

Tempe Aviation Commission

Tuesday, May 7, 2024

6:30 p.m. – Call to Order

HYBRID

Tempe Public Library, Second Floor Hackberry Room
3500 S Rural Rd, Tempe, AZ 85282

VIRTUAL

Microsoft Teams meeting, [Click here to join the meeting](#)
Meeting ID: 294 426 406 350 Passcode: e7SXQK. Or call in (audio only)
[+1 480-498-8745,,619476816#](#) United States, Phoenix
Phone Conference ID: 619 476 816#

AGENDA

1. **Call to Order & Introductions**
2. **Public Appearances:** The Tempe Aviation Commission welcomes public comments at this time. The Commission may not respond to public comments unless the topic has been placed on the agenda. There is a *three-minute time limit* per citizen.
3. **Consideration of Meeting Minutes April 9, 2024;** for discussion and approval.
4. **Noise Pollution & Urban Economics;** study update from Jasdeep Mandia ASU.
5. **PHX flight procedures;** draft report; questions and answer session.
6. **Commissioners' Business;** suggestions for future agenda items.
7. **Schedule Next TAVCO Meeting;** tentatively August 13, 2024
8. **Adjournment.**

According to the Arizona Open Meeting Law, the Commission may only discuss matters listed on the Commission agenda. The City of Tempe endeavors to make all public meetings accessible to persons with disabilities. With 48 hours advance notice, special assistance is available at public meetings for sight and/or hearing-impaired persons. Please call 350-2905 (voice) or 350-8400 (TDD) to request an accommodation to participate in a public meeting. Parking information is available at <http://www.millavenue.com/go/tempe-community-council>. For public transportation route and schedule information, please visit www.valleymetro.org or call 602-253-5000.

DRAFT MEETING MINUTES

TAVCO

April 9, 2024

Minutes of the Tempe Aviation Commission meeting held via virtual Microsoft Teams meeting with call in +1 (480) 498-8745 United States, Phoenix (Toll) Conference ID: 147896898# at the Tempe Public Library Second Floor Hackberry Room, on April 9, 2024, 6:30 p.m.

(MEMBERS) Present:

James P. Camargo
John Lynch, Chair
Aaron McBride (attending remotely)
Joel Hunter
Vikas Seelam (attending remotely)

(MEMBERS) Absent:

Stuart Mitnik
Peter H. Schelstraete (excused)
Desiree Walker, Vice Chair

Citizens Present:

Kate Nakamura & three fellow students from ASU Walter Cronkite School of Journalism

City Staff Present:

Oddvar Tveit Temporary Aviation Coordinator

Agenda Item 1 – Call to Order

Mr. Lynch calls the meeting to order at 6:32 p.m.

Agenda Item 2 – Public Appearances

No public appearances. The students present were attending only to observe the proceedings.

Agenda Item 3 – Consideration of Meeting Minutes, March 12, 2024

Mr. Lynch asks for any amendments to the March meeting minutes. Mr. Hunter responds he has some proofreading edits but nothing substantive. Mr. Lynch asks for motion to approve with the edits. Mr. Camargo moves to approve the March 12, 2024, as amended. The motion is seconded by Mr. Hunter. The March minutes with edits are approved with Mr. Camargo, Mr. McBride, Mr. Hunter, and Mr. Seelam voting yes. Mr. Lynch is abstaining.

Agenda Item 4 – PHX Tower/TRACON Tour June 11, 2024

Mr. Tveit announces he will submit a PHX TRACON/Tower tour request. The purpose of adding the item to the agenda is to let the members know that the tour will replace the regular meeting on June 11, 2024, and that all the current members will be included in the request. The tour will happen in the afternoon. The exact meet-up time remains to be decided. He explains the functions of the PHX Terminal Radar Approach Control (TRACON) and the Air Traffic Control Tower (ATCT), and how air traffic control responsibilities coordinated for the civil, but also with the Luke Radar Approach Control (RAPCON) in airspace periodically used by military operations.

Agenda Item 5 – Another Aviation in Tempe Public Event

Mr. Tveit gives an aircraft noise complaint update from the month of March 2024 to help the Commission find potential event items the commission could consider to include in a future public event.

Departure Noise

Mr. Tveit shows how the complaints received on the departure noise over Tempe can have several operational causes:

1. The need for air traffic control to make use all available runway capacity at PHX during the busy morning hours.
2. The routing of departures over waypoints both inside and outside of the airspace over Tempe, impact how airline departure trajectories go. They depend on the chosen route out of PHX.

He mentions a complaint received from a resident located close to the Western Canal in Tempe who is impacted by a departure procedure used by aircraft destined for airports in southern California. The procedure has a waypoint in the airspace just south of the canal in Tempe and another out west in Buckeye. The procedure routinely brings aircraft departures on headings over the complaining resident's neighborhood. Area navigation (RNAV) facilitates more accurate navigation causing narrower air traffic flows. Mr. Lynch comments that the departure height is about 10,000 feet over the neighborhood where the resident lives. Mr. Tveit mentions that the problem for the complaining resident is that the noise from aircraft climbing and turning on the narrower flight paths, becomes unrelenting during the busy morning hours.

3. Departure deviation caused by air traffic from another airport.

He states that he also responded to a complaint from a resident located at W 18th St. about a departure not following regular flight path. This was caused by an Allegiant flight from Phoenix Mesa Gateway that was on a northwest heading that prevented the PHX departure from following the normal paths out to 4-DME.

4. Departure diverting off the path of a Standard Instrument Departure (SID) west of the airport.

Mr. Tveit shows two departures to the west during the month of March that for reasons assumed to be the air traffic volume at the time, were not following the normal flight paths for the chosen procedure over south Phoenix with a turn east south of the airport. Instead, the departures went north and back southeast over North Tempe, over the neighborhood of a resident at Bluebell Lane concerned about many flights outside established paths.

