PHX EAST COMPLAINCE REPORT

First Quarter 2020

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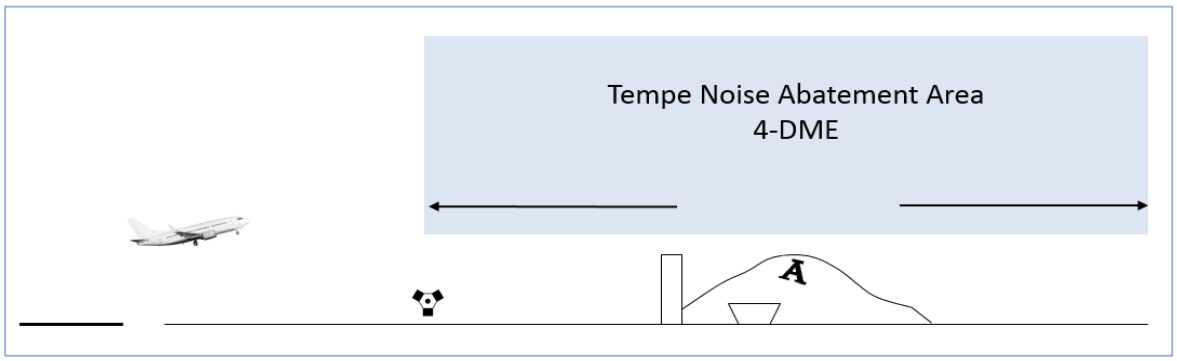
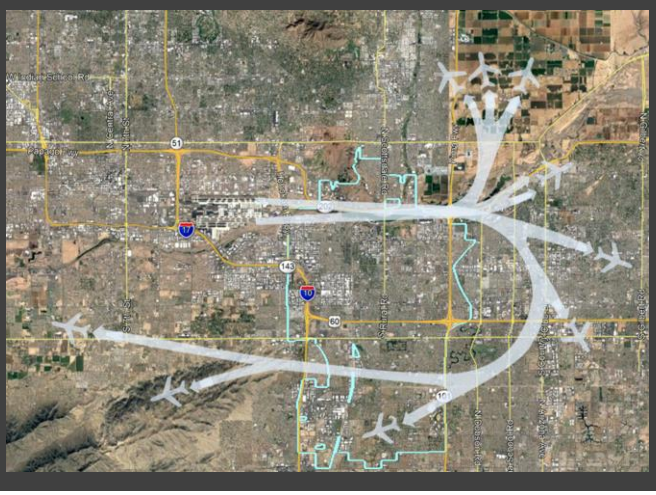


In September 1994 the cities of Tempe and Phoenix entered an Intergovernmental Agreement (IGA) to memorialize noise mitigation flight procedures that for decades had the purpose of keeping Phoenix Sky Harbor International Airport (PHX) aircraft operations over the dry riverbed of the Salt River in north Tempe and away from populated areas on both sides of the riverbed.

The agreement contains three measures to reduce noise from aircraft taking off and landing; (1) the requirement for jet and large turboprop aircraft departures to keep on headings off the runways to a single point at 4NM (Distance Measuring Equipment) before diverging; (2) equalize east and west of the airport the flow of jet and large turboprop aircraft departures night and day; (3) implement a side-step approach procedure to the third/south from the east.

A voluntary side-step procedure was tested in 2001 after the opening of the third runway but it was cancelled in March 2002 because of flight safety concerns raised by air traffic controllers and airline pilots.

