

# Why the Phoenix Sky Harbor flight-path noise may drive you crazy

*Low-frequency sound, biological reactions may drive frustration over airplane noise.*

Caitlin McGlade, The Republic | azcentral.com | August 29, 2015

It has been almost a year since the Federal Aviation Administration began directing concentrated air traffic over Megan Comstock's neighborhood, Phoenix's Woodland Historic District.

But the air traffic still disrupts her sleeping patterns, hampers front porch conversations and drives her to call the city to log complaints.

The FAA altered flight routes last September as part of a nationwide program aimed at boosting safety and reducing emissions.<sup>1</sup> The biggest change, and the one that has drawn the most ire, directs westbound planes leaving Phoenix over historic downtown neighborhoods including F.Q. Story, Willo and Roosevelt.

This surprised residents and ignited a fury that has sent politicians from City Council to Congress on a quest to quell the noise.

Residents of about 500 households in ZIP codes including those areas filed more than 6,300 complaints from September through May.

Phoenix leaders took to the courts. The city has spent at least \$295,000 already on a legal battle to argue that the FAA wrongfully changed flight routes, aiming to push the FAA to conduct an environmental assessment with public input about the changes. The city argues that the FAA failed to properly assess the effects of the changes before launching them.

Several of the historic neighborhoods, too, have filed their own petition to recall the FAA's decision, hiring former Arizona Attorney General Terry Goddard to lead their charge.

Residents have compared the rumblings overhead to getting bombed, saying that the clamor interrupts conversations and keeps them awake at night.

But a city-commissioned noise monitoring study, and testing completed by The Arizona Republic, shows noise in tested neighborhoods seldom registered loud enough to technically interfere with conversation on an industry-standard decibel scale.

Some sites experienced air traffic loud enough to interfere with telephone conversations, including one spot just north of the state Capitol.

The site with the loudest air traffic on average has always been beneath the flight path, Grant Park, a neighborhood where residents say they have resigned themselves to living with the constant roar of airplanes.

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<sup>1</sup> **aiR NOTE:** No, this change did nothing to improve safety, and the emissions reductions are insignificant. The **REAL REASON** for these NextGen RNAV routes is to improve airline profits. If FAA wanted to reduce airline emissions, they would tax air travel in proportion to total miles traveled, thus creating a strong disincentive to dogleg routes via major hubs such as Phoenix (KPHX).

Slightly to the west of Interstate 17, between Buckeye and Broadway roads, residents who previously experienced heavy air traffic are experiencing less because of the change.

No residents in the 85009 ZIP code, which covers much of that area, complained to the city in four years prior to the flight route changes.

What may be stirring widespread frustration about the noise is the grating nature of low-frequency sounds to some, and the inherent biological and psychological impact of new and unpredictable noises.

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## The unpredictable

### *How unexpected noises affect our brains*

Jennifer Longdon can hear a constant whoosh from her porch: Her house in the F.Q. Story neighborhood is about a block from Interstate 10, near the freeway's 19th and Grand avenues exit.

She compared the sound of passing vehicles to a rushing river. It's a sound she has come to expect as the natural ambient noise of her block, she said.

As for the airplanes that have made their own highway over her house for nearly a year?

"We still notice every single, freaking plane," she said.

During a two-hour span on a Friday afternoon in June, The Republic observed more than 30 airplanes pass overhead. At times, they flew over every few minutes. At other times, once about every 10 minutes or more.

Their volumes varied. Some planes didn't create any more noise than a conversation would, at about 60 decibels, while others rose into the 70s. That's still below the level that interferes with conversation, which is 80 decibels, but above the level that can interfere with a phone conversation, according to the National Institutes of Health.

Unpredictability of the noise may be one of the most frustrating components of the sound.

Our brains are hardwired to pay attention to new, irregular noises because those sounds signify something in our environment is changing, said Andrew Lotto, an associate professor in speech, language and hearing sciences at the University of Arizona.

This was crucial for the survival of our ancestors — an unexpected noise could mean a lion was lurking in the bushes.

Because we are so attuned to this, the interruption of unpredictable noises makes it difficult for our brains to wholly focus on other tasks.