5. Area navigation (RNAV) departure (SID) procedure waypoints.

Mr. Tveit explains that the FAA introduced a fly-over waypoint (SPRKY) back in 2014, which is located at 4-DME, in the airspace close to the SR101/202 intersection. The waypoint has helped airlines keep a more consistent path out to 4-DME. However, some of the east departure route descriptions do not have the waypoint included in the procedure, and the location of the next waypoints outside Tempe borders on a chosen departure procedure, (SID), has significant impact on the amount of departure dispersion that occurs over north Tempe. Departures on routes with sharp turns north or south after 4-DME cause many airlines to start the turn early over north Tempe or the technology position the aircraft favorably to reach altitude and get to the final waypoint of the SID close to cruising altitude as quickly as possible.

Arrivals off the normal paths over North Tempe.

He explains flight graphs showing deviations off the normal final approach to PHX during a busy afternoon hour. Maneuvers sometimes made by pilots to slow down or increase distance to planes ahead in arrival flow to the same runway, have encroached arrivals into areas of North Tempe from where complaints were received. Descents over Tempe neighborhoods to merge into the downwind leg for the other parallel runway also occurred.

Noise monitor readings at sites closest to the residents filing complaints in north Tempe during the month of March

Mr. Tveit ends his presentation by showing Casper noise monitor event data from monitors located closest to the neighborhoods from where complaints were received. The monitoring site at N. McAllister Avenue and the monitor close to 5th Street at Jaycee Park. The proximity of the monitoring sites to the major flight paths has significant impact on the number of events the noise monitoring software can identify as aircraft noise. The McAllister site had several undetermined events, the 5th Street had none. The Jaycee Park had over 10,000 events attributed to aircraft operations during the month of March 2024.

Mr. Lynch proposes to table the agenda item for now and bring it up again closer to a public event in the fall. He states that the Commission will quickly lose people's attention with too much information.

Agenda Item 6 – Aviation Training and Sky Harbor Near Misses

Mr. Tveit updates the attendants about appropriation committees in the U.S. House and Senate agreeing on second package of final Fiscal Year 2024 appropriations bills, to secure funding for air traffic control operations. This funding will enable the FAA to hire 1,800 air traffic controllers to replace the retiring workforce. Mr. Lynch explains to the attending students that after near miss at PHX last year was reported in media, a concerned resident brought the issue to the Commission's attention. Since then the members have followed federal initiatives to boost controller training and recruitment. Mr. Tveit comments that a PHX TRACON/Tower tour would give attending members the opportunity to ask questions about recruitment and training at PHX.

Agenda Item 7 – Commissioners' Business

Mr. Lynch suggests the members review the information from staff about PHX flight procedures and Casper flight graphs and have the issue on as a separate topic on the next agenda.

Mr. Tveit informs the members that he had been contacted by a soon to graduate Ph.D. economics student who would like to update the Commission on a presentation he made a couple of years ago about home prices and aircraft noise pollution. He would like to present the update at the next meeting.

Agenda Item 8 – Schedule Next TAVCO Meeting

The next TAVCO meeting was tentatively scheduled to Tuesday, May 7, 2024.

Agenda Item 9 – Adjournment.

Mr. Hunter motions to adjourn the meeting. Mr. Camargo seconds. Unanimous approval.

The meeting is adjourned at 7:20 p.m.

Prepared by: Oddvar Tveit

Agenda Item #4

Essays in Environmental and Urban Economics

Jasdeep Mandia
Arizona State University



Motivation to Study Noise Pollution

- Noise is associated with worse health outcomes, higher crime rates, and lower learning.
- Housing market: 1 dB noise is associated with discounting of property by 0.1%-1.5%.
- Noise pollution from airplanes can reach up to 75 dB (\sim vacuum cleaner).
- Tradeoff of the airline industry.

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- Noise pollution from airplanes can reach up to 75 dB (\sim vacuum cleaner).
- Tradeoff of the airline industry.
- Challenging to establish causality.
- Overcome this challenge by using quasi-random changes in airplane flight paths.

Capitalization of Noise Pollution and Environmental Justice: Evidence from Changes to Flight Paths

Dissertation Chapters

Capitalization of Noise Pollution and Environmental Justice: Evidence from Changes to Flight Paths

Valuing Noise Pollution in a Residential Sorting Model: Evidence from Changes to Flight Paths

Dissertation Chapters

Capitalization of Noise Pollution and Environmental Justice: Evidence from Changes to Flight Paths

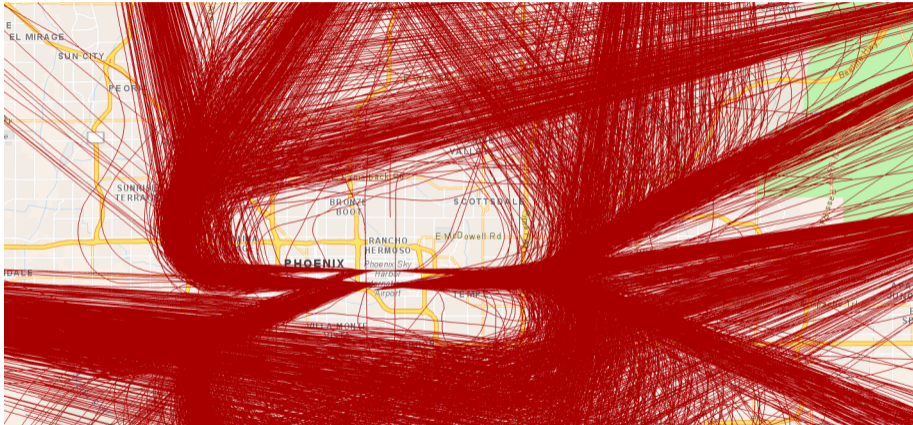
Valuing Noise Pollution in a Residential Sorting Model: Evidence from Changes to Flight Paths

Examining Amenity Valuation amid Information Friction in a Residential Sorting Model: Evidence from Changes in Noise Pollution