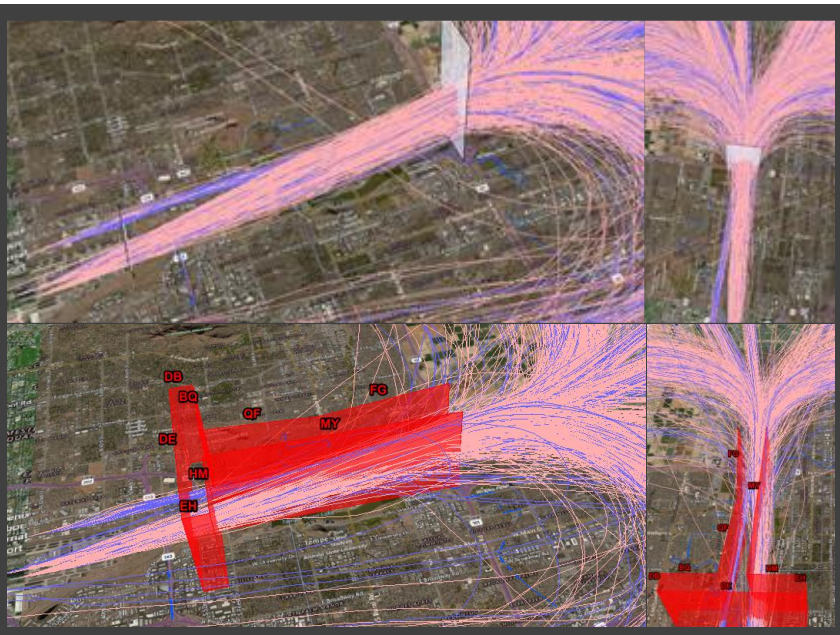


Standard Instrument Departure (SID) routes for PHX towards the east follow paths directly east over the City of Tempe before turns are made towards the route destinations. In September 2014 the FAA expanded the number of departure routes where airlines use satellite-based area navigation (RNAV) SID procedures from seven to nine. A fly-over waypoint at 4 NM DME was included in the east flow RNAV SIDs. The west flow SID versions, not shown here, were revised in 2018 according to a settlement agreement made after the ruling by Court of Appeals DC Circuit in City of Phoenix v. Huerta et al.

The depiction includes published instrument east flow departure routes, not actual paths.

With the 1994 IGA the City of Phoenix agreed to install a Noise and Flight Track Monitoring System for PHX also known as Airport Noise and Operations Management System (ANOMS). After the system was installed and became operational in 1997, the

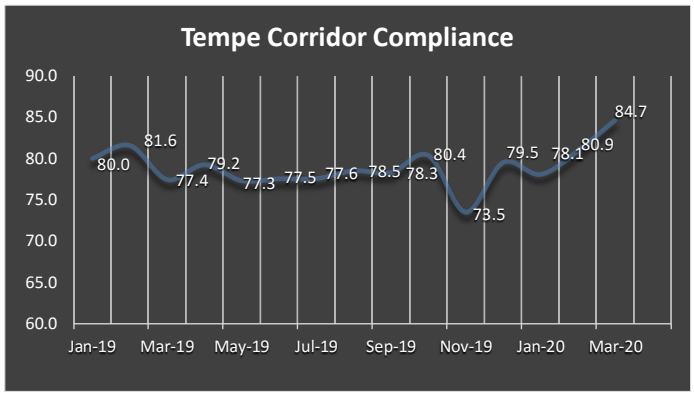
City of Tempe Aviation Commission proposed how the ANOMS could be set up to identify departures that failed stay over the riverbed in Tempe considering drift due to prevailing winds. The City of Phoenix did not find that the proposal was implementable and developed an imaginary "4-DME Gate" in the ANOMS stretching 5,500 feet north to south in the airspace over where the SR-202 and SR-101 Red Mountain exchange is located. Departing jet aircraft need to pass through the gate to stay in compliance. Jet departure times when deviations were impacted by wind, weather or other circumstances outside the pilots control are excluded. The City of Phoenix flagged deviations are notified to the respective airlines. Excluded deviations' share of all east jet departures during the quarter amounted to 0.06% in January, 0.19% in February and 0.54% in March 2020.



The PHX 4-DME Gate or exit window is shown in white.

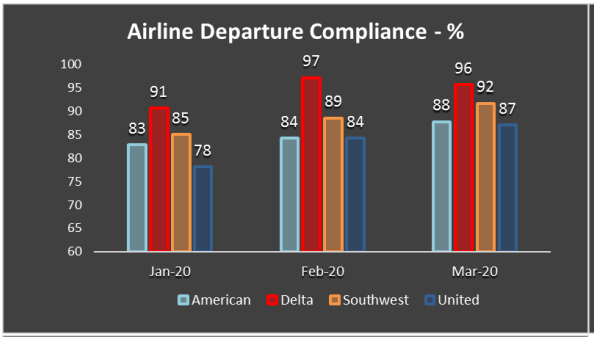
The red gate system or corridor was developed by the Tempe Aviation Commission and accepted by the City of Tempe as the city's preferred measure to identify airlines that fail to stay over the riverbed when departing over north Tempe. The corridor measure is used in this report.