And if our brains have associated that particular interruption with an emotion, such as anger over new, unexpected airplane noise, it becomes even more difficult.

"You have less resources for other tasks, such as having a conversation," Lotto said.

When we link an emotion with a sound, we exercise cognitive functions that would otherwise not kick in when that sound occurred. That can make the sound more noticeable, Lotto said.

Think about being at a concert. When the band is playing songs you don't know, the songs often blend together and become like background sound.

But when the band plays a song you know, you can hear the song more clearly. That's because you're using other parts of your brain to process the sound. Your brain is now connecting your experiences with that sound to the sound itself, and allowing you to process those experiences in the moment.

In addition, Lotto said, we are more likely to hear noises if we are actively listening to them, and have preconceived notions about them.

That could help explain why the entire Valley has lit up with complaints even though airport staff have said they don't think the changes have increased noise Valley-wide and the FAA says the new flight path has a smaller noise footprint than the former.

Phoenix Assistant Aviation Director Deborah Ostreicher said residents are now complaining from places that have experienced no material changes. She said some of the influx of complaints Valley-wide could be driven by a heightened awareness about aircraft noise since the change.



*Sky Harbor flight path draws complaints from Phoenix neighborhoods*

**“An airplane that goes overhead, if it has no emotional value, it can just flit through your neurological system,”** Lotto said. “If someone already has decided they're upset about airplane sounds, if it keeps happening, they're going to build up their emotional response.”

About 1,380 households logged 13,388 complaints about airplane noise from September through May, the most recent month for which The Republic has complaint data.

The year before the flight paths were changed, 52 households complained 469 times.

Some households complain more than others. In the 85258 ZIP code, where Salt River Fields is located, 11 households complained 1,636 times after the changes. In the Carefree-area ZIP Code 85266, three households complained 812 times.

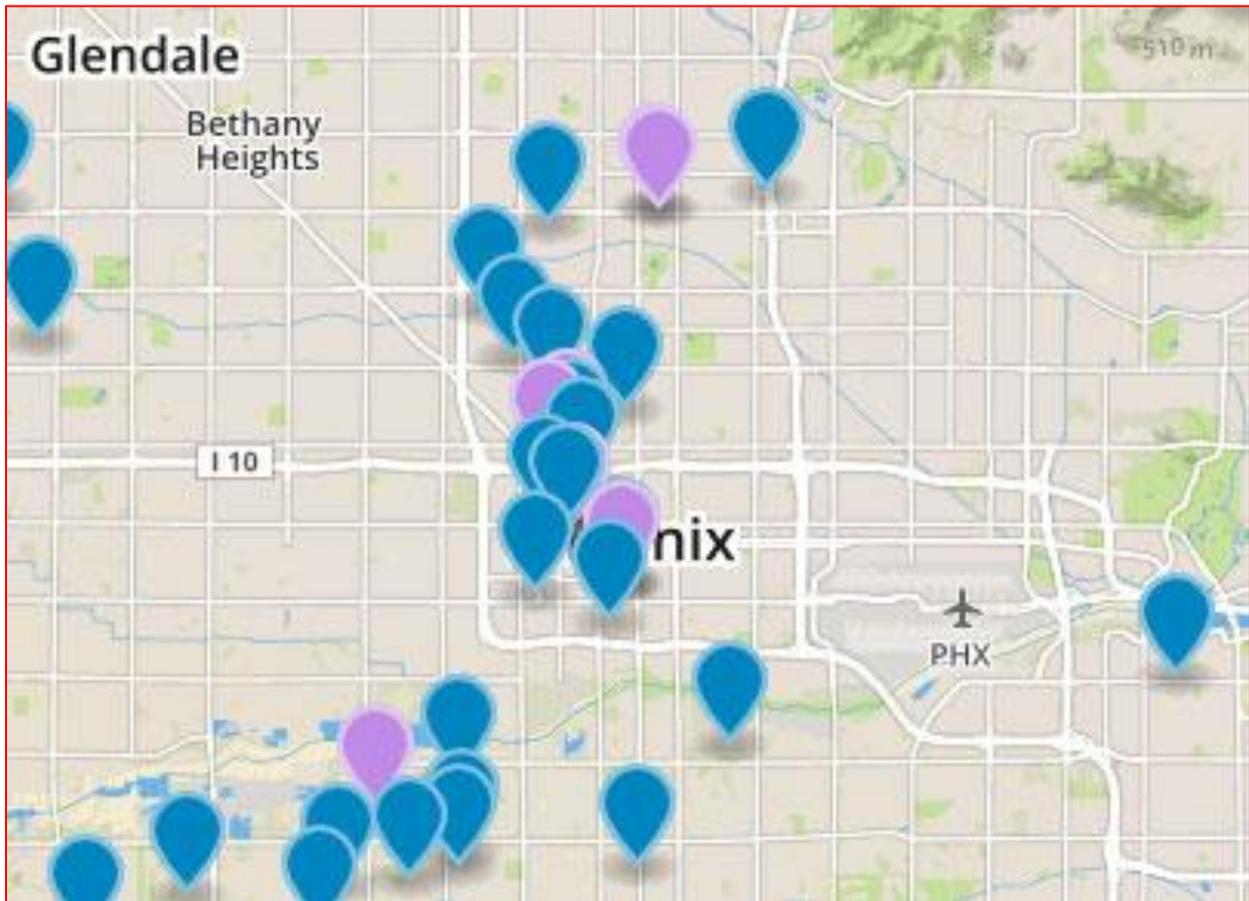
Noise monitoring near that area showed aircraft noise, on average, peaked at 62.6 decibels, which is on par with normal conversation.