Research Questions

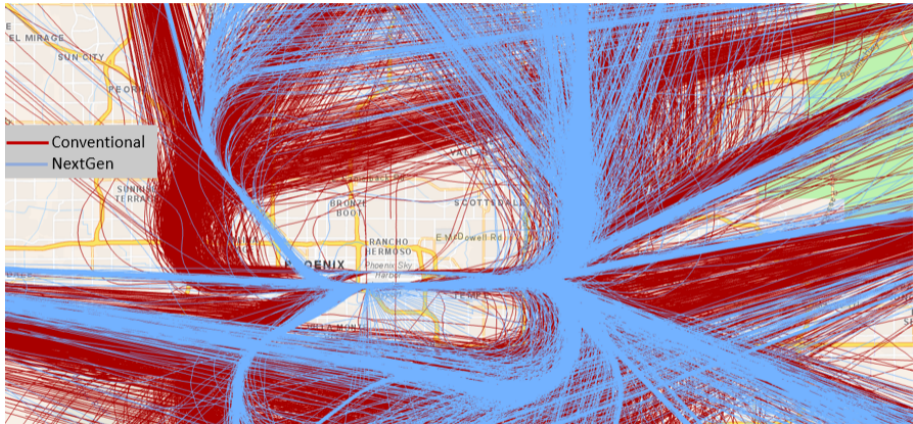
- What is the price of noise pollution?
- What are the distributional welfare effects of policies causing noise pollution change in the Phoenix metropolitan area?

Background



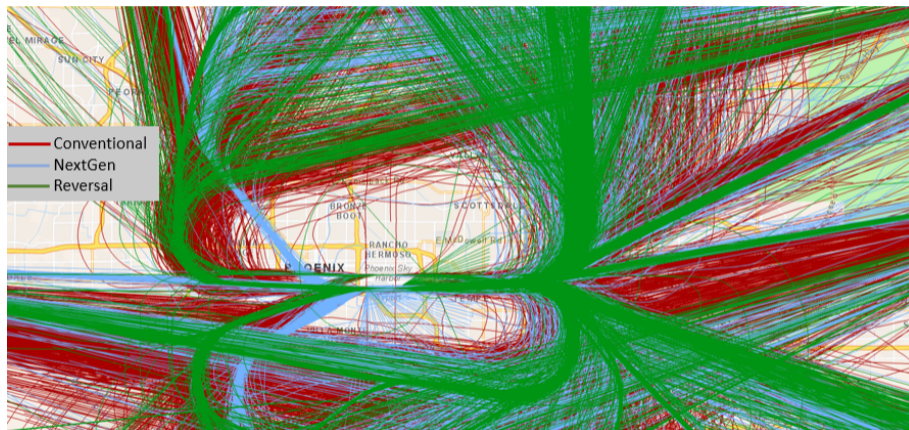
- Federal Aviation Administration (FAA) responsible for the flight routes
 - NextGen adopted across USA 2013 onwards.
 - Policy objective: shorter and narrower flight paths. Computer-generated optimized flight path.
 - Potential saving of \$4.6 million /year on fuel burn & carbon emissions in Phx.

Background



- NextGen adopted on September 2014 at Phoenix Airport
- 30 times increase in the noise complaints.
- The Historical neighborhood of Phoenix and the City of Phoenix Administration sued the FAA in 2015.

Background

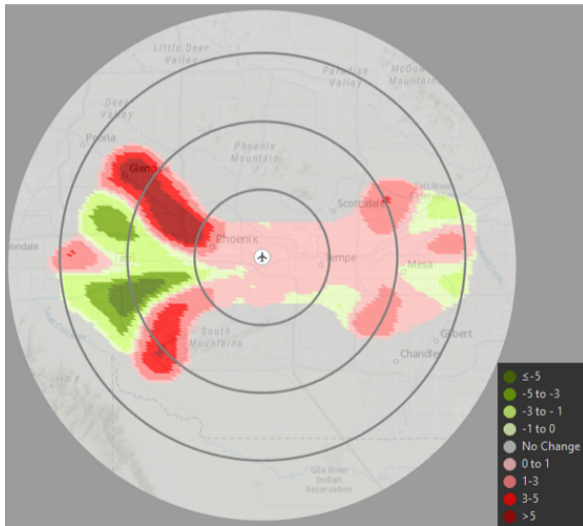


- Decision in favor of the City of Phoenix in August 2017.
- Partial policy reversal on April 2018.
- Conventional (Jan'10 - Sep'14); NextGen (Oct'14-Mar'18); Reversal (Apr'18-Apr'20).

Fundamentals of Noise

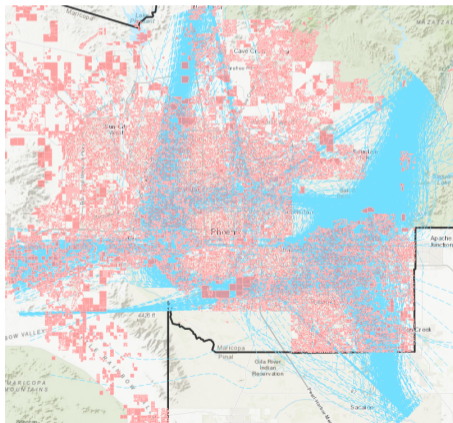
- Sound is the movement of energy in waves.
- Noise is an unwanted sound.
- Noise metric:
 - Noise intensity is measured in Decibel (dB).
 - DNL: Day-Night Average Sound Level.
- Noise exposure:
 - Noise measurement using Aviation Environmental Design Tool (AEDT)

Noise Pollution Change: Conventional to NextGen



Data

- GIS flight paths (900'k): Second week of every month (2010-2019) from Phoenix Airport.
- Housing data from Maricopa County Assessor's Office: property characteristics, sale data, GPS location.
- ACS: Census block group level neighborhood characteristics.
- DataAxle: HH demographics & moving data. ◀



Results

	OLS			FE	
	(1)	(2)	(3)	(4)	(5)
Noise	-0.0125*** (0.004)	-0.0158*** (0.003)	-0.0078*** (0.002)	-0.0104*** (0.000)	-0.0060* (0.003)
Any phase: all transactions	✓				
Conventional & NextGen		✓		✓	
NextGen & Reversal			✓		✓
Observations	138,307	26,277	12,577	26,277	12,577
Adjusted R^2	0.787	0.759	0.822	0.806	0.814

Results: Heterogeneity in Preferences

Age Group		Income Group		Ethnicity	
Group	MWTP	Group	MWTP	Group	MWTP
Less than 30	-2,861	Q1	-2,785	Hispanic	-2,730
30-45	-2,987	Q2	-2,901	African American	-2,863
45-65	-3,046	Q3	-2,990	Others	-3,029
More than 65	-3,135	Q4	-3,135	Western European	-3,088
		Q5	-3,335	Eastern European	-3,091
				Mediterranean	-3,122
				Uncoded	-3,114