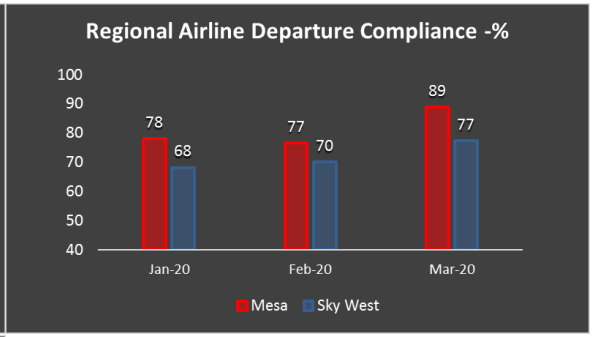
B. Airline Corridor Compliance:

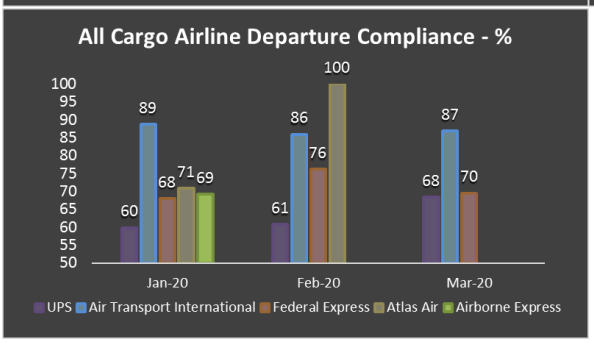


The compliance rate for jet aircraft with the Tempe corridor was 81.2% for the first quarter of 2020.

Large turboprop aircraft are routinely departing on diagonal headings to the northeast and southeast directly after take-off, and included as deviations the overall compliance rate is 80.7%.





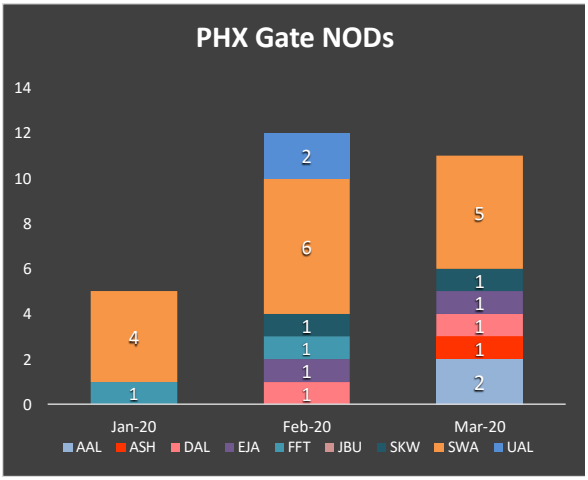


The graphs show corridor compliance rates for some of the larger airlines at PHX.

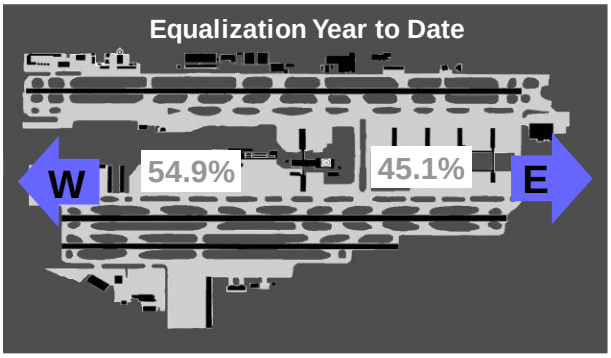
C. Non-compliance Notification:

The IGA with City of Phoenix requires notifying the airlines about aircraft that fail to follow the initial part of the Standard Instrument Departure (SID) routing towards the east, which ends at the SR-202 and SR-101 Red Mountain exchange (4-DME) where Phoenix has set up an imaginary gate to determine which aircraft are compliant and which are not.