“Perception is reality,” said Rob Adams, principal with Landrum and Brown, the firm that conducted the city’s noise-monitoring study. “I’m not going to tell them that they’re wrong.”

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*How often do planes fly over your neighborhood? And how loud are they?*

Click on a point on the map below to find out. Each point represents a spot that either the city of Phoenix monitored (blue) or The Arizona Republic monitored (purple), following thousands of complaints that flight-track changes from Phoenix Sky Harbor International Airport have created disruptive, unbearable noise.



The city paid \$56,930 to have consulting firm Landrum and Brown conduct the testing at 37 sites from Feb. 3 through Feb. 11. Four sites were monitored for multiple days, while most others were studied for a couple of hours.

The Landrum and Brown study noted that at some of the sites, aircraft noise came from other local airports and not just Sky Harbor. Some aircraft noise was also attributed to helicopters.

The firm measured aircraft noise in decibels (dB) and on an industry-standard A-weighted scale.

Using that scale, The Republic also took decibel readings at households beneath the flight path at random times, both inside and outside at most places. We charted maximum decibel level and how often our decibel meter recorded at 65 dB or louder. The National Institutes for Health deems 70 dB intrusive and able to interfere with telephone conversation.

Points on the map indicating Republic sites are approximate locations. Each site has two points.

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## The low-frequency rumble

### *Noise levels don't tell the whole story*

Comstock's neighborhood, Woodland, carried the record for the single, loudest decibel generated by airplane noise across all of the city's noise monitoring spots, at 84.4. But that was not the norm for her area or others.

The average of peak noise levels hit by each airplane in Woodland was 63.7, according to city readings.

Inside Comstock's home, the noise level seldom rose above levels equivalent to a quiet office, according to The Republic's meter.

That doesn't capture the whole picture, though.

"There is a disconnect between what you can physically measure and what you psychologically experience," said William Yost, a research professor and former chair of speech and hearing science at Arizona State University.

Part of the issue is low-frequency sound, which experts say can be the most irritating, but contributes less to the overall loudness of a noise than higher pitches on the industry-standard decibel scale used by the FAA to assess noise impacts.

That's because the scale was designed to meter sounds that affect human communication. The filter is necessary to block out irrelevant sounds that the human ear does not observe, such as the hum of fluorescent lighting, Yost said.

Low-frequency levels are what rattles Comstock's windows but slips by the decibel meter like a whisper.

Think about the times when you're stopped at a light and the car next to you is blaring music with its windows up. You hear the bass notes, and see and hear the entire car rattling — maybe you even feel your windows rattling.

