either the 2014 or 2019 Noise Exposure

[34] See https://whispertrack.com/

Maps, and the fact that the noise contours are projected to shrink over the five-year forecast period, an automatic commitment to conduct updates every five years appears unjustified.

A more practical approach adopted by many airports is to monitor airport operations to identify changes that might trigger FAA's Part 150 requirement that: "Revision should occur when it is likely a change has taken place at the airport that will cause a significant increase or decrease in the DNL noise contour of 1.5 dB or greater over noncompatible land uses. See §150.21(d)."[35]

Since there are no noncompatible land uses within the 65 dB DNL contour in either Noise Exposure Map, and few sensitive land uses even within 60 dB DNL, the contours would first have to grow sufficiently to extend the 65 dB DNL over a sensitive land use (e.g., residential). The contours prepared for this study indicate that noise levels would have to grow by at least three decibels to approach this requirement.

Analyses conducted for the fourth advisory committee meeting showed that jet operations were the most significant contributors to overall exposure and modeling them in isolation resulted in contours that were nearly identical to those for all activity.[36] Therefore to be conservative, it would be appropriate for the Authority to prepare an annual analysis of changes in total jet operations, with the purpose of identifying when and if they have increased sufficiently to result in a three decibel increase.

All else remaining equal, a three decibel increase would result from a doubling in operations. This would represent the simplest method of monitoring the potential need for a Noise Exposure Map update. The analysis also should consider changes in fleet mix, such as introduction of regular activity in noisier aircraft types than forecast in this study. Given the anticipated continuing transition to newer, quieter air carrier and corporate jet aircraft, this appears unlikely. A major change in military operations, such as introduction of regular fixed-wing jet operations, would be another category to monitor.

In the event that either the level or mix of aircraft operating at the airport varies dramatically from that forecast in this study, the Authority might seek assistance from their planning consultant, who could perform some simplified calculations short of a full contour update to determine whether a full Noise Exposure Map update might be needed.[37]

[35] Part 150 Noise Compatibility Program Checklist, Part 1,1, Section VI. Program Revision.

See http://www.faa.gov/airports/environmental/airport_noise/part_150/checklists/media/noise_comp_cklist_parti.pdf

[36] See Section 3.3.1 of the project memorandum "Background for the Fourth Advisory Committee Meeting," http://www.akroncantonairport.com/files/noise/first-roundnoiseanalyses.pdf

[37] For example, the FAA's "Area Equivalent Method" is a simply spreadsheet-based tool that might be used for this purpose. See http://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/aem_model/

APPENDIX A: Written Input Received Following the Second Public Workshop

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June 3, 2014

Director McQueen
Akron Canton Airport
5400 Lauby Road NW
North Canton, OH 44720

RE: Noise Assessment Akron Canton Airport

Dear Mr. McQueen:

In followup to attending the May 29, 2014 meeting, I tried logging onto the airport's website and sending comments consistent with what I had told you and received a message that the website would not accept comments because of firewall projections. I'm not sure if my comments were sent through the Wall or not and whether this is a problem for computers in other locations.

In any event, here is a quick summary in writing.

First, it may be helpful to keep aircraft in assent patterns until after crossing Wise Road so that aircraft stay above non-housing areas during takeoff and landing. Small craft should also follow this procedure both on takeoff and landings. They are often seen turning East on takeoff or landing from approaches involving a turn from the East. This one step would greatly reduce noise over Mayfair Road and have little impact on costs.

I am aware that the FAA does not fund noise fences unless houses are within certain distances but I think funding could come from other sources such as state and local government. I would encourage that this option be considered and remain open as part of any noise "plan." One possible alternative to placing fences at the end of the runway on Greensburg Road would be to ask U.S. Department of Transportation to consider fences along I-77 from the Lobby airport exit coming off I-77 North to Wise Road. This would provide a double sound barrier if properly constructed and would also contain the noise of the expressway and may mitigate both the noise of the runway and may also help contain the smell of burnt jet fuel in Winter months (I forgot to mention this topic, a recent development last two Winters). Planting rows of evergreens along the East border of airport properties may also help with sound and air pollution control. I recently listened to a program on MPR regarding this topic and studies show trees eat air pollution. Thinking out of the box and improvising should be part of any plan regardless of what experts wish to advise the airport.

Lastly, military aircraft sometimes travel very low over houses in our area and you might caution them to stay at higher elevations on the East side per flight safety regulations not only to abate noise but due to a set of high tension wires traversing East to West parallel to Byron Drive.

Thank you for the opportunity to comment.

Sincerely,

David A. Mucklow

Ronnie & Cynthia Anderson
4678 Mayfair Rd
N. Canton, OH 44720

June 12, 2014

David A. Mucklow
919 E. Turkeyfoot Lake Rd #B
Akron, OH 44312

RE: Noise Assessment Akron Canton Airport

Dear Mr. Mucklow:

I am writing to make you aware of my agreement to your concerns in reference to the excessive noise associated with the air traffic in and out of the Akron Canton Airport (CAK).

I have lived just south of Wise Road for almost forty years. When we purchased this property, CAK did not have the daily traffic we currently see. As this airport has expanded into the Regional status it is today, the noise has become a great concern pertaining to my properly value and the desirability to live near CAK.

While commercial and military air traffic is an obvious concern. Please do not overlook the private air traffic in and out of CAK. I find these smaller jets to be louder and more frequent than the commercial or military.

I would personally like to see the noise fences installed, as well as stricter regulations on flight times and patterns.

Additionally, if Federal funding was made available, triple pained windows and other measures to help reduce air traffic noise inside the homes most near the airport would be very beneficial.

Please let me know if I could be of further assistance. Ron cell 330-714-4465.

Respectfully,

Ronnie and Cynthia Anderson