◀ Mean MWTP

◀ Price Change

◀ Mean MWTP

Summary of Results

- Marginal willingness to pay:
 - MWTP to avoid 1 dB of noise pollution is \$3,038 (\approx \$6,000 for 1 sd).
 - Noise tax on a one-way flight is estimated at \$16.
 - Heterogeneity in MWTP: \$2,500 to \$3,500.
 - Ignoring time-varying unobserved quality overestimates the mean MWTP.
- Welfare analysis of NextGen adoption:
 - Annual potential savings from fuel and carbon emissions: \$4.6 million.
 - Net welfare loss: \$4.2 million.
 - Renters gain, owners lose.
 - Higher welfare losses for older, lower-income households.
- Counterfactual: Narrower NextGen:
 - Annualized total net welfare gain improves a little, but at the cost to some owners.
 - Bottom 1 percentile loses the most.

Summary of Results

- Effect:
 - 1 dB increase in the noise pollution flight reduces the property values by 1%.
 - MWTP to avoid 1 dB of noise pollution is \$3,038 (\approx \$6,000 for 1 sd).
 - Comparable to amenities like school quality.
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 - Noise tax on a one-way flight is estimated at \$16.
 - Heterogeneity in MWTP: \$2,500 to \$3,500.
- Capitalization effect:
 - NextGen: Total annualized capitalization gain, losses and net losses are \$ 7.1 million, \$ 13.3 million, and \$ 6.2 million respectively.

Chapter 3: Motivation to Study Information Frictions

- Relation between information and property value:
 - 4% decline in housing prices in flood zones after disclosures. (Pope, 2008b).
 - 3% decline in housing prices upon airport noise disclosure. (Pope, 2008a).

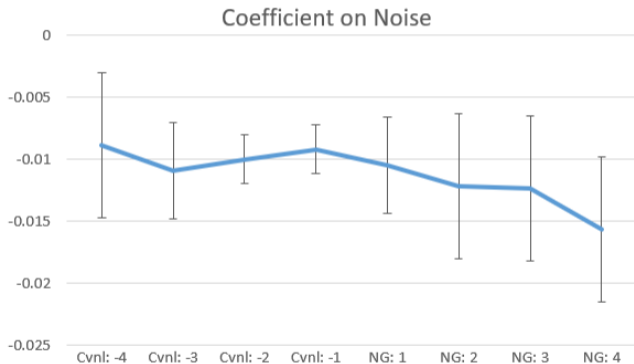
Chapter 3: Motivation to Study Information Frictions

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- Mechanism:
 - 94% of respondents become aware of the landfill after buying (McClelland et al., 1990).
 - Most homeowners did not know about the flood zone (Chivers and Flores, 2002).
 - Strong evidence of heterogeneity in flood risk perceptions (Bakkensen and Barrage, 2021).

Chapter 3: Motivation to Study Information Frictions

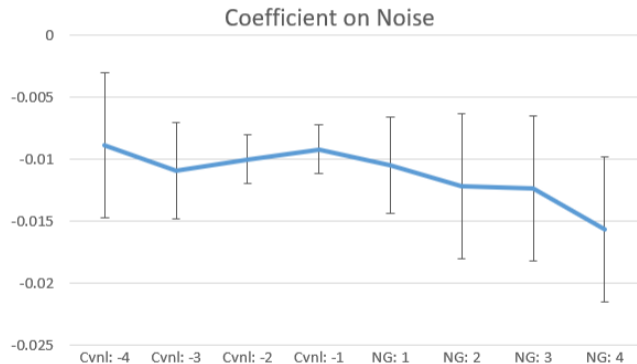
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 - Most homeowners did not know about the flood zone (Chivers and Flores, 2002).
 - Strong evidence of heterogeneity in flood risk perceptions (Bakkensen and Barrage, 2021).
- Important to study revealed preference under beliefs / information frictions.
 - Studied across the fields. ((Wiswall and Zafar, 2021), (Handel and Kolstad, 2015), (Ketcham et al., 2019), (Ma, 2019), (Bakkensen and Barrage, 2021))
 - Ignoring information frictions might cause non-trivial biases in MWTP

MWTP Pattern



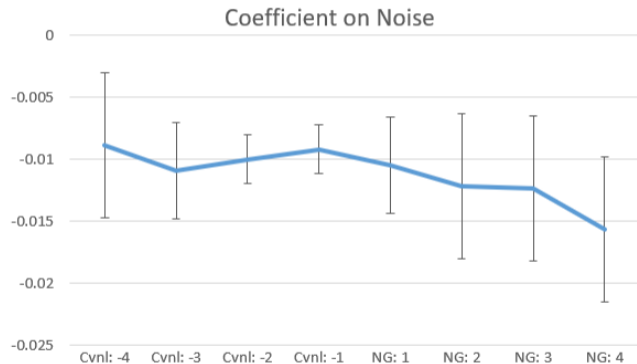
- MWTP increases from 1% to 1.5%.

MWTP Pattern



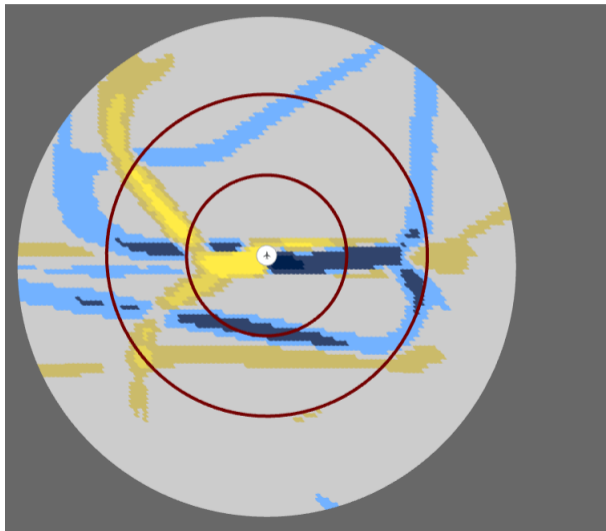
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MWTP Pattern