That's because sound is air movement. The lower the frequency, the more air gets moved.

Single-paned windows will flex under that air pressure and act like an amplifier, said Rod Warembourg, Arizona regional manager with MSR West, a firm that offers technical support for hearing-testing equipment.

Call it the annoyance factor — it might not get loud enough on a standard decibel scale to signal red flags or overshadow conversation but it might get on your nerves so much that you can't carry on a conversation when it passes through.

The FAA is considering ways in which it can better assess annoyance when it determines potential noise impact, including looking into ways to address low-frequency sounds. The agency said it is also questioning whether its current calculation for noise impact assessment should be altered.

The calculation averages airplane noise over a 24-hour period, with more weight given to nighttime noise.

A change is considered to have a significant noise impact and requires further environmental review if it would increase noise by at least 1.5 decibels in an area that already experiences 65 dB using that calculation.

The FAA determined that Sky Harbor changes would not have significant impact.

Adams said that day/night-level calculation is good at telling how people would react to airplane noise if they've lived under the flight routes for 10 to 15 years.

“But it is not good at telling us how people are going to react to new noise,” he said.

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## Getting used to the clamor

*'This is the way of life that we got used to'*

Mary Chou-Thompson and her husband moved into their home in the Grant Park neighborhood four years ago. They knew their house was beneath the flight path before the move, but were surprised by how loud and frequent sounds occurred once they settled in.

Their house shook under the low-frequency waves.

They were, at first, annoyed. But after time — and with the help of a box fan at night for some white noise — the two barely notice the airplane rumblings overhead anymore. It's part of living in a city with a convenient, international airport, she said.

Chou-Thompson's neighborhood is still under the flight path even after the changes, and would be if the path were changed back. The city's noise monitoring observed the loudest average sound level from airplanes over her area compared with all other readings around the Valley.

On average, airplane noise in Chou-Thompson's neighborhood spiked at 74.7 decibels. Airplanes came an average of every 3 minutes and 25 seconds during a 75-minute period, and the loudest one registered 80.1 decibels.

By comparison, a site in F.Q. Story recorded 29 planes during 2 hours, flying over at an average of every 3 minutes and 15 seconds. The average aircraft rumble peaked at 67.2, while the loudest one hit 76.7 dB, but it was a helicopter.

Chou-Thompson said she understood the plight of Willo, F.Q. Story and other neighborhoods because residents there hadn't purchased their homes expecting the aircraft sounds. But she also said "it seems a little sad watching this whole thing unfold," since her neighbors have lived for decades with the noise.

Connie Gandarilla, the secretary of the Grant Park Neighborhood Fight Back Association, and Vangie Muller, the president, grew up in that neighborhood and dealt with increased noise overhead as the airport grew.

They pause phone conversations during flyovers. The pastor across the street stops preaching when planes pass. Outdoor Easter service has been barely audible, they said.

They learned to live with that after the neighborhood made frequent complaints about a decade ago and the city told them it could not fight the FAA.

"After a while, you just learn to stop what you're doing and let the plane go by," Muller said. "This is the way of life that we got used to."

Some residents in another neighborhood that formerly experienced concentrated air traffic hardly noticed it.

Prior to the recent change, the area between 51st and 75th avenues, Van Buren Street and Camelback Road experienced air traffic comparable with F.Q. Story, according to the FAA.

Just four households in that west Phoenix area's ZIP codes complained over four years.

But planes flew at higher altitudes there, and were spread out over a larger area, so it was likely not as loud as the air traffic over F.Q. Story, Adams said.

Jose Gutierrez, a 35-year-old resident of west Phoenix, said he notices fewer airplanes over his neighborhood than last year. But the constant airplane sound never bothered him, he said.



*Phoenix is suing the FAA for changing flight routes at Phoenix Sky Harbor International Airport, saying that the administration unfairly launched them without a public process or proper review of potential impacts. (Photo: Michael Chow/The Republic)*

Patricia Robertson, who lives near 56th Avenue and Monte Vista Road, enjoyed seeing and hearing the airplanes every day. She’s never flown, she said.