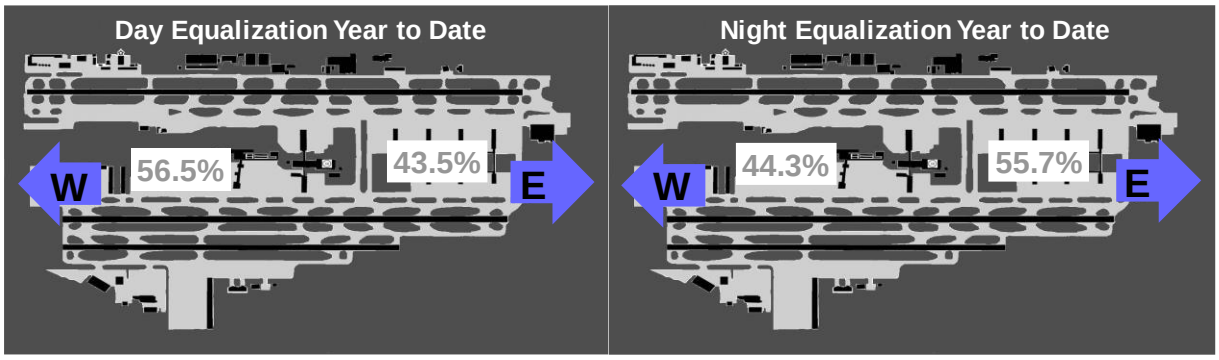
The City of Phoenix flagged twenty-eight non-compliant departures in notices to airlines during the quarter.



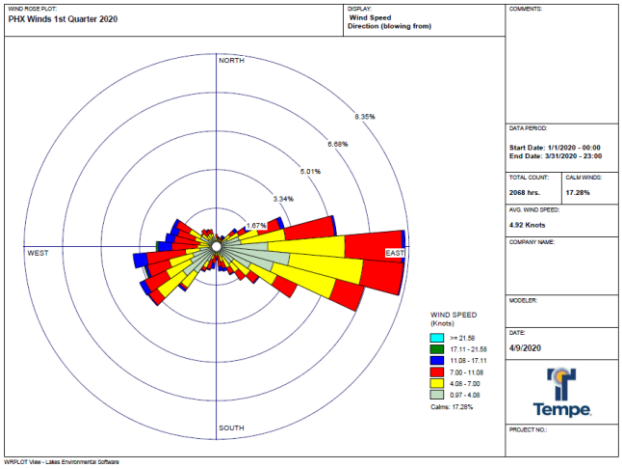
East West Split



The noise mitigation agreement between the City of Tempe and the City of Phoenix calls for equalizing the noise burden from jet and large turboprop aircraft departures east and west during daytime and nighttime hours on an annual basis. The agreement calls for FAA compensation for periodic changes in flight pattern, so equalization is accomplished over a twelve-month period.

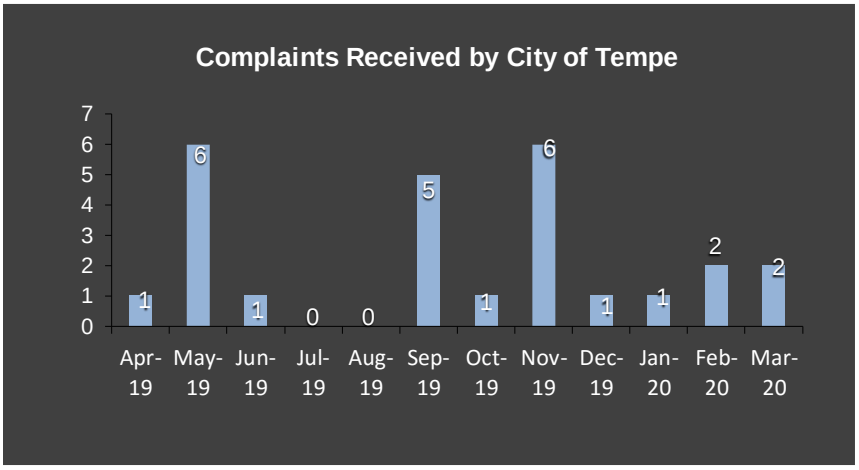


Wind speeds during the quarter were on average was 4.9 knots mainly from the east with most of the highest wind speeds coming in from the west.