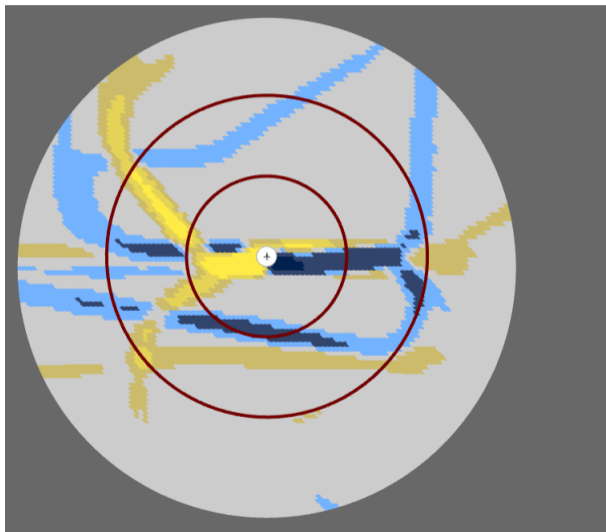
- MWTP increases from 1% to 1.5%.
- Mechanisms:
 - Increase in information
 - Decrease in other amenities

Variation in Information



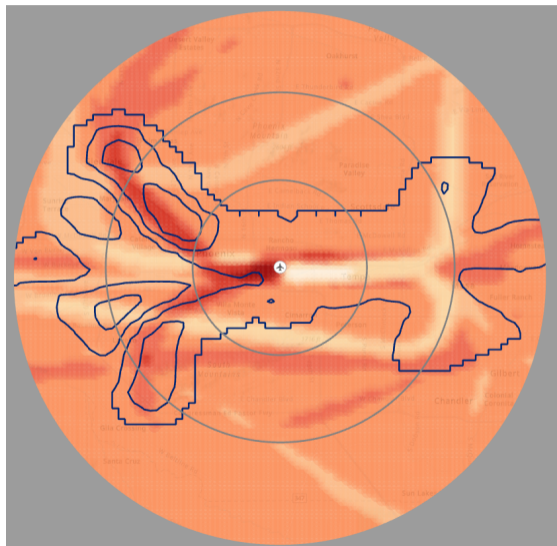
- Wind direction determine the direction of flight paths within a day.
- Spatial information gaps.

Variation in Information



- Wind direction determine the direction of flight paths within a day.
- Spatial information gaps.
- Buyers are likely to visit the house in the day time.

Noise Pollution Change upon NextGen Adoption & Information



- Contours show variation upon NextGen adoption.
- Shade of orange represents level of information (IV).

Results

		Log-Linear	
	(1)	(2)	(3)
Year 1	-3,038	-3,885	-2,371
Year 2	-3,038	-6,157	-3,758
Year 3	-3,038	-7,770	-4,742
IV for price	✓	✓	✓
Info Friction		✓	✓
Information IV			✓
Observations	7,728	7,728	7,728
Count of properties	368,655	368,655	368,655



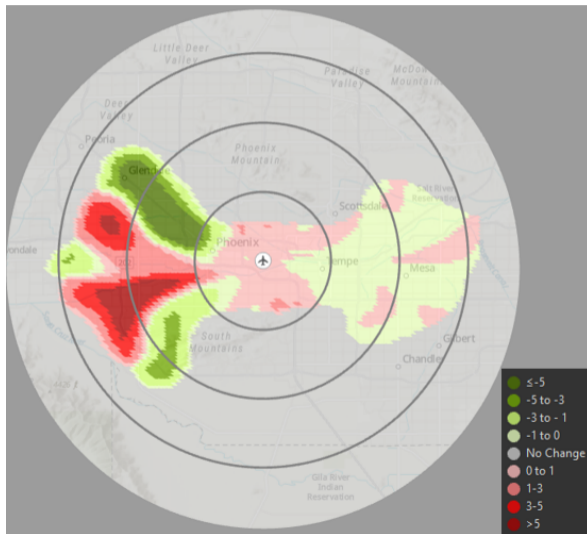
Thank you.

Jasdeep Mandia
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JMandia@asu.edu
www.jasdeepmandia.com

Bibliography

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- J. Chivers and N. E. Flores. Market failure in information: the national flood insurance program. *Land Economics*, 78(4): 515–521, 2002.
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- M. Wiswall and B. Zafar. Human capital investments and expectations about career and family. *Journal of Political Economy*, 129(5):1361–1424, 2021.

Noise Pollution Change: NextGen to Reversal ◀



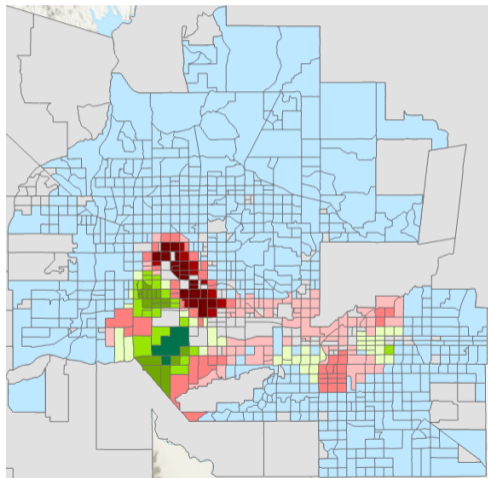
Mean Capitalization Effect by the Direction of Noise Pollution Change

Change	Mean		Capitalization Effect	
	Δ Noise (dB)	Δ % value	Per HH (\$)	Total Annualized (\$ Million)
Conventional to Nextgen				
Decrease	-2.2	2.3%	4,884	7.1
Increase	1.5	-1.5%	-3,259	-13.3
Total	0.5	-0.5%	-1,118	-6.2