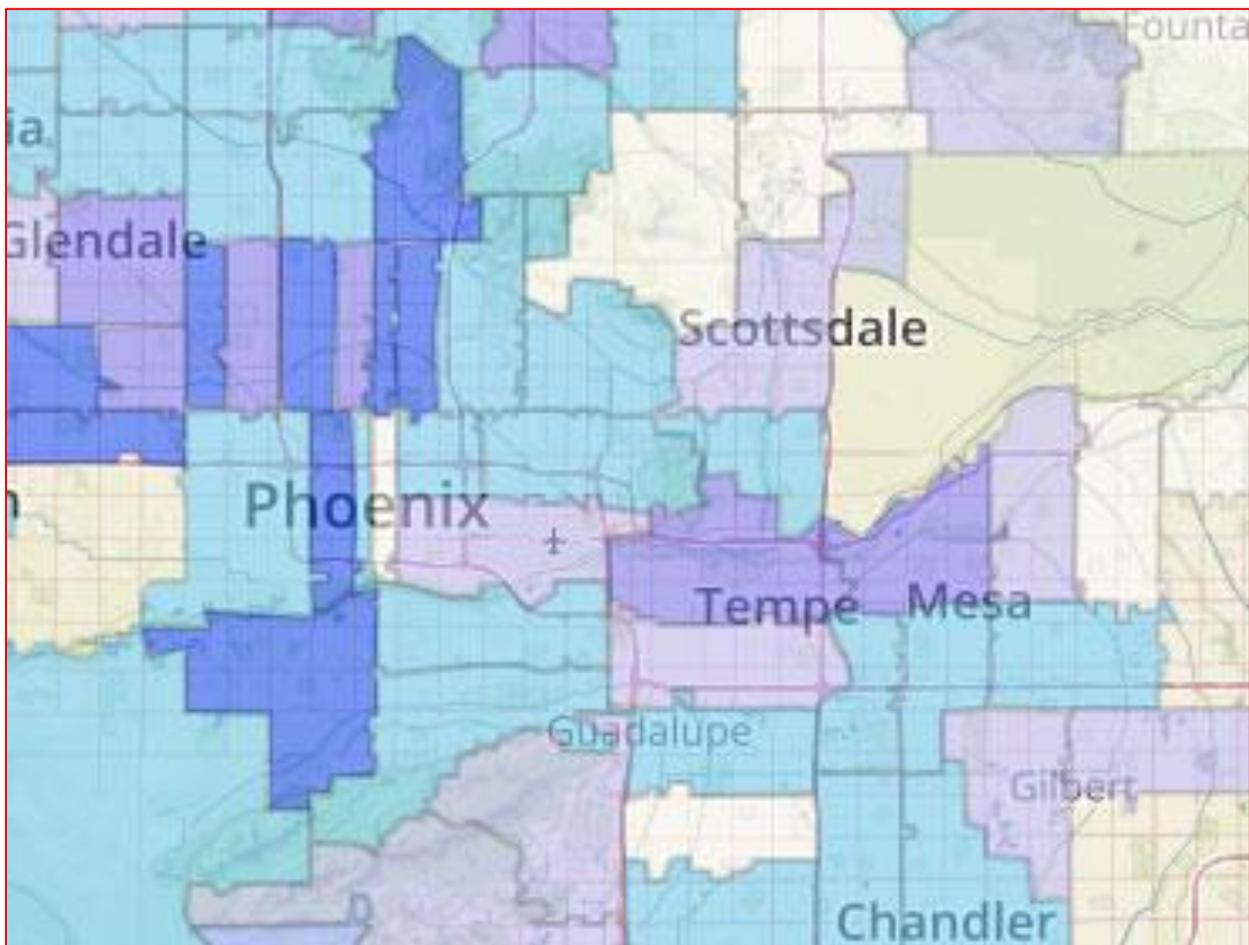
The 67-year-old rolled her eyes about the reaction to the new flight path.

“They just need something to bitch about,” Robertson said. “Put the airplanes back over here.”

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### *Airplane noise complaint map*

Flight path changes launched last September from Phoenix Sky Harbor International Airport ignited a fury that has driven the city to sue the Federal Aviation Administration and hire new employees to deal with the fallout.