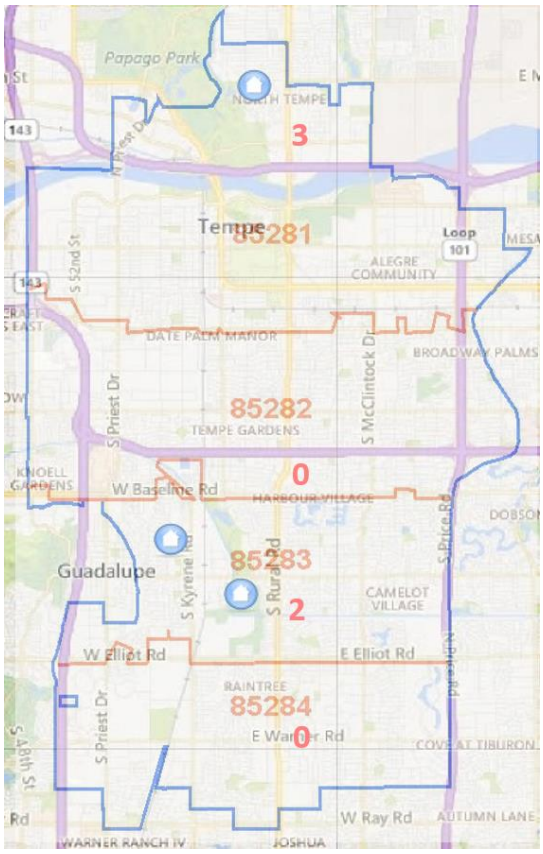


Noise Complaints

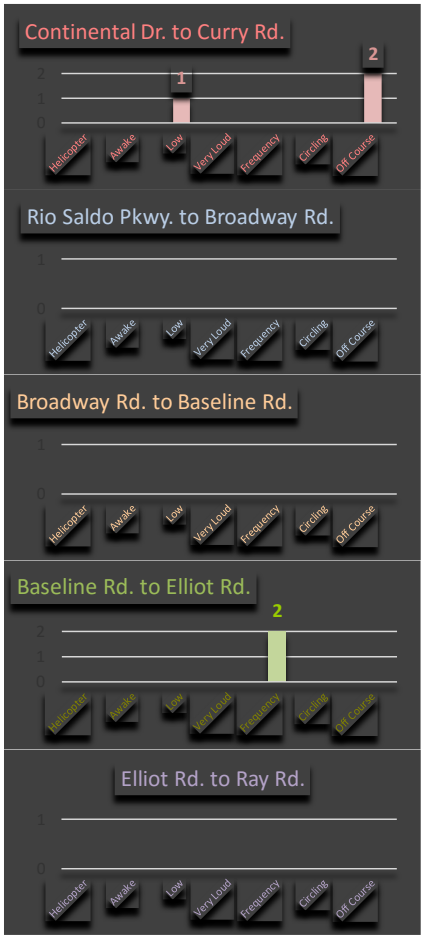
Complaints recorded are the number of phone calls, voice-mails, and electronic messages received from residents calling in or using the Tempe 311 call center electronic complaint options.



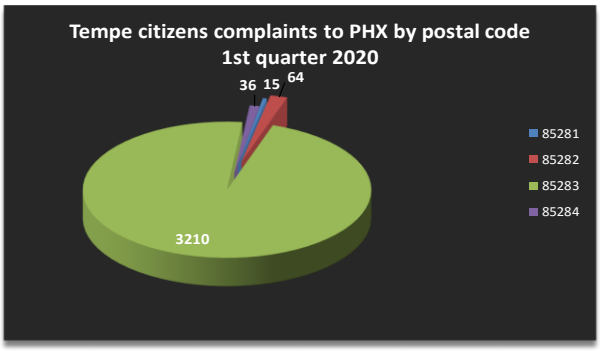
Complaints can be sent electronically through the Tempe web site: A city smart phone app is available for download that includes the reporting of aircraft noise complaints.