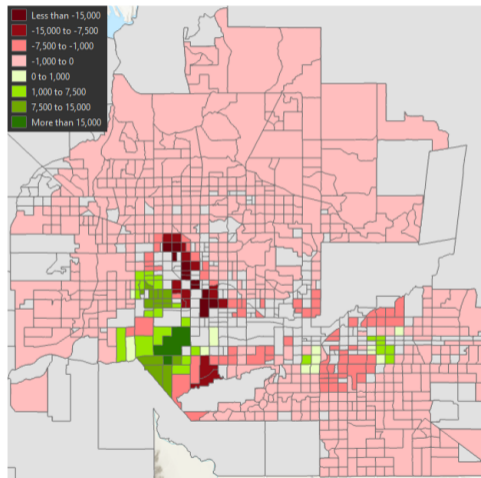
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Nextgen to Reversal				
Decrease	-1.7	1.0%	1,931	5.9
Increase	1.6	-1.0%	-2,129	-5.2
Total	-0.2	0.1%	121	0.7

NextGen Adoption: Price Change ◀

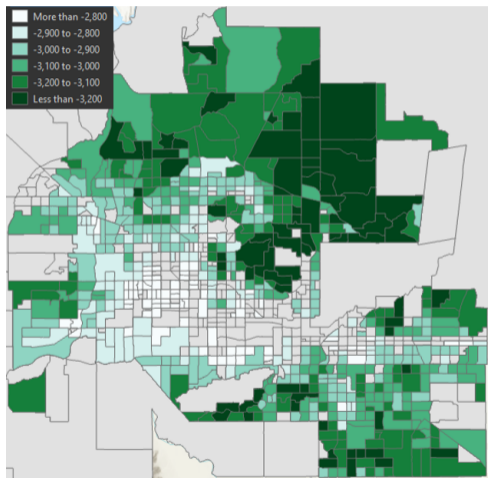


(a) Noise Pollution Change (dB)

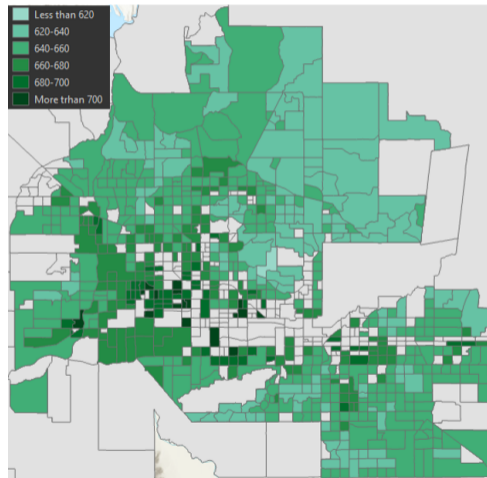


(b) Price Change (\$)

NextGen Adoption: Mean Welfare Change



(c) Mean MWTP



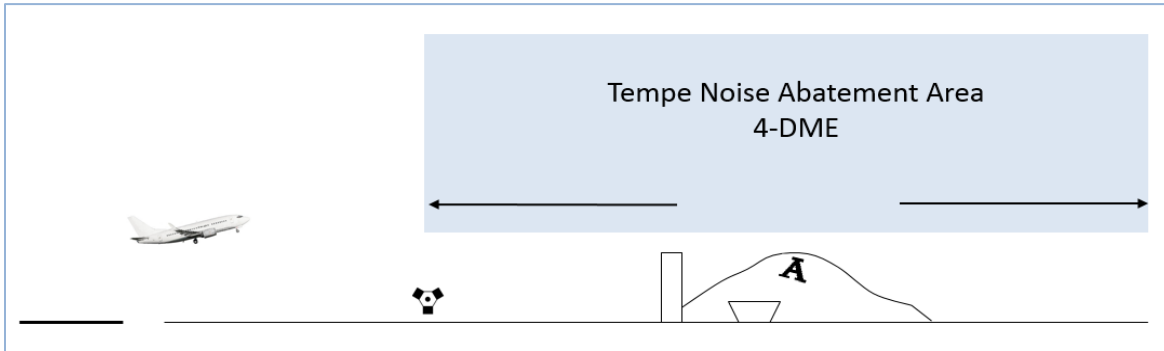
(d) Mean Welfare Change (GE)

PHX East Compliance Report Q1, 2024

Introduction

The City of Tempe is located directly east of Phoenix Sky Harbor International Airport (PHX) which is owned and operated by the City of Phoenix.

This report gives an account of how well PHX operations comply with noise mitigation flight procedures over the City of Tempe. The flight procedures are memorialized in an intergovernmental agreement between the two cities, and the Tempe Aviation Commission (TAVCO) is tracking the implementation of the agreement in quarterly reports followed by an annual summary.



The Tempe and Phoenix Intergovernmental Agreement (IGA) from 1994, requires jet and large turboprop aircraft to stay on headings east within the Salt River (Rio Salado) riverbed and Tempe Town Lake to 4DME (Distance Measuring Equipment) before diverging to intercept PHX departure routes. FAA does not require large turboprop to fly the headings to 4-DME. 4-DME east is located at the SR-202 and SR-101 intersection.

Because most of the airlines when departing PHX use area navigation (RNAV), the lateral accuracy required for airlines following departure procedures in the airport terminal area is 1 nautical mile, (RNP1), or three tenths of a nautical mile, (RNP0.3), if the airline has special FAA [approval](#). An RNP of 0.3 means the aircraft navigation system must be able to calculate its position within a circle around a waypoint which has a radius of three tenths of a nautical mile.

Because PHX Standard Instrument Departure (SID) Procedures to the east include procedures that direct departures to a waypoint, (navigation fix), at 4DME, and a few RNAVs SID and classic SIDs that do not, airline compliance is separated in three categories in this report. 2.5% lacked departure route ID.