Source: City of Phoenix

Hover your mouse over the icon at the top-right corner of the map to toggle between airplane noise complaints the city collected four years prior to the change, and how many it saw in less than one year after the change. Hover over the ZIP codes to see how many households have filed complaints, and how many they filed.

You'll see that complaints have lit up across the Valley and that many households complain frequently. About 1,382 households have logged 13,388 complaints from September through May, the most recent month for which The Republic has complaint data.

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## Legal battle

### *City fights FAA over flight paths*

If Muller lived less than a mile closer to the airport, she would have been eligible to move on the city's dime through a program that has relocated more than 1,000 families under the airport's noise wake.

Instead, she had her windows soundproofed and lived with increasing noise after her noise complaints gave her no respite.

Muller and Gandarilla said they've walked out of meetings about the flight path change because they are insulted by other neighborhoods' outrage, and the attention they've gotten.

They said the recent action related to the flight path change makes them feel their neighborhood's voice was not as important. It's a poor-vs.-rich issue, they said, pointing out that the neighborhoods underneath the new flight path have historically had more influence and wealth than theirs.

Ostreicher rejected that notion. She said the city is fighting the FAA now because it changed flight paths without public input and without participation from city leaders.

The city has helped move people in the airport's wake, soundproof homes and assure that no new homes would have to endure airport noise, she said.

The FAA's move cancels out some of that work, because some families who moved away from the old flight path through that program are now living under the new one, Ostreicher said.

Some neighborhoods have asked the city to take action for years against airplane noise, she said. But there was never a new FAA action, such as a unilateral flight path change, that the city felt was unlawful and could challenge, she said.

The goal is to go back to the drawing board and create flight routes with public input before the FAA rolls out its plans to streamline air traffic routes between destination cities nationwide, Ostreicher said.

F.Q. Story resident Longdon said she and her neighbors want to solve the noise problem in a way that improves conditions for everyone. She said they've talked about sharing the sound burden, posing the possibility of alternating days of concentrated air traffic with other communities.

"There are elected officials who live in my neighborhood, there are journalists who live here. Folks who have the cellphone number of the mayor and members of the City Council," she said. "One of the things I'm really proud of is that we've made a point of not trying to solve our noise

abatement issue on the backs of our neighbors, in communities that may not have the same level of influence.”

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## How we did it

### *Measuring noise levels*

The Republic purchased a decibel meter to measure noise levels experienced by neighborhoods under the new flight path. The meter measures sound within 1.4 dB of accuracy and meets standards required by agencies such as the Occupational Safety and Health Administration.

The Republic measured sound on the A-weighted decibel scale at five houses within ZIP codes with high complaint volumes: 85007, 85003 and 85041. For comparison, we also measured sound at a house in north-central Phoenix that is not under the new flight path.

We took multiple recordings at each site at random times, some indoors and some outdoors, by placing the meter in a secure spot for up to nine hours at a time. When analyzing the recordings, we eliminated the first five minutes of each take to account for any sounds generated by the start-up process or conversation with the homeowner.

The meter was regularly calibrated.

At one location in F.Q. Story, we sat with the meter and noted each time a plane flew overhead for a two-hour period.

We left the decibel meter to record on its own for other instances. While we noticed regular sound-level spikes throughout recording times, we cannot peg those sound events specifically to airplanes. What we can gauge, however, is how loud the homeowner’s surroundings are and how often the noise climbs above normal conversational levels, about 60 dB.

To determine how frequently homeowners hear the airplanes and how loud those airplanes are, we used data from a noise-level monitoring report commissioned by the city. The study monitored 37 sites and linked sound events to specific aircraft.

The city’s results show dB levels similar to The Republic’s results.

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*Testing completed by The Arizona Republic shows noise in tested neighborhoods seldom registered loud enough to technically interfere with conversation on an industry-standard decibel scale. (Photo: Caitlin McGlade/The Republic)*

# On the beat

## *Meet the reporter*

Caitlin McGlade is a data reporter on the watchdog team. She digs through public records, analyzes massive data sets, builds charts and maps and talks to the experts to get to the bottom of complicated stories that you want to learn about.

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