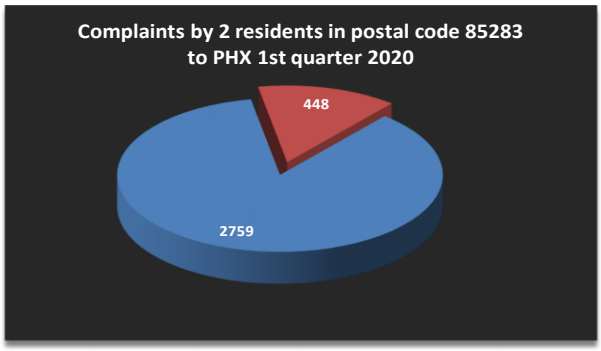


Complaints by location, zip code.



Complaints to the City of Phoenix from Tempe postal codes:

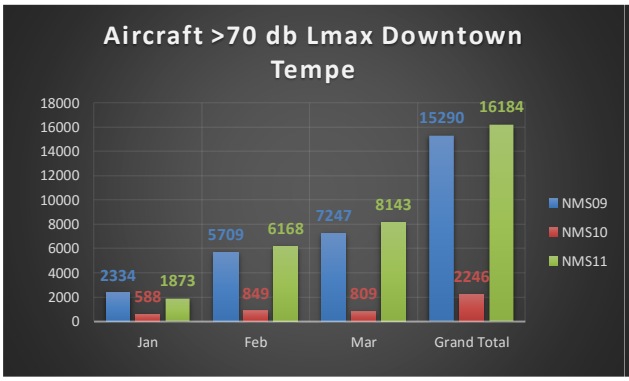


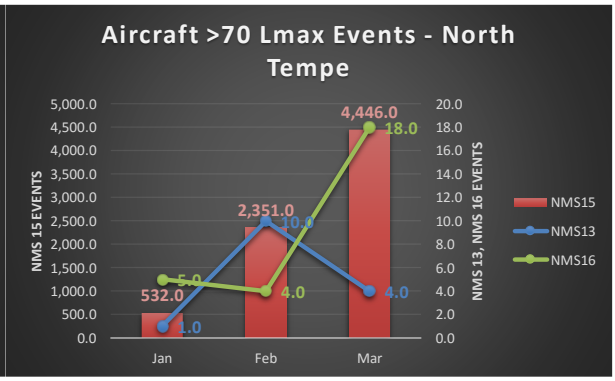


Noise Exposure

D. Maximum Sound Energy Levels:

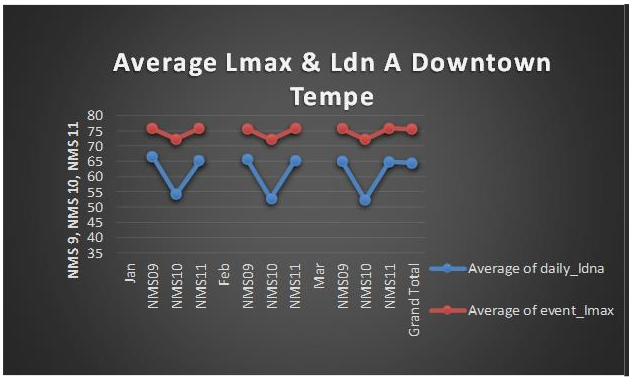
Higher sound energy level events attributed to airline operations varies each month, which influences average sound exposure day and night, called Ldn or DNL. Lmax is the maximum A-weighted sound level, dB (A) squared registered during a sound event. "A-weighted" means the sound is measured at frequencies that reflect the sensitivity ranges of the human ear.

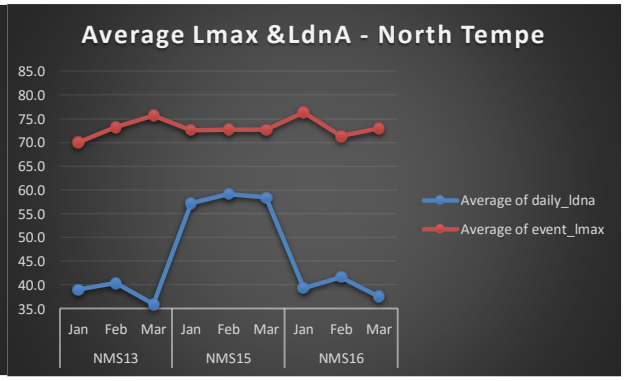




E. Averaged Sound Energy Levels:

Average aircraft sound exposure event levels are calculated from the Ldn or day-night average sound level also called Day Night Level (DNL) that includes a penalty of 10 dB (A) added for sound events occurring between 22.00-07.00 hours.