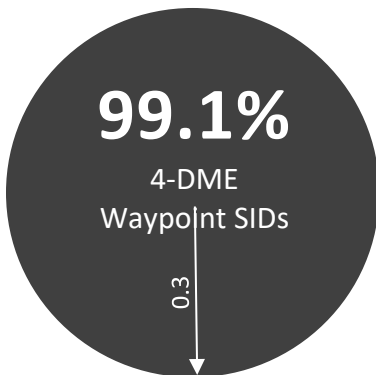


Figure 1: Departure compliance for jets using RNAV SIDs, (7), with a fly-over waypoint at 4-DME

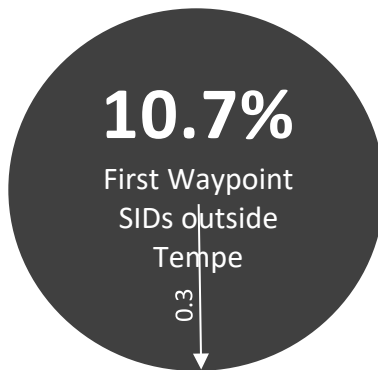


Figure 2: Departure compliance for jets using RNAV SIDs with a first waypoint after 4-DME

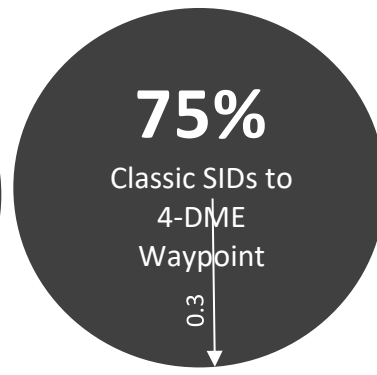


Figure 3: Departure compliance for jets using procedures with headings the runways

During the first quarter the airlines flying RNAV SIDs with a first waypoint after 4-DME followed two procedures with a sharp turn south after 4-DME, which caused a majority to stay outside the area of 3/10 NM around the waypoint.

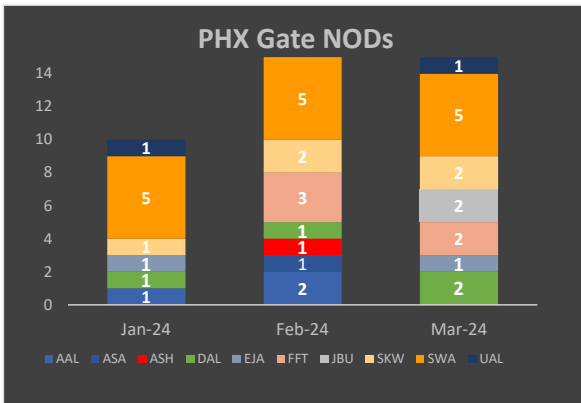


Figure 4: City of Phoenix violation notices to selected airlines.

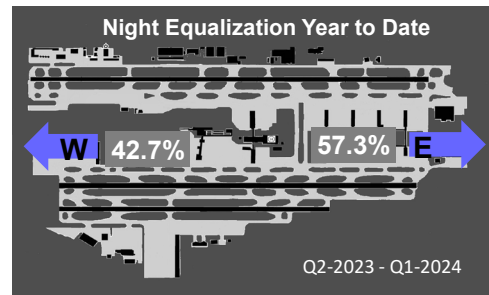
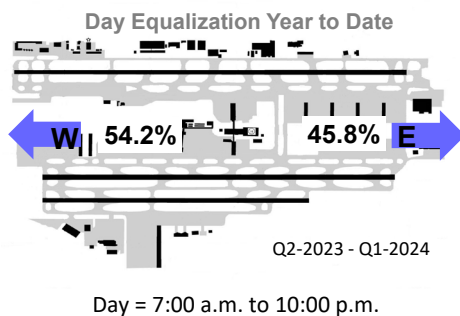
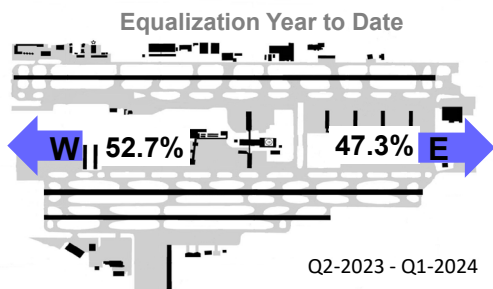
Airlines with jet departures to the east that fail to pass through the PHX Gate receives e-mail Notices of Deviations (NODs) from the City of Phoenix.

The gate is set up in the PHX Airport Noise & Operations Monitoring System (ANOMS) at 4-DME just west of the SR-202 and SR-101 interchange. It is 5,500 feet wide and runs parallel to the SR-101. PHX Gate compliance is published Noise Reports, see [Updates & Reports | Phoenix Sky Harbor International](#).



Figure 5: PHX 4-DME Departure Compliance Gate

Departure Equalization



The IGA calls for an even split of the noise burden from departing jet and large turboprop aircraft east and west of PHX parallel runways during daytime and nighttime hours. The FAA is expected to compensate for periodic changes in flight patterns as weather and air traffic allows to accomplish equalization over a twelve-month period.

Figures 6, 7 & 8: East and west departure flows by jets and large turboprop aircraft over the last twelve months.

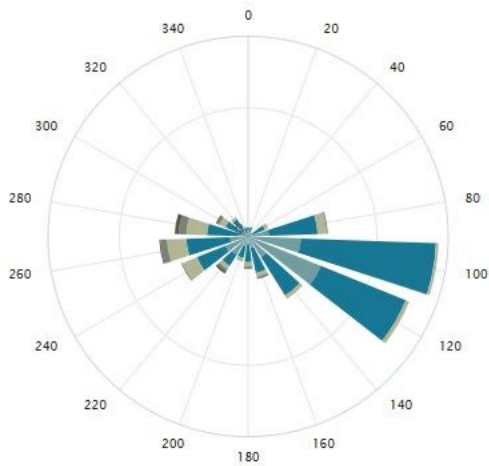


Figure 9: Wind directions.