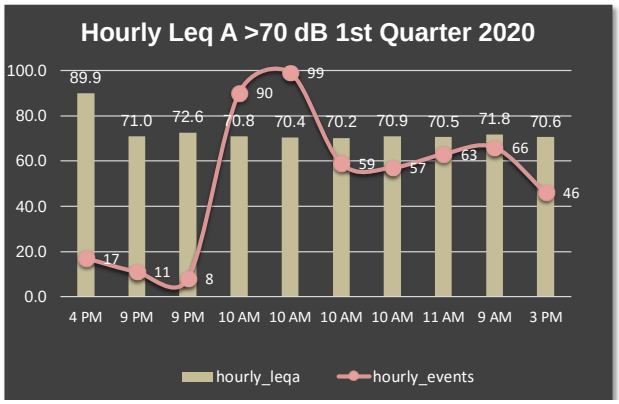




F. Equivalent Sound Energy levels:

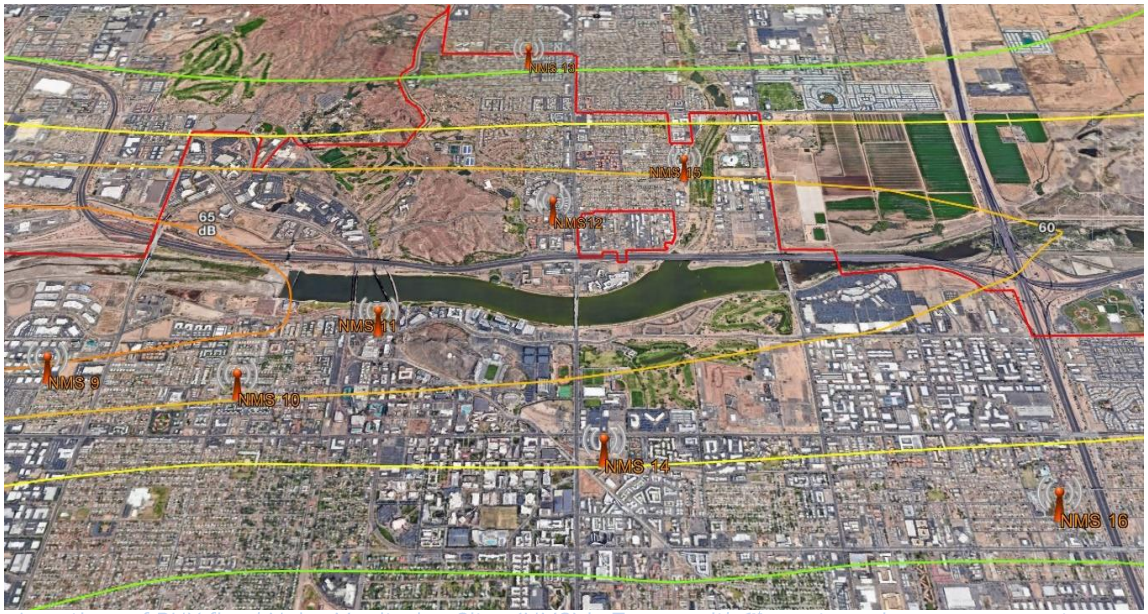
This is a description of noise based on long-term equivalent level (Leq) where the total sound energy measured over a stated period.

The graph shows the hours of the day the Leq (A) events were calculated to be above 70 dB in north Tempe during the quarter and how many of those events occurred during those hours. The events were registered at NMS 9 and NMS 11.



G. Fixed Noise Monitoring Equipment:

The noise monitoring sites for the PHX in Tempe have not changed since the original system was installed, but the system has received various technical upgrades including a transition from phone line to cell phone connection network and equipment upgrades in 2010 and a transition to solar power supply most recently in 2019 and 2020. The system was originally set up with Brüel and Kjær sound monitoring equipment, which has been gradually been replaced with newer Larson Davis 831 C equipment. The ANOMS software has been enhanced with new tools by L3Harris.



Locations of PHX fixed Noise Monitoring Sites (NMS) in Tempe with 1st quarter noise exposure contour lines 65, 60, 55 and 50 db DNL.