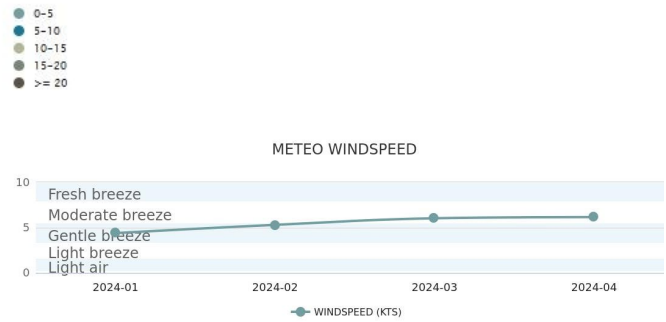
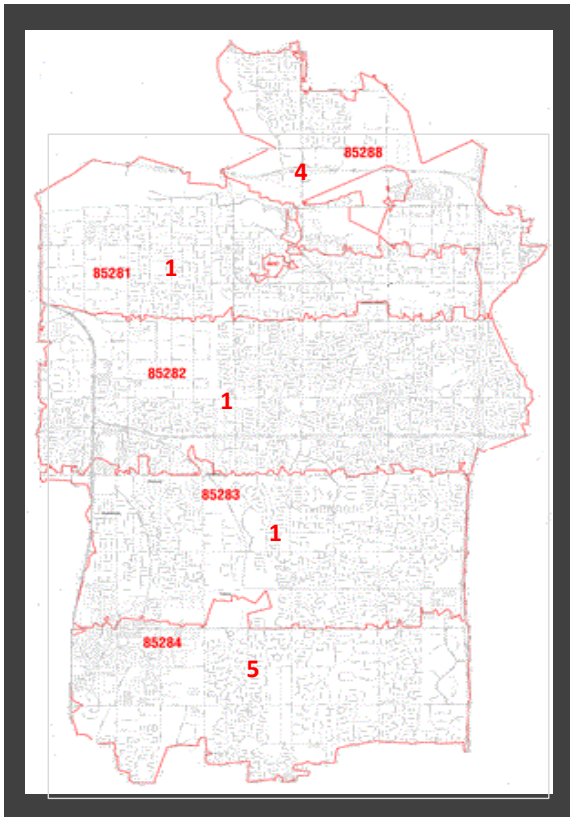


Figure 10: Wind speeds (knots).

The average wind speeds during the quarter was 3.5 knots. The majority of the higher wind speeds came from the west.

 **Tempe Citizens' Noise Complaints**



Complaints are recorded as the number of phone calls, voicemails, and electronic messages received from residents calling in or using the Tempe 311 web complaint option.

Figure 11: Complaints per postal code area

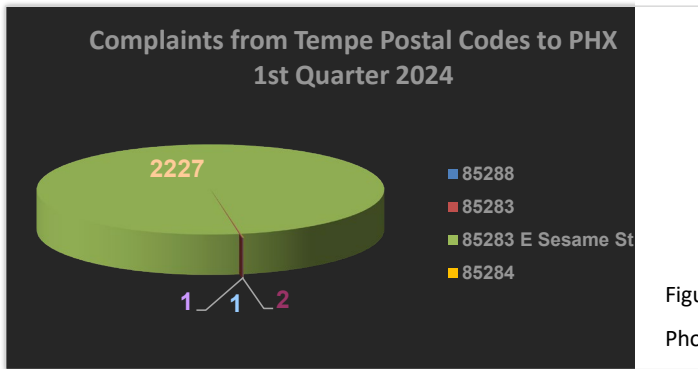


Figure 12: Aircraft noise complaints received by the City of Phoenix from Tempe addresses during the quarter.

It has not been possible in this report to establish a clear correlation between the large volumes of complaints submitted to Phoenix from one home addresses and the total volume of airlines being routed over the resident's home.

North Tempe Noise Exposure

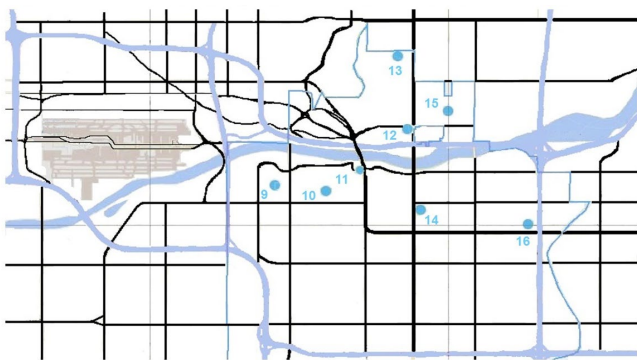


Figure 13: PHX ANOMS fixed noise monitors located in Tempe

Aircraft sound exposure are registered by twenty fixed PHX ANOMS noise monitors of which eight are located in North Tempe.

Average equivalent sound level (Ldn) or Day Night Level (DNL) is the metrics used to determine exposure over time and is calculated over a 24-hour period with a penalty of 10dB added for sound events occurring between 10:00 p.m. and 7:00 a.m. The PHX ANOMS provider Casper uses European metrics, Lden, which separate day, evening and night, where evenings are given a separate 5dB penalty.

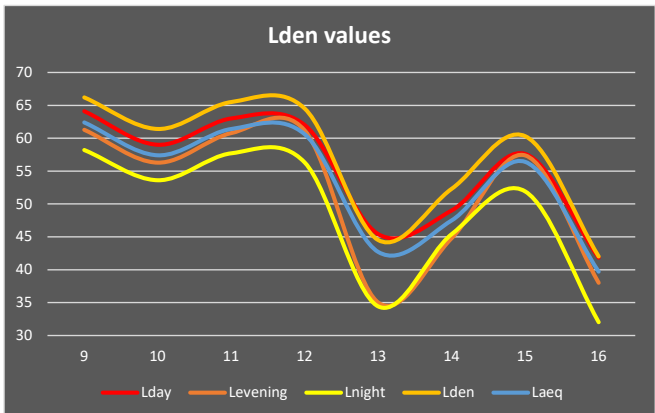


Figure 17: Lden values separated out for time of day and the equivalent average 24-hour dB A level

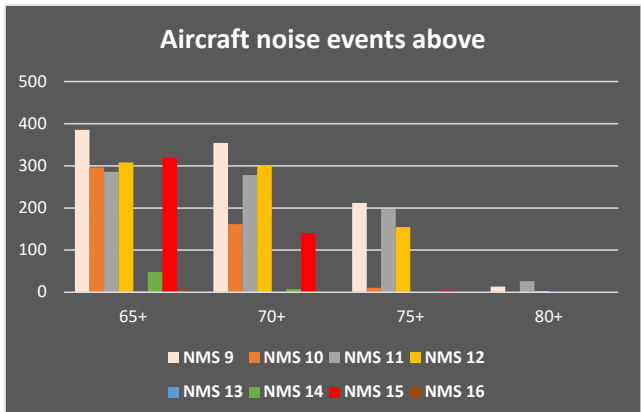


Figure `8: Number of events attributed to aircraft.